SWATANTRA'17

celebrating freedom

Sixth Annual Free Software Conference, Kerala

ICFOSS

International Centre for Free and Open Source Software

Swatantra, Ground Floor, South Pavilion, Sports Hub, Karyavattom

Trivandrum – 695 581, Kerala, India

Contents

Acknowledgement

ICFOSS gratefully acknowledges all individuals and organizations who have supported

“Swatantra 2017”, and the following in particular:

- The Hon. Chief Minister of Kerala for the support & inauguration of the Conference;
- The Secretary to the Government(IT) and the IT Department, Government of Kerala, for their wholehearted support and help in the organization of the Conference;
- Members of the Conference Steering Committee who spent time and effort in organizing the event;
- All the supporting organizations who contributed significantly to the success of the Conference;
- The Free Software Foundation (FSF);
- All Speakers and presenters for their great efforts;
- Members of the Free Software Community for their enthusiastic support;
- Media persons who present for reporting the Conference details;
- Muscot Hotel for their Support as the Conference venue; and
- The ICFOSS team who tirelessly worked to make the Conference happen.

Foreword

The internet, social media, smart phones and tablet computers have been playing a larger role in our daily lives. People have become increasingly dependent on computer networks in many aspects of their lives from communication, entertainment and financial transactions, to education and Government services. Dr. Richard Stallman who is credited with the collaboration effort to create a freedom-respecting operating system which gives a spirit of co-operation and sharing of knowledge by making public availability or access to source code that allows the users free to study, change and distribute it. India's first-ever Free Software event, "Freedom First" that convened in Thiruvananthapuram in 2001, was initiated by users groups who interested in the state and this sparked to the community initiative further. Kerala had organised International Free software Conferences in 2005, 2008, 2011 and 2014. These Conferences were an occasion to highlight Kerala's achievements in the domain of the free software, as well as to bring together the community to discuss priorities and action items.

With a view to the tradition forward, ICFOSS conducted the sixth International Free software Conference of Kerala, the Swatantra 2017 on 20th and 21st December, 2017 in Thiruvananthapuram. Themed "Free Software for the sustainable development of the Society ", the Conference throws light to various emerging concerns of the citizens and community such as privacy, online rights and freedom, security at the global level, in addition to examining the advanced developments in the mainstream software areas.

The Conference has been made possible through the efforts of a number of prominent organizations and individuals by participating in its organisation as well as in the organisation itself. ICFOSS thanks all the supporting institutions and places on record its appreciation for speakers and presenters from different parts of the World. Also, thanks the chairs of the 12 parallel tracks who helped the conduct of the event.

ICFOSS is indebted to the Free Software community and practitioners for elevating the Swatantra 2017 to a truly community event, through their participation. ICFOSS thanks all those eminent personalities and organizations for the support and guidance given to the Conference and places on record its gratitude for their tiresome work to make the Conference a great success.

Dr. Jayasankar Prasad. C

Director, ICFOSS

2 DAY 1: 20 December 2017

2.1 Conference Keynote: "Software Freedom Conservancy" : Mrs. Karen Sandler

Miss Anjaly G of ICFOSS introduced Mrs. Karen Sandler to the audience and said that the event is for FOSS Professionals across the world. Swatantra 2017 will be the forum for sharing experiences across communities and brainstorm on the ways forward for FOSS to be the technology enabler in meeting sustainable goals. There were eminent invited persons with expertise in the field of FOSS present there to guide them. To begin with, there was a key note session of one hour by Mrs. Karen Sandler. Mrs. Karen Sandler is the Executive Director of Software Freedom Conservancy, former Executive Director of the GNOME Foundation, an attorney and former General Council of the software Freedom Law Centre, while working with the GNOME Foundation. She was the key person behind an ambitious project to draw more women into Free and Open Source Software, the Outreach Programme for Women. While at the SFLC, Mrs. Sandler advised a wide range of Free and Open Source Software organisations such as the Free Software Foundation, The Apache Software Foundation, the Exdol Foundation, software in the public interest and the software in the freedom conservancy. With SFLC she became a public speaker about issues of Free and Open Source Software at conferences such as Oscon, Scale, Linux Con etc.. In 2010 she led an initiative advocating for Free Software on implantable medical devices.

Mrs. Karen Sandler introduced herself to the audience and narrated her own experience in the use of software and the vulnerabilities associated with it. She was the Executive Director of the Software Freedom Conservancy and also a lawyer, but she mostly give pro bono legal advice and she does that for the GNOME Foundation and the Free Software Foundation and a few others. She expressed her experience as a patient by adding that she is very much interested in FOSS.

She has a big heart which is three times the size of a normal person's heart, a heart condition called hypertrophic cardiomyopathy. The heart is really thick and stiff so it does not necessarily beat correctly and so there is a very high risk of sudden death. She got diagnosed the same at the age of 31. She went to a lot of cardiologists, to heart doctors and they all said to her not to worry because she can get a pacemaker defibrillator. The devices are very small and not very heavy and the Electrophysiologist slid the device across the desk to her. She asked on what software does the device run and explained that the device had software in it, and that its operation was dependent on the software working correctly. The doctor had implanted himself thousands of those devices, often more than one per day, and he had never once thought about the software on those devices. He had never considered that there was software on those devices and said that a representative from the device manufacturer will be able to answer all of her questions. She approached the representative but in vain . As directed by him she moved to several such other persons but she never got information regarding the software installed in the device. She then wanted to have a research project to evaluate the safety of the software on those medical devices and it was a very interesting experience. She totally put off getting her own device. She did all the research about all of the failures of medical devices that have happened, all of the insulin pumps that have injected the wrong amounts of insulin, the defibrillators and pacemakers that have delivered unnecessary shocks or had problems with their wires, and all the pain management devices that also failed. She decided to think about actually getting the device and she hesitated over the idea of getting this device in her body because it seem like such a foreign idea. She thought about how she could become a cyborg, because she had the technology in her body, screwed in into her heart and without being able to see the software in her own body. It was terrifying and really hard to think about. She thought it is terrifying to have a proprietary software in her body which has no control of herself. She then gained strength from a picture of Bill Gates in which a woman character was made an involuntary cyborg against her will and became strong. She launched a real research experiment and a real campaign about the safety of these devices and software generally and so she did a whole bunch of research with the Food and Drug Administration in the US, when she was in the Freedom Law Centre. They put together a paper showing how the advantages of Free and Open Source Software were really fundamental to any kind of critical software. She found out all of those failures were really due to shocking people inappropriately, or not shocking when they were supposed to. Insulin pumps and pain management system all failing because software has bugs. The software engineering institute estimates that for every 100 lines of code one new bug is introduced. So she realised that it was a very short walk from pacemaker defibrillators to cars, from cars to voting machines, from voting machines to our stock markets and anything we rely on, which are vulnerable to attacks. These devices are broadcasting wirelessly all of the time and have radio telemetry with the broadcasting information and with no security on them whatsoever. There is no encryption, there is not even password protection, there is no real security on these devices and since the software is closed in proprietary we cannot review the software for quality and for bugs. But we also have completely exposed medical devices without any security on them at all. The studies were able to show that they could take control of these pacemaker defibrillators with just over-the-counter equipment, they were able to deliver unnecessary shocks, they were able to get patients' information off of the device including government identification numbers and patient’s doctors names and they were able to get not only deliver shocks that could be fatal, but also they could put the device in testing mode. Testing mode means that the device is constantly testing itself,

which means that it runs down its battery and these devices are only as good as the battery life. So as soon as the battery is run down on these defibrillators you should have surgery to get a new one, and so even just interfering with the operation of these devices in a small way can have very profound consequences for the patients.

A security study on what is called honeymoon effect started and the security researchers have evaluated Free and Open Source Software versus proprietary software systems. They looked at the number of bugs in a software project over the time. If you look at vulnerabilities, when a product comes to market people are worried about some big security vulnerability and the companies that launch the product are really worried about it. But in fact what actually happens is that there is a period of time when there are no known vulnerabilities, and so then, and so that is zero and that is what the researchers call the honeymoon period. So it is that sort of a honeymoon where no known exploits and everything is hunky-dory and safe and sound with their device and then over the time once the vulnerability is found then the number of vulnerability is increased almost exponentially, and what they found, and so this is interesting for a number of reasons that when they first come out right, we have to worry about our devices down the road and we are using devices like her defibrillator that could be used in for a decade or two or cars or refrigerators or lot of the products that we are using. We do not necessarily have to worry about the vulnerabilities today but we have to worry about the vulnerabilities down the road. We have to worry about the vulnerabilities when perhaps the company that sold the product is out of business or does not have good relationships with the suppliers or perhaps does not employ the engineers that worked on the product any more and the only way that we can be sure that we will be safe and sound and secure and that we can improve and fix our own devices, if we have the complete and corresponding source code for everything that we use and everything we rely on. Because down the road we would not be able to protect ourselves from problems with our own equipment and our own devices.

There are bugs in all softwares and can not say that Free and Open Source Software is necessarily better and safer. Some free software is better and safer and some has not had the attention poured in to it and is not very good. But what the study shown is that free software is better and safer over time, and that when you compare big proprietary systems versus big free and open source systems that the free software systems perform better. The attackers do not learn as quickly and are not as many bugs and exploits. Now we have an internet of things where everything we have is talking to everything else, so when a person have a pacemaker defibrillator and he cannot see the source code in it, then that is wrong because he want to be able to see what his critical equipment is doing, because any device could be critical since they are all talking to each other. And while all of our devices are talking to everything else, we simply do not know what our most critical software is. So it is easy to see that our critical software needs to be free and open because we know that we want to be able to repair it when things go wrong, we want to be able to study it, and we want to be able to use it in new ways. And with medical devices, people are literally being connected to a network without being knowing of it. She recently had got a new defibrillator and since there were no devices currently in the market in the United States that do not broadcast remotely, she got the only device that can be disabled while most people are getting the factory settings. They are getting this automatic broadcasting of completely not secure broadcasts that can be interfered with and they do not have any concept that this is happening. So they are

literally being connected to a network without realising it. Thus all of this and her own experience in finding out about her own software in her own heart made her realise that software is something that we need to be passionate about.

When she entered the field she started working up legal issues for a Free and Open Source Software. She thought that open source was cool. But when gone through it she understood that software freedom is essential and so she turned her attention to address some of the biggest issues facing the adoption of Free and Open Source Software. And that is why she is working at Software Freedom Conservancy. It is a charity organisation based in the United States and have a non-profit home of 46 software projects. Those may be Samba, Wayne, Inkscape, Selenium, QEMU, GIT and so on. They safeguard software solutions and help to provide alternatives and really address all of the ethical issues in Free and Open Source Software and everything they need to know in order to make free software a success. And one of the programmes that they run also is called Outreachy which is a paid internship programme for women and non-binary people in Free and Open Source Software that happen twice a year for three months. They have a large participation from India and they like to have a larger participation from Kerala as well.

She observed that if we do not have a diverse set of people making our software, we would not be able to address all of the key situations we need to address. One of the last critical programme that the Software Freedom Conservancy did was representing some kind of developers who have asked them to help them and force the GPL. The GPL is a sharing license, and it is one of the fundamental free software license. Its basic premise is that you can do whatever you can with this software provided, you can study it, you can use it, you can make changes to it and you can share those changes with others. But if you make changes and share those changes with other people, then you must do so it under the same license. GPL is a legal mechanism that enabled free software developers to share in a way that really made the ecosystem work, because there is a license, it promotes fairness and ability to share The Linux kernel is one of the most important projects for free software, for software generally, and it is licensed under GPL version 2. Linux is in all over the place, it is in tons of products, in the laptop of a child, it is in air traffic control systems, it is basically everywhere, it is in millions and millions of phones. It is every where and it is hard to find products that do not have some free software in it. But what she observed is that while there is more free and open source software than ever before, we have less actual freedom since a lot of our free software is being wrapped in proprietary software and we are having less access to our software and our equipment than ever before. Then if you want to change basic things in your equipment it will be very hard to do so. It is very hard to live without using proprietary software. If you want to book a flight, if you want to interact with your bank you have to install proprietary java script. It is very hard to live in the modern world now unless you have somebody else doing a lot of things for you. You have to make choices thoughtfully and take a step towards freedom,the situation will get better for everyone. So, while there is a lot of open source software, we are loosing on freedom, we are loosing the freedom that really matter, which is being able to really fix our devices when they break, which is creating new exciting product out of the software that we have already, being able to review our software for safety like in the case of her heart device.

Open source is big business and there are tons of businesses making a lot of money out of Free and Open Source Software. So a lot of people are making a lot of money out of the Free and Open Source Software and that is great but we cannot necessarily rely on these companies to have our best interests are hired. The best example that she had is her own defibrillator which had problems with our technology. When she was pregnant relatively recently and she had her defibrillator, her heart did something that a lot of pregnant women's heart do. Her heart palpitated as about a quarter of all women have palpitations when they are pregnant. The doctor would say that it is very normal funny palpitations occur when women become pregnant. When her heart palpitated her defibrillator thought that she was having a dangerous rhythm and it shocked her twice, and when she went to her doctor to say how do she get this not happen again he said they were going to put her on drugs to slow her heart rate down. Never was there even the question of whether we could look at the software and see if we could fix it. When she looked in to this, it is realised that only a few pregnant women have defibrillators and the medical device manufactures do not want pregnant women getting shocked. If they had thought about that possibility while they were designing the device they probably would have done something about it, but because it is such a small set of people and because it is a temporary condition, like being pregnant is only temporary, from the device manufacturers perspective this is not a high priority issue .Even though they know about it, they have to decide that whether it is worth the resources and it is simply not worth the resources because it does not come very often. So we have to think about how our devices might be used in ways that the manufacturers may not have anticipated. A device designed in California might not be great in India and so we need diversity in our development base, in our developers and our contributors. We need that diversity because we will anticipate more situations, but we also need to retain control of our critical technology from the beginning and we need to do it now and so it is a balancing act that we need to do and which the free software helps us with immensely. When we have freely licensed software, that means that we can later take that software and analyse it, we can propose patches, we do not have to wait for companies to first admit that there is a problem and then fix it, we can fix it ourselves, we can adjust our software to our own use cases. We do not have to convince some company that they should license it to another company, so that we can make changes to our software so that we can live with it and they can write our lives. Over three million people in the world have pacemakers and every year six hundred thousand are implanted and that India is identified as a growing market for defibrillators.

She was a bit cheeky and a little silly when she call herself a cyborg by having implanted a medical device. But the line between what is a cyborg and what is not a cyborg is very thin and very blurry and she would argue that we are all in the process of becoming and unbecoming cyborgs every day. We put on our glasses and incorporate technology in to our critical lives and thus become cyborgs. And she want to say cyborgs because that means our technology is integrated into who we are fundamentally and what we can rely on and we do not know what the next steps in our technology are. She is terrified to adopt the technology because she feel that if we continue on the road that we are on, then we keep adopting proprietary software for the critical things that we rely on and that we would not have any options down the road. Then we cannot anticipate what is going to happen, the good or the bad, and therefore we need to have control. We need to have an exit hatch for one of those bad things happen and so cyborgs should unite because we are all cyborgs. We are either now cyborgs or about to become cyborg and it is our very being

that is threatened by proprietary software.

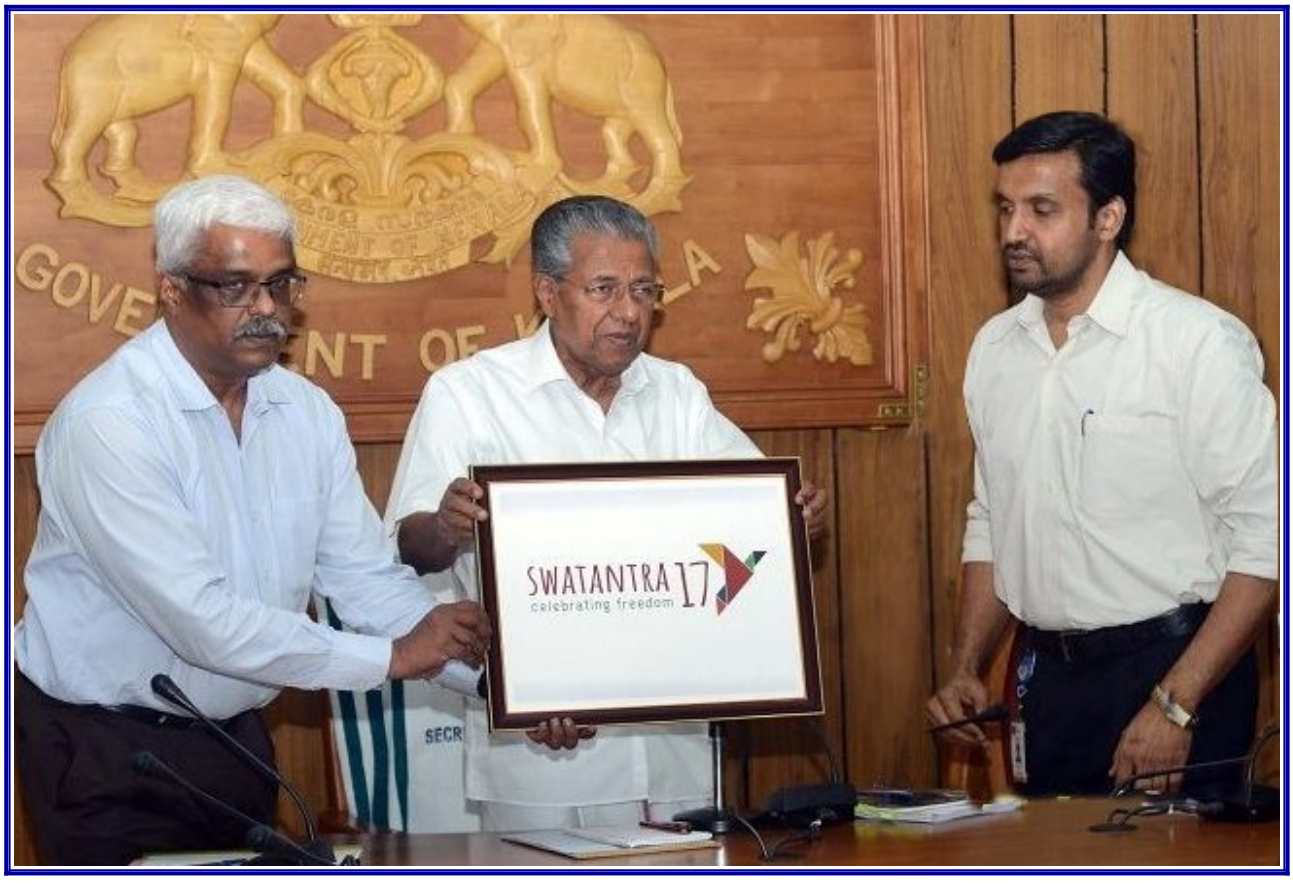
She recently got a new defibrillator which was the only one device that was available in the US market made by a manufacturer. She upgraded it and in order to get her defibrillator checked to make sure that it was functioning properly she went to the electrophysiologist in the doctor's office. But everybody else comes in and out of the doctor's office, they can see their wireless functionality coming in and out and when she had her device there are a few people with that brand of defibrillators that a representative from the manufacturer had to come every time with the programmer because they have programmers from all the major manufacturers but not from her company. She had to use with her company because it was the only one available that has no wireless functionality. She received severe threats, even rape threats, through internet since she is a known person who is running diversity programmes for women. She thought it is very dangerous to the idea of getting a defibrillator that had no security on it. She thought that it was the only device that she was going to be able to get and thought that she had to stop advocating for software freedom or advocating for any ethical technology because it was simply too dangerous. But luckily she found that wonderful and she was able to talk to the device manufacturer and because they want to make inroads in to the United States and they want to have a bigger sales presence. They were thinking about incorporating some of the safety mechanisms that she was suggesting. This is the way that one established critical technologies like these defibrillators. But we are enabling wireless by default, we are connecting everything by default, and we are not thinking twice about it. We are creating proprietary protocols and proprietary software. We carry our most critical functionality, the way we talk to each other, our most personal information, the way we create, the way we do everything in our lives. We are entrusting big companies to make sure that our interests are covered and we are creating that world that we have no escape hatch and we have no way that when things go wrong. It is just that they are focused on their next quarterly profits and we are focussed on our lives. It is just a different balance and different metric and we are at the point now where we can take control of our software. It would be nice to have access to the source code and we work better when we collaborate and in 10 or 20 years we will have established a lot of infrastructure based on what we are doing now. It will be too late if we do not take action now. With free software, we can take where ever we are now, we can take software that has mistakes, we can take a failed product, we can take something that we are successful but has outlet its usefulness and we can begin again, we can take something where we have no control and we can gain control and so on. So she urged all to think about these issues of Free and Open Source Software.

She concluded her key note by saying that she was excited to be present there in that amazing Conference and she had been hearing about the Software Community and ICFOSS for years. She then answered the questions asked by the participants. She explained about the Outreachy Programme. It is a three month programme which runs twice per year in two sessions. One starts in December, and another in May. The internship is for three months. The Interns get paired with mentors and they work on a Free and Open Source Software project. They have usually about 20 projects that participate in a given round. Linux Kernel, Vulcan Media, Debian etc. are quite a lot of free software projects that participate and the internship is with that community. They have a voluntary mentor who helps interns contribute to the project and that all the works done by those interns are out in the public. They have sponsorship and fund raise and they pick

quite fifty five hundred dollars for three months of work. 450 people had come through their programme and about 80 of them had become speakers. They are doing full length sessions like conferences and a very high number of them have employment working in Free and Open Source Software and even higher number of them have jobs working in software generally. A favourite thing about the programme is that some of the people who have graduated from the programme have gone on to become mentors in the programme, and some of those mentors have even mentored people who have become mentors themselves.

2.2 Inaugural Session :

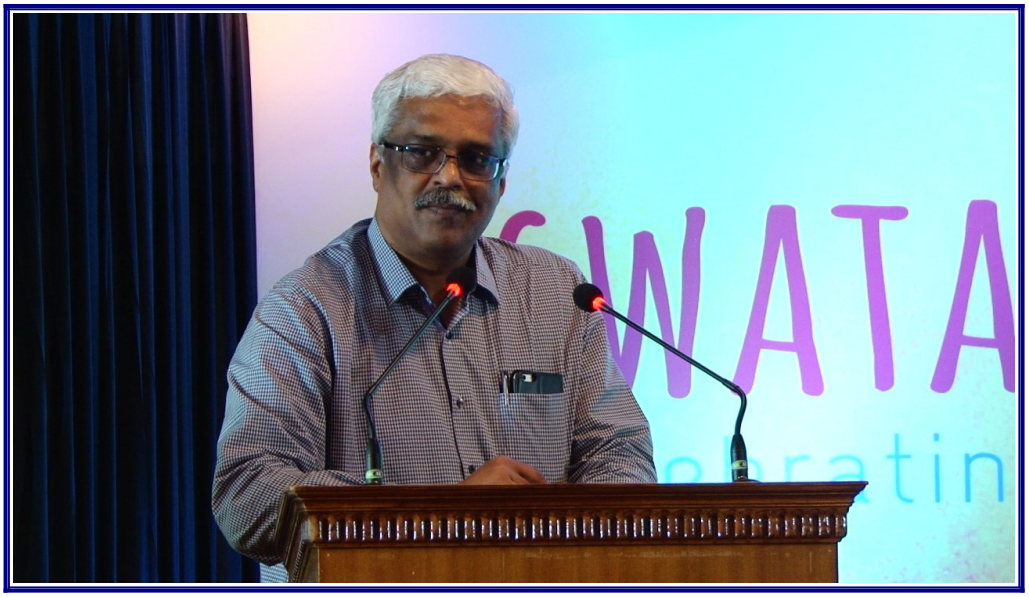
Honorable Chief Minister of Kerala, Shri Pinarayi Vijayan was the Chief Guest present for the formal inauguration of the event. Shri M Sivasankar IAS, Secretary to Government, IT & Secretary to the Hon. Chief Minister for the welcome speech, Mrs. Karen Sandler for speech and Dr. Jayasankar Prasad, Director of ICFOSS to propose vote of thanks were present. This Session commenced with the Welcome Speech. A summary of this Session is as follows:-



Shri M Sivasankar IAS, Secretary, IT Department :

He said he was extremely happy to be there that day morning to welcome all for the inaugural function of Swatantra 2017, the prestigious event of International Centre of Free and Open Source Software, an organisation under the Government of Kerala. Usually his welcome

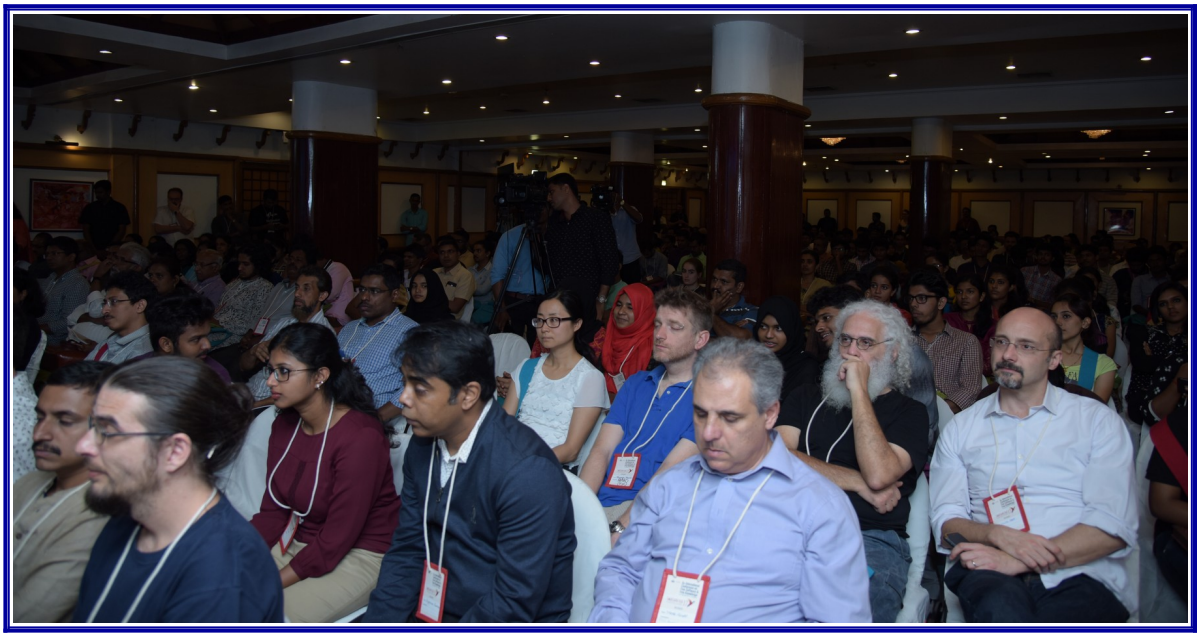
speech will be concluded in two sentences by offering a one line welcome to everyone, but this time since they had a very short function, he think it is better for him to spend at least three minutes in explaining the context and developments for Swantantra 2017 that year, he added. That was the sixth edition of the International Conference, Kerala. During the last 10 to 12 years have consistently taken a stand that it will prefer to use free software in the Government applications.



The latest IT policy of Government of Kerala have outlined that free software is the medium to be used in Government deployments. During the last 10 to 12 years they had been following that practice. We have had a very strong community of free software activists emerging from the State, he said. The talent which is there in the State to work in the free software segment is really impressive but, however, we have not been able to get in to the stage large investments in the free software space by companies who are working in the free software space. He was just listening to Karen when she was making the key note who said free software has now become a big business where many big companies are there and lot of activities there. In Kerala since we are using free software, we have a ready market, we need all these products and we need all the services. And she was talking about defibrillator which was there. She was just mentioning that there is a medical device which now people are putting inside, the insulin pumps and pacemakers and all these devices run on a software and that if it has a bug, the device functionality itself comes down. So she was suggesting that we should try to look at the possibility of having these devices run on error-free software and from the security point of view and reliability point of view, the free software offers a great chance.

Kerala, as a matter of policy has decided to embrace free software and now like when you talk about start ups in the global scenario people think of silicon valley, when you talk about IoT people think about Shenzhen, similarly when you talk about free software, Kerala is somewhere

in the radar internationally. Then why is that we are not getting large investments and ecosystem in free software and why are we continuing as a manpower supply to the free software system, he asked. That was a thing which he hope that Conference would very seriously deliberate.



He said that there had esteemed guests from various parts of the world, some 20 international speakers and almost everyone who is working in the free software movement is associated with them, he think that year 2018, they should declare as an year when they introspect on that and make Kerala a vibrant ecosystem for future for free software as an economy as a whole. That was his humble submission and what he would like to place before that august gathering.

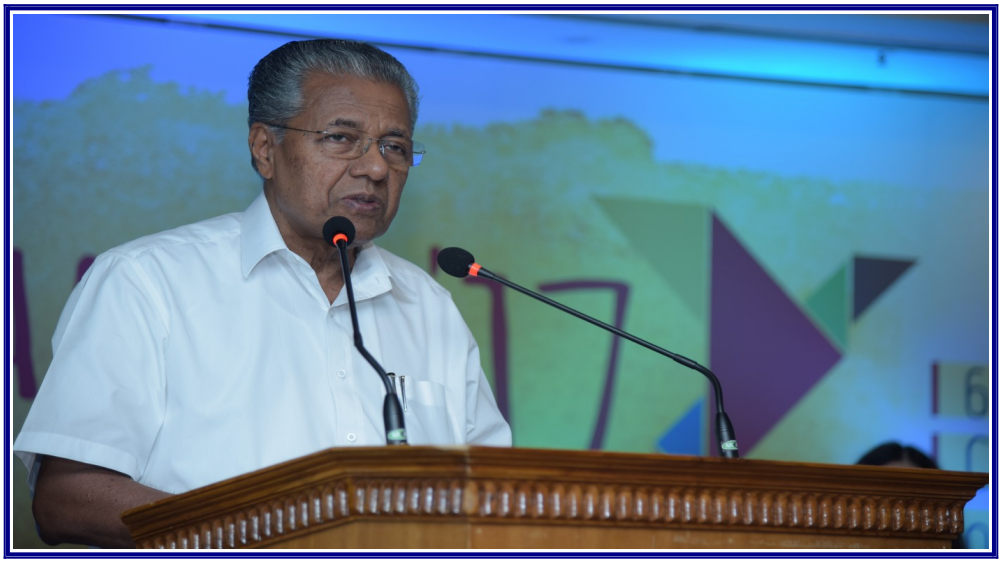
Then he welcomed the Honorable Chief Minister of Kerala, Shri Pinarayi Vijayan to the Conference and said that in spite of his packed schedule, his presence in Conference shows his commitment to the State of Kerala and the Government of Kerala for the free software movement. Then he welcomed Mrs. Karen Sandler by reminding the interesting key note speech made by her and jokingly said that he was getting confused as to whether he was a cyborg version 1.0 or 2.0 and added that they look forward to interact with her in future also.

Then he welcomed the esteemed dignitaries who had accepted their invitation to attend that session and said they had 18 international speakers, 12 speakers from the country and delegates from all over the country and primarily the young and vibrant free software community from the State to attend the Conference. He congratulated the small team from ICFOSS and said when they took over ICFOSS they just had three people there and now have a very vibrant and good team who will be able to put out a stellar Conference. He expressed the hope of adding an Agenda in the Conference for building of a free software industry ecosystem in Kerala. He welcomed all the young volunteers of ICFOSS who had made the Conference happen and congratulated them. He wished the Conference all success and requested the Honorable Chief Minister, Shri Pinarayi Vijayan to deliver the inaugural address and to declare the Conference open.

Shri Pinarayi Vijayan, Honourable Chief Minister of Kerala :

He made an inspiring speech which may be summarized as follows:-

It is a widely accepted fact that the people of Kerala are ready to adopt the progressive movements happening anywhere in the world. Whether it be social issues, scientific subjects or technologies, we used to understand quickly and then to adopt it as fast as possible. This is what happened originally in the case of Free and Open Sources Software also. The Free Software technology originated from the lowest strata of the society. Generally the common people of the society were the users of it. The sectors of people including teachers and workers were to adopt it from the technical experts and to guide it forward. It is sure to say that it emerged as an alternative of the software used by the multinationals in the field of technical knowledge with the union of common people. It is due to the efforts of many people who unitedly defend the monopoly of knowledge and the anti-people use of knowledge, the Free Software emerged as a honest presence and alternative. All of us know about the revelation made by people like Edward Snowden as to how the rulers unlawfully intrude into the human privacy. Now the new digital technology is one of the most important weapons used to steal privacy and to deny freedom. And so there is a major role for the use and development of free software in the struggle for the protection of privacy and freedom. The free software is a strong lesson in the development of democracy. It is functioning as a strong weapon against all digital technology based exploitations.



Regarding the young technological experts, the Free Software is also an area to provide opportunity for beginning new initiatives and to make experiments. Through this the State will gain economical progress and also new employment opportunities will be germented. Start-ups initiatives are being given much importance by the State Government. In addition to the development of the existing IT Parks, new Technocity is also started functioning. Efforts are being taken by the Government to make Kerala as an important centre in the global IT business. The most important thing is to extend the Free Software which is having no large license fee or cost to the villages and to provide the benefits of this free knowledge to thousands of poor people who have no

access to this technology. The activists of the Free Software should undertake this mission. This is to be carried out in co-operation with the common people . It is an undisputed matter that our State has gone forward in this matter than other different parts of India.

We have to work with an aim to go forward in more areas in the coming days. The new Government in our State is going forward by taking strong stand in this matter. The Government have made clear their oneness with the Free Software in the IT policy much earlier. The policy of the Government is to wide open the space of knowledge to all. The KFON project and the project for providing Wi-Fi in places are examples to show the stand of the Government in this matter. The Free Software based curriculum conducted by us in the school education sector has become a model to the Country. Government wish to go forward with further development in it. In addition to that, it intends to make all IT projects running in the public sector in Free and Open Source Software. There might be backlashes in the past, but the Govt. will be with you for the Free Software with strong steps. Hearty Congratulation to ICFOSS for conducting Swatantra 2017 and for the efforts taken in the Country, making Kerala as the destination of the software during the last few years. He then wised all the very best to the Conference and declared the Conference inaugurated.

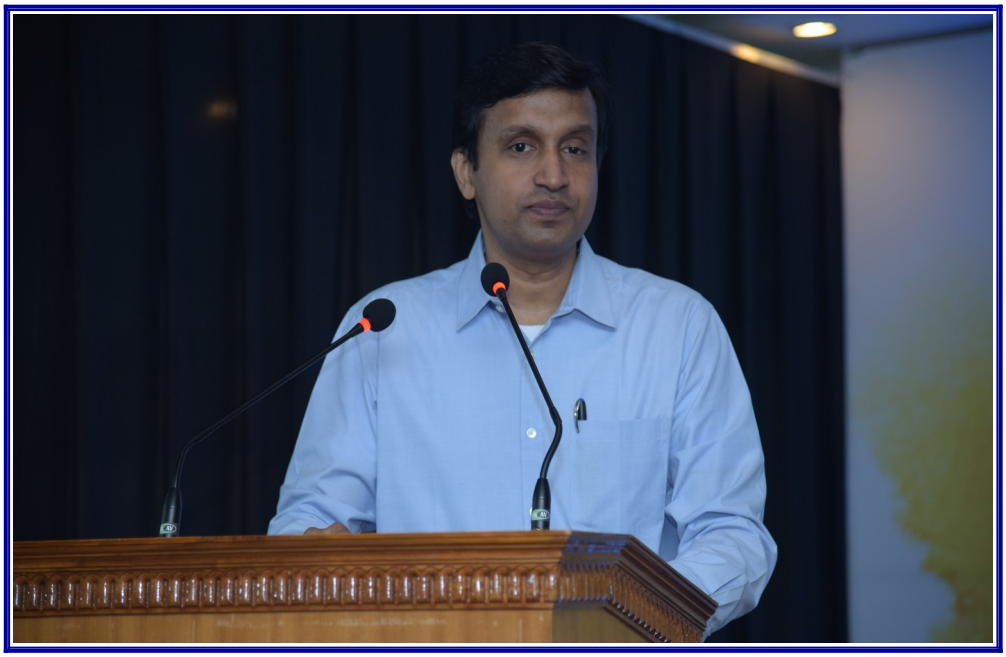
Mrs. Karen Sandler

Mrs. Karen Sandler made a brief speech and said that Kerala has shown such creativity and leadership in the Free Software space that has been watched by the world. She thanked all the great persons for making the important event happen.

Dr. Jayasankar Prasad. C, Director, ICFOSS

Dr. Jayasankar Prasad proposed the Vote of Thanks to the gathering and said the inaugural address was delivered by our beloved Chairman of ICFOSS and also the Chief Minister of the State. He then explained the gist of the inaugural address made by the Hon'ble Chief Minister of Kerala to those who are not very familiar with Malayalam. The Chief Minister had reiterated the State's commitment to Free and Open Source Software and mentioned about how we are going to adopt it in the public sector enterprises and in Government in a large scale, he continued. He was talking about how over the years we have been trying to have free software as one of the fabric of our own living industry actually and the Government is also committed by various means of adoption and propagation of free software. It looks forward to the larger community to help reach the rural and other areas where a proprietary solution are much costlier, a solution may not be reaching or may not be affordable for those people, he added.

That was not just an ICFOSS programme, that has been supported by the FOSS enthusiasts across various organisations, various communities in the State, in the country and even otherwise and ably supported by the team under the leadership of Sri. Arun and the rest of them. He then said that it is a larger gathering, it is not just one institution delivering it, it is a large group of enthusiasts who are around there from various places. He then thanked our Honorable Chief Minister for having spared his time, came over there and inaugurated the Conference.



He extended his gratitude to Mrs. Karen Sandler who had spoken about how a personal issue has become a eye opener for a much larger problem that needs to be addressed and how she has been working on it. He said that we are indeed happy to had her there talking about her experience, her journey and also probably we might need to talk to her in much detail about a lot more on medical devices. There were some personal questions also he would like to ask her since medical devices need a lot of clinical trials and other things. The next person whom he thanked was Shri Sivasankar IAS who is the Secretary to the CM and Secretary to IT and also the Chairman of the Executive Committee for ICFOSS. He said that he has been the driving force and he expands the scope of ICFOSS every time and they were trying to reach it. That day again he had expanded that a little further for bringing in the FOSS industry to look at Kerala, not just as a group of evangelists alone and so they have been talking to very many people around there who have really made businesses out of FOSS. The business does not necessarily have to mean a negative thing, it could also be something which support the society and also for the benefit of every one. He thanked him for the leadership that he had been giving them and for the time that he had spent for them.

He then added that they would want the Conference to be ongoing, or being a conduit for an ongoing interaction with the international community. They would not like to leave that as an event and then wait for the next event, they would like this to continue, keep on connecting with the FOSS enthusiasts.

With the above words the Director of ICFOSS proposed Vote of Thanks to each one of the august audience including the entire set of Speakers, professionals, students, volunteers, co-ordinators, the Programme Managers, the FOSS Community members etc. for having came over there to attend the Conference.

2.3 VENUE 01

2.3.1 GNU Health in the Context of Integrative and Precision Medicine : Mr. Luis Falcon Martin, M. D.

Mr. Luis Falcon Martin is the founder of GNU Solidario, a non-profit orgnisation that delivers health and education with Free Software. Dr. Falion holds a computer Science mathematics degree also. He is also a Free Software activist. He said public health is a public good and so there is no plan for proprietary one in public good because it is a contradiction by itself. Today we are running into a formidable time in terms of bio-informatics. We are living in an over sophisticated society. We have very expensive MRI Scan machines, CT scans etc. But we have to come to a point of importance of all that in our health not as a personal health but as a public health. We are now dealing with patients and dealing with people. We would be able to talk with people come to the office before they become sick. If we will be able to do that, a much lower population will be going to become sick. That is a much better way of directing public health. He is a computer scientist and a doctor and so trying to combine together those two aspects to embrace technology in Public Health. So one of the things that they have made was to give birth to an institution which deals with all the genetic information and natural variants that are associated with human health conditions. You have a large database of different gene variants that have actual coverage in the same clinical expression of a disease. For example, we can not treat Parkinson's disease as a single disease. In order to give better quality of life, we should think of in what way these persons are treated. Because we are individual complex beings that need to have precision medicine or personal medicine. People suffer from social diseases like human trafficking, contaminated water, cholera, drug abuse, prostitution, tuberculosis, dental disease, diseases associated with child labour etc. And they are also preventable diseases. If we are working on preventing the above diseases, there will be much healthier population. This should be the first thing to be done in the study of medicine. Though there are four years of study in Pharmacology, there is nothing about primary care, he said.

He was thinking about social projects and the knowledge involved in it. Technology is just a tool to be able to deliver things in to a kind of eye opener to Government officials and also to avoid these type of things. When we think of free software, we have to think about the miseries caused by

the war also, which need to be put an end for the peace and welfare of the society. We have to make open the eyes of the Government to stop the business of war, sex trafficking, drug trafficking , human trafficking etc.

The HIV infected patients are susceptible to tuberculosis infection. He would like to focus on people before they become patients. The more we deal with them in the community where those people live, in the family housing conditions, domiciliary units of personal areas, health institutions and so on, before getting affected with disease, the better world going to be the user community as a whole.

Every single component they use in GNU health are in Free Software . If not making like that, then the whole thing will collapse. The data are collected and made available to the health authority for making better analysis and for keeping good public health. The assumption that the physicians or doctors are the only important people in the health care system is a huge mistake. The nurses are equally important since they are very close to the patients and can do many services to cure the diseases of patients. So each one of them has their own part to perform health care of the diseases of patients and so each one has their own part to perform in a self disciplinary way.

There is no need to use paper since everything like invoices, prescriptions, certificates, signatures etc. are digitized. Tuberculosis is a social respiratory diseases which can be taken as an index case. The Ministry can collect data regarding the nature of the disease, the area where most affected etc. Then the prevention as well as treatment will become much easier by using these statistics. These data can be shared with social workers and health workers. This can be adopted in the case of alcoholism, drug, abuse, prostitution etc. There can be the concept of a unique ID for a person in the whole world in order to record the above data. A doctor or social worker need not move on to the person if he resides in another country and so the clinical data available with the unique ID of a person will help them to understand the previous history of that person. There shall be records relating to car accidents, violence, sexual assault, robbery, suicidal attempt to know the condition by which it happened, where did the same happened etc. for assessing the higher prevalence areas of those incidents and to find out solutions for not happen it again. In the case social medicine, there is not much about in the text books of medicine. Health campaigns can be conducted with the help of computers and can identify which part of the world actually vaccinated or not. These recording are very important in the case of emergence of on epidemic disease. He concluded the speech by saying that people working on open source data are very helpful for collecting and recording data relating to public health.

2.3.2 RedHat : Mr. Sreejith Anujan

RedHat is an American multinational company founded in 1996 for providing open source products to the enterprise community, Mr. Sreejith Anujan said. Currently they have over 10,000 employees across 35 countries. They are the first ever complete open source company in the world with a revenue of two billion dollars per year. RedHat is not a free software company but an open source software company. They do not sell free software. There are a lot of other products in open source software than Linux operating system. RedHat is not just a Linux Company but have a

lot of other products in Open Source Software. They were just a Linux Operating System company till 2006. But they started acquiring other companies and so they have a lot of services and products around Linux operating system.

People widely use RedHat services, products and software only because these are basically tried, tested and trusted. Try, tested and trusted are the three basic pillar things which they actually encourage and strive in RedHat. Trusted is a word very very important in Government organisations. He continued to explain about the use of open sources in the Red Hat.

RedHat uses open source in three ways. One by participating in the open source community. 20% of their global annual revenue is being utilised back for fostering open sources community programme and for evangelism. Second thing is that they take the technologies which are relevant to their products and integrate in to their product mainstream. They make quality assurance and make them stable for enterprises to use. They basically gives services on open source enterprise products which are stabilised for enterprise customers, Government, as well as Non-Governmental Organisations. Their development model is complete open source and the business model is subscriptions. They use subscriptions instead of licenses. They sell subscriptions and as part of subscriptions you get features like the user interfaces, QA and integration and predictable stable life cycle support. The operating system getting from Red hat has a life cycle of 13 years and other products like cloud have five years of life cycle. They guarantee life cycle and support for the services they provide by taking the open sources solution from the community. So their business model is basically subscriptions which is renewable in every year or three years or five years. They participate in the communities and integrate those particular services and technologies they think relevant to their business and stabilize into enterprise products. In fact their flagship product still is Red Hat enterprise Linux which actually has a community free OS Code as Fedora. The desktop edition will get free. RedHat enterprise Linux is based in Fedora and like that all their products actually have equivalent other community offerings. They contribute largely to open stalk foundation . They are the leading contributors by giving 27% of it . They contribute by investing their engineering resources' time, machines and the like. They have also commercial version of open stalk and have contributions to containers and dockers.

From 2006 onwards they were acquiring a lot of companies which were using proprietary software. Over a period of six months or one year they made all of them completely in open source. They have commitment back to the community that what ever solution they acquire, they will make them completely in open sources in the due course. He cites an example in the case of Ansible, which is an automation and orchestration tool. When they acquired Ansible, some part of the same was not completely open source. They have commitment to the community that they made them completely in open source. The new open sources project is AWX. You can go to GitHub and download it and can be used based on GPL licenses.

He then answered some related questions asked and added that RedHat has a very good alliance with Microsoft who open sourced their docmat core and MS SQL is also available in Linux. They have very good strategic alliance with Microsoft not only in business but also for fostering the open source community and for adoptions. They basically deal with four parts of their customer's infrastructure. One is how to optimize the infrastructure available . The second one is how to integrate the existing applications, data and processes. The third one is how to mange the cloud infrastructure and to build modern applications.

The products and services of RedHat offered, as he stated, are the following :-

RedHat stalk

RedHat Enterprise Linux

RedHat storage

Open stalk Platform

Atomic host

RedHat virtualization

RedHat Openshift, a container platform

Pre scale – API management

Satellite, etc.

The Bombay stock exchange and National stock Exchange are using open sources for their functioning. RedHat is supporting some part of it, he added.

2.3.3 Eliminating “Black Boxes” from Your Life: Using Free Software, Free Hardware & Self-Hosting : Mr. Abhas Abhinav

Phone is a computer and likewise Raspberry Pi, laptop, embedded computers, wireless access points etc. are computers though we might not think of these devices are computers, Mr. Abhas Abhinav said. If you need to run free software in a device, you need a certain type of laptop or desktop. He went on to explain some of those things like what is the benchmark for running GNU Linux, what if you need to run it everywhere and what is the sort of hardware or software enables it or inhibits it.

Every piece of hardware would not allow you to do what ever you want to do with it. If you buy a computing device from the market, there is few chances that you can run your own operating system in it. The black box is essentially a computer that employs technical needs to limit you from doing whatever you might want to do with the device. So if you have a wireless router or mobile phone or something like that, the choice is to free it and hence be more productive with it to use it for whatever end to use it for. A person has any sort of standard or even very unusual ideas about what he want to do with a computer. But when the company develops that device, implements technical means to stop you from doing whatever you want to do, then that essentially becomes a 'black box'. For example there are so many ways of doing something. We have some hardware to capture the slides of the laptop and store it on the computer . It would take an input from a camera or a laptop and it could combine those and store it in a computer. That piece of hardware is completely free and it entirely runs using free software. There are hundreds of ways of capturing video on a computer. But all those methods will not give you the necessary freedom that you would expect from a device. The concept of ownership is to be thought about. If somebody owns a device and could not do what he want to do with it, then the sort of ownership he is enjoying is to be analyzed. The true sense of ownership gets when he is able to free that device and use in which ever way he want. If you want to own something, you should not buy a “black box”. His desire is to have freedom and to run free software in the device is contrary to what the device expect from him. A Raspberry Pi is free enough to most of the people. You deploy Raspberry Pi and can do anything by using it. But it has binary drivers which do not make it easy to change the Kernels or compiler on kernel. The microcode which runs inside the graphics accelerator is not free software. That is also a black box in a way.

One of the things that they do from the very beginning of the free software activities is to encourage the communities to run GNU Linux in their computers. You can deploy GNU Linux in almost all types of desktop computers, laptops, servers or embedded computing devices. The emphasis should be given to those devices which we do not see as computers. The smartphone is an example and most challenges in this respect are seen there. You can see cameras in offices and other security devices in an office. But there we can see black boxes in the smartness in these devices. There could be a camera to monitor security in the office or home. It is fine as a user of that technology but the control of it is not open and you could not programme it for your own use. You can not take the data from there and put them into your own computers. The data of your office or home goes to some one else’s data centre or cloud and you will not get any control over it. These are privacy aspects and control aspects . We are trading our security in lieu of convenience by using

these smart devices . What is the cost of that convenience is a question to be considered.

There is some sort of software in all devices. There is no devices which is truly hardware. It would be very costly to build a device entirely in hardware. It is convenient to do that in software. It is to build the minimum amount of hardware and you do all the magic in the software. The typically available board on the market would not share the source code. The software freedom can not be limited to the software that runs on the laptops or desktop computers, it should be in all smart systems we have . In printers, for example, if we build a network printer we would connect a single board computer to the USB printer and share it to the network. We would not buy printer having smartness in it.

How do we define free hardware or free software, he asked. Hardware which is really free is not just hardware which allows you to run your own software and compile it and flash it as your own. It must allow you to study the source code and use it for your own purposes. Thus we can use and implement the ideas elsewhere. This can be done in the case of hardware as well. We can learn from the existing hardware. We can learn how it is wired up, how various firmware by which it is written, how that firmware controls various aspects of the hardware. We can learn from that and we can make use of these ideas for something of our own to build. That is the kind of freedom that we deserve to have. You can take apart a part of free software, put it back and then there is one level of enjoying freedom. You can hack it, change things in it, replicate it and it is up to you to determine what you have to do with it. If you have an implementation, it might not be able to implement exactly the same thing because you might not have the hardware resources to produce, like a printed circuit board , and assemble it. But you can use the ideas to produce similar components and try to replicate it. You can use the ideas somewhere else. You can learn from it and you can fix it when it breaks. You can make things that are not meant to make. Such a lot of great things are happening in the field of free software. The challenge is if you are going to consume a lot of non-free hardware, you are not going to be able to do any of these things. This severely limits how much you can innovate with those pieces of hardware , unless you choose to build those sort of things by yourself. No one should tell you what you should do or should not do with that. You have your own constraints and you know certain things. Moving from not knowing something to knowing something is a process that you can cover if you want to do so. That is a self imposed

limitation . But when somebody tells you that you can not do something is very irritating. Because having grown used the freedom that you enjoy with the software and knowing that all these devices are nothing but computer which are a combination of hardware and software how do you put up with that sort of black box or control, he asked.

He tried to explain the ways by which the black boxes are eliminated. If you look anything in future like a projector, some thing that connects to the wireless net work or the internet, something tracks your pulse rate, location tracking and the like, you have to spent to consider what goes on inside the device, how much of that device's hardware, how much of that functionality is software, could it be built you want to, could you be able to hack into it, could you be able to change something in it, enhanced, extended or fixed. All are expected to think of it or question those aspects . Then you will be able to understand the existence of black boxes in it. Thus solution can emerge. You should create things that you need so that you can control what you have. If you need a small device to play music, you should create it so that you can control it and there is no limit to what you can do with it. It is very easy to buy something and everybody is not capable of building such things . Then some body capable can build for others too and that is how the world of software also works.

This holds good for any one and not just for an individual. If in a college a variety of infrastructure in the network that could be wireless controllers, virtualization systems, systems to track attendance of students and the like, then what could be learned out of the infrastructure if that were built on proprietary software and hardware . You can see computing all over the place in the colleges. But the software and hardware used are non- free. Focusing on the freedom aspects these are not important for them. But the principle of freedom applies to them also. The colleges should have a seat of learning in which trying to teach these concepts of building these things to others and to own control and freedom in the management and building their own infrastructure. This can be applied to offices, defense, Government Organizations and the like. The amount of control you have or something that you own is influenced by the amount of freedom that provided to you. If you have no such freedom, you can not claim ownership of that device and you are almost a slave to it. You are paying for whatever put up and letting to do which is unfair. This might help you today but there is no guarantee for help tomorrow. In the absence of software and hardware freedom, there is no way to control it. The first thing for eliminating these black boxes is care and observe. You start caring about these things, you start observing as well and understand that there is separation between hardware and software in it. Consider a hardware product you purchase which is crippled by a certain level, can not be termed as a hardware constraint. But this is a software enabled constraint. Then you will choose to purchase a device which uses completely free software in the next time. If you are using a proprietary software in your computer, then this is your choice. But you are free to use non-proprietary software as another choice and so it is up to you what choice should make. But you have to make the choice carefully so that will get freedom and flexibility in using the device. Freedom is very useful to every one, no matter what entity it is. If you can do something by yourself, then have the job done. You can also do the job by using proprietary software and hardware. But you should be able to do something more than you did earlier. If you know more about the system you are then very well placed to free that system. Self hosting is the easiest way to understand the system is free or not.

There are so many ways you can enable yourself and others to build hardware and software which provide freedom to you. You could develop, release and you could found it. There are a large number of cloud funding campaign around hardware today. You should be a participant in the development efforts. You can just buy them, employ people who develop them, support, promote and document these systems. By making self hosting, you can test the deployment readiness of that system which is the freedom aspect of that system, he added. Certain questions were asked and he gave satisfactory answers.

2.3.4 Open Data Kit and Openstreetmap : Mr. Ashish Abraham

He is a Research Fellow of ICFOSS and working on KSEB Line Mapping Application being developed by ICFOSS. He tried to share his experience of line mapping application being developed for KSEB with the participants. The line mapping application is about collecting data from the field and floating it into the OpenStreetMap,he continued. The first thing was collecting precise data from the field. They generated a form and the required data and articles collected from the field were uploaded in the web service they used. After uploading data they analyse the data for optimizing the network which was currently established. Open data is the collection of open source tools which are used for collecting field data. This can be used for the purpose of spatial data after converting into the format and later on can be used for analysing and modeling. It consists of three parts first one is building a form.

Then the data collection. A normal smartphone is used for collection of data. There will be an application for data collection and they use geo data collection application for the purpose. This Android app will be connected to the web server which they used for the aggregate system. From the aggregate system the forms will be loaded to the application and with the use of this application we can send back the data which connected to the server. The geo data collection application supports many types of data structures such as geolocation videos, textual data, optional

datas of single choices or multiple choices and so on. So we can actually build the form with the server and plotted this android application. This application is solely meant for the purpose of collecting data from the field . So the base aggregate system regarding the server application is for form hosting and collecting the data from the android application. From this form hub blank forms will be provided to the Android application. After collecting the data from the application, we can use this server for visualizing the data and exporting the data to another sources. From this form web service we actually export data and later on we can use this as spatial data in any vector format.

Data were collected from the power points and transformers and they had to connect those nodes to poles, sub stations and other sources for the collection of data. They are not entering the data in field survey but adding or manipulating it using an editor. The editor used is a much more advanced one with a lot of plugins which are used for importing and exporting data from the vector format. A web feature service standard, which acts as the middle ware for the back end is used to provide data to the user end. Some questions regarding the application were asked and he gave answers to that.

2.3.5 Building a Collaborative Economy over Networks held in Commons : Mr. Ramon Roca

He is working with Guifi.net maintained by the Guifi.net Foundation, which is a free, open and neutral, mostly wireless telecommunications community network, with over 35,000 active nodes and about 63,000 km of wireless links. The majority of these nodes are located in Catalonia and the Valencian Community in Spain. The network is self-organized and operated by the users using unlicensed wireless links and open optical fiber links. The nodes of the network are contributed by individuals, companies and administrations that freely connect to an open network of telecommunications and extend the network wherever the infrastructure and content might not otherwise be accessible. Nodes join the network following the self-provision model since the whole structure is explicitly open to facilitate understanding how it is structured, so that everyone can create new sections as required. That results in a network infrastructure commons that provides abundant connectivity. Since early 2011, guifi.net is connected to the Catalonia Neutral Internet Exchange Point, which exchanges data with other international telecommunications operators. This Internet connection is used by several associations that offer their members Internet access to low-cost at high speeds, which other internet service providers currently do not offer. The model is oriented to cost sharing, the compensation mechanism and the basic principle of operation is based on the Wireless Commons License.

Everybody in the world are not getting access to internet facility either because of economical reasons or living in rural area where there is no internet connectivity, and that is the motivation behind the Guifi.net, he said. Two characteristics in the working model of them are listing all the infrastructure on the website for identifying thousands of communities and declaring that the infrastructure will proactively be working as a whole in a common pool. The individual works are not privatized but are declared for the common good. The idea is to declare formally the infrastructure for common good and not for reserving to the use of a particular group of individuals or a community. With the help of many stakeholders, they have created an ecosystem for the

Foundation which is very essential for an individual to work with and he is now working in the Foundation. They have started the Foundation in the year 2004 and now it has shown a substantial progress in terms of internet connection and they have gained some recognition from the Government and the European Union, who are very conservative in this matter. There is competition among the community network providers and that is essential for the growth of a market economy, he said.

The working of the networking system, its installations such as servers, Wi-Fi, wireless system, economically cheap fiber cables and so on were explained in detail. The internet facility provided to the rural areas of Catalonia were explained and he said that now there is no difference between rural area and urban area in terms of access to internet facility there. The people in the rural area may not have enough money to buy a SIM card for getting an internet connection or even for their food. A significant amount of money is being invested for the internet facilities for the people in the urban area due to economic reasons and commercial reasons. Certain rules should be framed for the benefit of the rural people for making the society sustainable, and otherwise the Commons will be collapsed.

He continued the speech by explaining the roles and relationships in the governance of internet for the Commons and the expenditures involved, economic compensation, return of investment and business model. The questions asked were answered.

2.3.6 Women Hackathon :

There was a session for sharing experience in the Women Hackathon conducted by ICFOSS, with an aim for empowerment of women. The first one who shared the experience was a student of B.Tech in Computer Science from the College of Engineering, Trivandrum and was an intern of ICFOSS. She began to talk about her experience during the Women Hackathon and the thoughts regarding it . There is a common saying that if you educate a woman you educate a family or a community, she continued. With the advent of Technology, when you educate a woman you are educating a region or may be even country. India has the second largest population in the world, but still we are

lagging behind many countries in many factors. About 50% of our population is women. The reason for lagging behind may be due to the non-utilization of the potential of the 50% women completely. For example in her class there is a strength of 74 students, but there are only thirteen girls present there. Still we find women in almost all the top positions in many sectors. An average student acquire knowledge and new skill sets through a curriculum pre-planned by some authority, from friends and also through online courses. This is true and common for boys and girls. But still girls are lagging behind the boys. So, women empowerment is more important for bringing these people to the upfront. A few days back, a Global entrepreneurship Summit was conducted in Hyderabad which had the main theme, 'women first priority for all' and with that idea in mind ICFOSS introduced women hackathon, she added.

She was a member of the Hackathon conducted by the ICFOSS. It was a residential workshop like thing for three days. Basically what they mean by Hackathon was a competition with prizes. But the Hackathon conducted by ICFOSS was a bit different as it was not a competition. There were technical sessions as well as non-technical sessions. There were almost 20 to 25 students in one Hackathon each and there were conducted three such Hackathons. These Hackathons were conducted during August and September. Going into the technical stuff, they had Debian installation, delivery of speech on software freedom and so on. There were sessions about machine learning, app development and other stuff for enjoyment.

She then invited Miss Preethi of LBS college of engineering, Kasaragod for sharing more about their experience in the Hackathon. She said that she had attended two women Hackathons, the first one was conducted by the TKM College of Engineering, in collaboration with the SPACE Organization and the second one conducted by ICFOSS. She was not aware of Hackathon in the beginning and accidentally she came to know about that and went there with her friends to participate. She found there a lot of girls passionate about technology. They had many sessions like debate, games etc. and everything was concentrated on the questions why the girls are lagging behind boys in the case of technology and what we can do in order to help them to improve the technical skills. From there they got an idea to start a campaign called Iinstall that mainly focused on helping girls to improve their technical skills like teaching them how to install the open source software in laptops. The first thing that they started was teaching to instal Debian in the laptop. After going back to college they started many things in the Iinstal campaign where they got a very huge response from their juniors and they came forward to participate in that campaign. There were also participation of women hackers from various colleges at different parts of Kerala in the Hackathon she attended secondly. There also they got a lot of experience to share with their juniors at the college. Now they had a group of women hackers working together to improve their skills at the same time for helping others to come forward to know

more about technology and she was so proud to say that she became part of a group which is growing day by day with full passion for technology. She is also proud to say that she is a woman hacker, she concluded.

The first speaker continued and mentioned that it was a train the trainer kind of program which means that they train some students from some colleges selected from all over kerala and they go to their colleges and try to teach others. The other thing they gained from the Hackathon was that they got an inspiration to install FOSS Cells in their colleges and are continuing successfully. The main problem is that this Hackathon is localized to Thiruvananthapuram and people from Kozhikode have to travel to Thiruvananthapuram to attend the programme. So it is better to conduct the Hackathons in some other cities as well to get the program a huge success.

2.4 VENUE 02

2.4.1 How can FOSS Empower Me? : Mrs. Aruna Sankaranarayanan

She is working as an Engineer at Map box, built on top of the Open street Map Project which is a crowd sourced Map with informations added by the people from the entire world. She narrated her journey in the FOSS movement and how through the process of working in FOSS, had overcome certain fears and how can find avenues to contribute to FOSS projects and how can use FOSS basically for solving problems actively in the world. She said that it is important to reach a place in life where you actually feel empowered to create change. She got the strength due to working on various FOSS projects. If you want to contribute to free software but you are not a programmer, then also you can contribute by writing, drawing, collecting things and so there is a place for everybody in the FOSS movement, she continued.

She was very interested in pursuing literature but there was a fear like being a middle class person she did not know if she could find a job or if she could find enough opportunities to follow her passion. So she studied engineering, though not interested to it. There were broken things that she somehow assumed that she would solve when she grew up right in a certain sense of the term. Because of the broken system, she was torn between focusing on marks versus focusing on working on really interesting projects where she could actually make a difference. So, that was where the first change in her life happened. She found community is really important for individuals to actually make change so as an individual you can have a really minimal impact. But if you find community and in a way you enable and build this community and this community enables and builds you right and then the chances effecting a larger change is more probable. So the first things that happened is that she found the wonderful community called FSMK, which is the Free Software Movement of Karnataka that was a part of the FSMI movement, the Free Software Movement of India. The FSMK used to host Linux users groups in several colleges and one of the places where they hosted this was her college. So she went to the Linux users group not knowing what to expect and somebody was talking about how you can partition your hard disk to install Linux. At that moment she was working using windows like any other

person and was so terrified at the thought of even installing another operating system because she believed that she would not be able to use that. The other thing was that she did not have a laptop and the only computer that was there was the desktop of her parents at home. She was obviously terrified of breaking their system by installing Linux on it. Eventually she managed to partition her hard disk and that was really thrilling for her because all her knowledge had been theoretical to an extent and that very small step where she was really scared of what would happen. But nothing bad happened was and amazing feeling.

FSMK used to run community centers in Bangalore, usually located in slums and housewives who came there were taught how to use Linux. There would be children from the slums who would come in to play games on the Linux machine. And the other thing that they also did was go to small shops in the area who were using windows and say that they do not have to use a pirated version of windows. They can actually use Linux instead and they can help them to move to that stuff. So in a small way she started to feel like she was affecting change in a very very small way. And through FSMK the other thing she did was also help organize conferences and talk to students, where they spoke about free software. She learned a bunch of really new things in. The second step after found the community was that she wanted to acquire some skills. She was a really good C++ programmer in high school and she got in to a fear that she could not program because she did not know what to do with programming. She heard about the Outreachy Programme for women when she was in the college. One had to be a woman to apply and she had to at least submit one patch for a bug in order to qualify for application. So one had to actually contribute before she could even qualify for the programme. She had to pick an organization and a skill so there are many many organizations like GNOME foundation, the Vicky Media Foundation,the Mozilla, the Debian, the Linux Kernel and several other organizations. She did not had to be a programmer, but could write software, could code if she want to, could write documentation and so on. They often need maintenance and they go through several cycles and you could also draw if someone who likes designing things, you could design logos for the project like a gaming application that is in open source, to draw pictures that go in to the game so you could do all of those things. It is really important to be fearless because a lot of that was very new when you start doing it and the newness

is really overwhelming . So it is really important to be fearless, if you want to be a programmer. She chose a documentation project, so she worked with that mentor where she started to write documentation for the GNOME foundation. It is really important to be persistent through all the newness and even though she contributed to a documentation project, she ended up learning GIT the version control system. She also had a lot of confidence because she had exposure to the world outside India by working with contributors who were in the UK and in the US, and actually contributing to a large project. All of these were very empowering, and so she got confidence and ability to take initiative and look for opportunities. She also started actively to think about problems in the world.

The nice thing that happened a year later after contributing to the GNOME foundation was the GCompris project. This was her first attempt at writing code for a free software project. She picked the Gcompris Project because at that time they were actually moving all the software from an old framework to a new framework and personally she felt that it was the best time to contribute to a free software project and it was very easy to get in to groove more quickly. The other nice thing about the GCompris project was that it was really fragmented so you can contribute to individual activities. The GCompris is a Game Software for children and so you have a set of activities and people constantly come up with new activities to contribute to the project. So when she worked on the project she moved three arithmetic activities that taught addition, subtraction and multiplication to children from the old project. For her, technology is interesting but what is more interesting was how it can actually change something for someone. The GCompris Project is widely used in Kerala and SPACE is actually using GCompris to teach children with disabilities and also other children in kerala who come to the Center. So by this time she actually reached the point where she started to think about if she felt something that was not fixable, had enough confidence to actually want to fix it.

She was also writing for Wikipedia and so wrote articles on Musicians and also on Ragas and other things that were very specific to Indian classical music. So at this point she noticed that there are a lot of information on Wikipedia about the theory of music. There are pages about ragas where people are talking about what the raga skill looks like and what is its emotion and all that. When she was reading those pages what she knew very intimately about the art form was how it sounds right and when you read this page it is not very clear like how it sounds. So she looked at Wiki media commons which is where the media that comes in to the Wikipedia pages lives and she found that there were two media articles that were related to music. She really wanted to change that, for example, the scale of Mohana raga sounded differently when heard and so she started to make recordings of her and posted them on Wiki media commons. That was where she had her first adventure with free software. The project is called the Archive of Indian Music and what the project did was it digitized gramophone recordings. She used to listen to that project quite a bit and what she found was the project claimed copyright on all those recordings, but some recordings were clearly out of copyright, because the artist who had sung those songs was long dead. She went looking for the office, the website of the Archive of Indian Music for collection of recordings and the efforts taken in that regard was really empowering. Currently there are 60 recordings on Wiki media commons, all related to classical music that are freely licensed and so everyone without internet can actually listen to all of that.

There were several projects since then that have worked on and a project that is based on the open street map is an important one. It uses open street map data and it is essentially a map of the world where you classify the names of street as those named after women versus those named after men. So in Bombay you can see everything in blue is named after men and everything in pink named after women.

The second project was the Chennai Flood Map. In 2015 Chennai had a really disastrous flood and at that time what they did was they took the Open Street Map Project and they built a really simple application that would allow users to click a road and mark it as being flooded or not flooded. If everything that you have see in pink is actually a flooded street in Chennai and if you like to unmark a road as not being flooded, you could also do that. So they worked on that for two days as they were just interested in doing something and they did not even knew if it would be used and had any time for publicizing that. But what was really amazing was that it was really widely used and at peak time about 6,00,000 users had used the application. People contributed so much data that was very useful and that project actually went on to win recognition from the United Nations and that was featured as an exhibit in an exhibition around Urban Planning and Development by the United Nations.

The next project was an analysis of the BMTC Network in Bangalore. They took the Bus Network and they just did a lot of statistical analysis on it and so in that map the sizes of the vehicles were actually the number of routes that pass through a bus stop. Every circle is a bus stop and you can see that the Bus Depot or the place where most buses come in are concentrated on the centre of the city or they are spread widely across in the outskirts. There are depots in the outskirts of the city.

Currently she is working on the project where she is transliterating data for the Open Street Map Project. You are just required to convey the sound of the word in transliteration. She was really interested in doing that because her Grandma cannot read English but can read Tamil. So she was very interested in transliterating to Indic Languages. Then to start off with she is transliterating everything to Hindi, and subsequently there are python libraries that were actually developed by Swatantra Malayalam Computing and they transliterate between Indian Languages, so she is planning to use the library once she gets the first phase done.

The other stuff that she worked on is the internet shutdown tracker for software freedom life centres. They were tracking how the Government actively shuts down the internet in districts whenever they scares a confusion. There were tapping all the news from the media and wanted to represent that as a map.

Another thing was that her friends were going around India to interview women in science and technology. A map made on this actually shows all of the places they have been to and the place they are currently in. It is really important as a first step to find a community with your own friends. Then you can approach a group of free software community that you resonate with and you have friends in it. And the third one is to start thinking actively about the world so there are so

many things that directly impact you or people can actually change by using a small piece of technology and solve those problems.

If you write, then you can do a lot of work with Wikipedia and thereby make contributions to free software. Wikipedia also offers grants so you, if you are someone who is writing in Wikipedia. You can ask them for money to travel to conferences and also can ask them for money to organize workshops where you teach other people to contribute to Wikipedia. You can write user documentation for several free software projects and there are mentors who can help you through it. There are tons and tons of projects where you can contribute as a programmer, you can fix bugs, you can fix issues, that may be just personal to you or that affect many people.

Another one is design. You can draw, add assets that can go to games. That can be service logos for Free Software Organisations. You can also translate and there are several people who translate English in to many languages. There is also localization like the project of SPACE using GCompris. This GCompris project currently is one game that features currency and currently it uses like Euros and like the western form of currency and that is not something that the children here will relate to. So at SPACE they had actually designed assets that resembled rupee notes and rupee coin and the software suddenly became more usable for the children. Similarly they used an India Map and the Kerala Map to look at various districts and that is also really useful. She mentioned about some opportunities that are specific to women, that only cater to women in Open Source which are listed below:-

The Asen project actually gives you 50 dollars per day to immerse yourself in Free software. It is a six week long fellowship and you can actually work and everyday you get paid for it.

The HP Helion Open Stack Scholarship that caters to people who want to solve issues in security and issues related to infrastructure so again you get paid for a three month internship and you get mentored and you work actively on a Free Software and contribute to it.

You have the Anita Borg Pass It On Awards and these Awards are for people who want to solve issues related to the gender BIOS and FOSS and to improve awareness around FOSS . So if you are someone who wants to organise events and introduce more people to free software you can look at that.

There is the Outreachy program which currently caters to women. There is also the Rails Girls Summer of Code which is again a women specific program and you can work on a Ruby on Rails project for about three months. So this is just like the tip of the Iceberg, if you go to this you are in wiki.openhatch.org and there are several organizations listed and not all opportunities are isolated only for women. There are also opportunities for everyone, so you should definitely go and take a look.

She had mentioned those because she had personally gone to all of those conferences and gained a lot, though she is in no means advertising any of them. She had been to FOSS MEET

at Calicut which also was really good at introducing students to free software. Hillhacks was a really cool conference which she went to a couple of years back. It happened in Himalayas and it actually brings together the people in the media, artists, people who work with technology. There was also Hackbeach actually happened in Kovalam, the last year and the year before last. Hillhacks was hacking in the hills and hackbeach was hacking in the beach. There were people working around renewable energy. There was someone that she met who was trying to create an Open-Source Alternative for biogas and how it can be used in households and act as an alternative for conventional fuels. There was also the state of the map Asia which is very specific to the Open Street Map Project where you learn how you can contribute data about your neighborhood and how that data is then used by several others which includes again lots of grassroots organisations that are interested in those data. She advised that you can go to any of those.

Some questions relating to the subject were asked and she answered them satisfactorily.

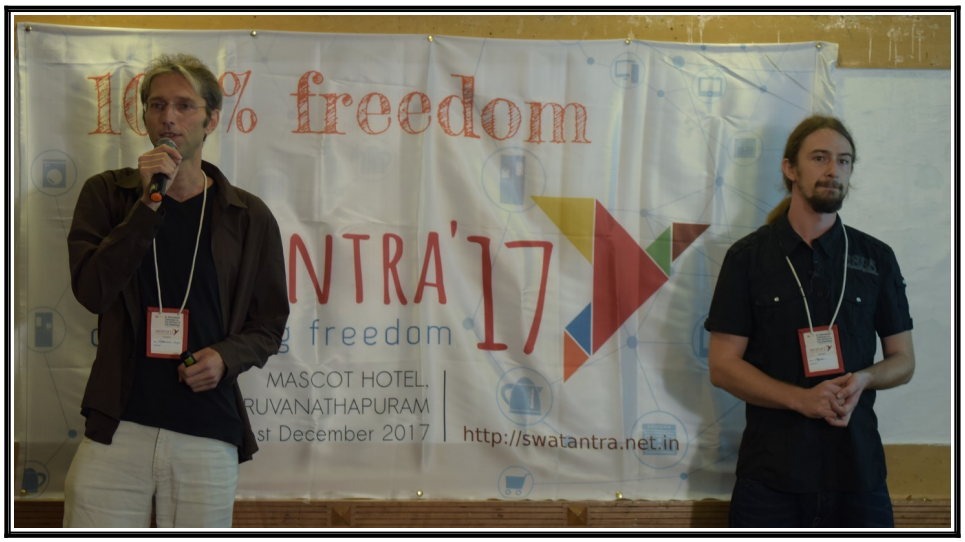
2.5 VENUE 03

2.5.1 Affordable & Opensource Assistive Technology Solutions for People with Physical Disablities : AsTeRICS, FABI and the FlipMouse : Benjamin Aigner & Chris Veigl

Mr. Chris Veigl is a computer scientist and compere robot designer and a former Deputy Head of BMP Smart Homes and Technologies. Mr. Benjamin Algner is a lecturer at University of Applied Sciences Technical Wing, Vienna. They introduced themselves and began to talk about the assistive Technology tools they have created. They have been working for software development and the technology for the last 10 years and developing Assistive Technology Tools for people with disabilities in open source software for the last seven years. They have formed a small group called Asterix Foundation to advocate assistive tools and open source technology. There are 200 million people in the globe suffering with severe disabilities of different types who could benefit from assistive technology. The main problem affecting these people is that most of them are not affordable to the assistive tools they are getting today. People have different types of disabilities such as motor disabilities, multiple sclerosis, sense disabilities, speech disabilities, hearing disabilities, cognitive disabilities such as learning disabilities and the like. The engineers and developers can help with the creation of technology tools. Assistive Technology can be defined as any piece of product or system that designed to help to smoothen the functional capabilities of individuals with disabilities. These include glasses, wheel chairs, Hi Tech tools, ASCII based tools and so on, for which they are focusing.

Some of the Assistive Technology Devices developed by them were explained with the help of pictures. One of them is called Mouse flip which is a specially designed very small keyboard with which people with low range of movement can have access to the keyboard with the mouse. Several devices for mouse control were designed with aim to help such people. The main challenge for making these tools are the high expenses involved and people chose open source based tools to make the expenses reduced at a much lower level. Another difficulty is that the

assistive technology tools are not flexible because the product may be designed for a particular disability and that cannot be suitable for another kinds of disabilities. Different kinds of assistive technology tools are made in the AsTeRICS framework in accordance with the capabilities of the user. Mr. Benjamin explained the features and specialties and working of the Assistive Technology Tools in detail with the help of pictures. He added that the devices are developed for running on free software and are made with cheap materials affordable to the people with disabilities. A demonstration of a fifty four year old person called Peter who is suffering from multiple sclerosis, a disease affecting the movement capabilities of the muscles was made there. He could only move his head and not the hands or fingers and had also problem with his vision. He was a lover of music and he had great collections of music and want to play music. They visited him and suggested a solution for his problem by making suitable assistive technology devices, for which he agreed. The challenge there was to develop a suitable device to make it possible to use the computer and internet by him. They want to make multiplication of the screen so that the letters appear very big to suit his vision. They have made a combination of Flip Mouse and AsTeRICS framework and made the same happen with his lip movement.



They are of opinion that assistive technology tools in open source are very suitable for the countries having shortage of money. They have visited Nepal and Bhutan during the year 2014 and some of the occupational therapists showed much interest in the technology used for disabled people. They have stated that the situation in Kerala is much better because many people are engaged in open source software and are cooperating for developing assistive technology tools here. Availability of the devices in the market and the licensing issues were also discussed. They concluded the speech by saying that the software and details are available and they will be happy if somebody is interested to work in collaboration with them.

2.5.2 Being Human in an Open Source Driven 4th Industrial Revolution : Milan Vathooppan

He is working in Fortiss In the group industry 4.0. They are a non-profit Research

Organization located in Munich, Germany. The topic relates to automation and industrial revolution and open source is the key enabling factor for industry 4.o with a lot of humans in it, he continued. You see automation everywhere, when you drive a car, riding in a public transport or in a traffic Island. When you enter a building where we see automation in lighting system, in the doors etc. which improves the building performance and thereby improves the quality of life. The objective of industrial automation is to improve the industrial production or industrial environment when compared to the general automation. If we look at some scenarios like in the soldering in an electronic manufacturing plant or in a power plant or in a bottling plant where the action is very fast or in robotic plant, human is not safe or convenient for work there. Thus the industrial automation improves the quality of industry by making increase in manufacturing and improvement in the working environment of humans in the industry. Automation revolutionized the industry. The first Industrial Revolution happened in the 18th Century with the help of mechanized automated industrial units. The first industrial revolution was based on mechanical power using levers like in cotton industries.

The second industrial revolution took place in the beginning of 20th century with the introduction of electrical power. Mass production of industrial goods happened with the electrical power. The third Industrial Revolution happened with the introduction of Programmable Logic Controllers. The peculiarity here is a computer takes the decision in accordance with the programs made by human being, though until then decisions were made by human alone. The fourth Industrial Revolution is yet to be happened. This is going to happen in a few years from now and the German government initiated it with the ambition that by integrating all the operational technology happened so far and to manage it by using information communication technology. With each industrial revolution the automation systems are getting complex and complex. The use of open source is the key enabler of industrial revolution 4.0 because it gives the flexibility to alter the set up according to the needs. In a water bottling unit, there are different machines for pouring water in the bottle, filling the gap, sealing labeling etc. which are connected to a single computer with programmable logic controllers. In that case it is not possible to produce some different quality of water by using the same system of machines and so they are not flexible or adaptable. But a machine envisioned for industry 4.0 will have programmable logic controllers for each machine and if you want, for example, shoes or a car with some special features of your own, the company can produce the items the next possible time by making some changes in the different machines installed for making each components of the item. The mass manufacturing method adopted in companies will be dispensed with in the industry 4.0 and you will be able to customise your products. There are different machines which are heterogeneous, intelligent and able to talk to each other. If the company wants to connect with another distribution unit, then they will be able to do so because all the units in the systems are integrated and interconnected and are communicable. We could say that the future industries will be flexible, integrated, predictive and safe.

The open source is the key enabling factor for this type of industry. We have to make sure that different machines used are interoperable, customisable and to arrange them to interact each other. Collaboration of multi organisations reduces the capital cost and most of the companies are not able Implement automated solutions and much amount for purchasing such solutions from the open market. So open source is the key enabling factor to make industry 4.0 happen.

The next important aspect in industry 4. 0 is the human aspect, passive human and active human. Passive human means you are part of the system, interacting with the system and passing some information to the system. Active human means those who develop the system, interacting and connecting all the human in the system. Then he explained the working of the active human in an industry by showing an industry automation pyramid with different units working together and the stages with which an industrial unit like a water bottling plant is functioning. Passive human is someone as part of the system who has to understand the future control system. Everything is there but they are loosely coupled and can be connected like a plugin free manner. This helps for building an adaptable reconfigurable solutions. There is service oriented plug and produce architecture and here each resource offers a service, contributing to the process. The reason for developing this kind of architecture is to make the system more human friendly. Here humans can talk to the machines and they in turn can talk to other humans.

There is a control and communication layer. A standard is introduced for the distributed control networks in a service oriented architecture, namely, IEC 61499 which is a standard introduced by the Industries Electronics Commission. Industrial products have to comply with certain standards and people will not accept the products that are not in conformity with the standards introduced by IEC 61499.The basic introduction of standards happened in the year 1990 and the aim of it was flexibility, modularity and distribution in industries. Here the different automated units interact with each other to act on a base unit In the digital frame and the automation is made possible in the standard introduced in IEC 61499 which integrates free and open exchange formats in Industrial Automation. If you want to make any changes in the production of your shoe, for example, the company has to make changes. If the mechanical wing want to make some changes they do it by the software and if the electrical wing want to make some changes they also do it with the software. There shall be some tools to connect all these things. You can exchange standard data from one software tool to another which was done earlier by through papers and here the tools are communicating with each other seriously. For each component or modular units we are producing an automationable data for generating programs for different tools. We have the automationable description of machine for producing the product. You can generate control programs in tools like 4diac, Open Modelica or Unity. 4diac is most popularly used one which is publicly available

He concluded the speech by saying that he recommends to become Active Human in industry 4.0 future plans for the growth of the industry.

2.5.3 Manually Building Your Own Tile Server with OSM : Yogesh K. S

He is working at IT for Change, an NGO which seeks to promote innovative and effective use of Information and Communication Technology. He introduced himself and said he would explain how you could build your own Tile Server using the open street map data. We see in internet that the Street Map specifically comes from a system called file server which usually generates a set of images that are tied together The database can be from any source and in the case of Google map the data is from the Google data source.

There are some other third party tile servers available in the internet and so you have to decide whether you want to build it as your own or to use the third party tiles that are available in the internet. It is easier to get started by using third party tiles but there will not be much control over it. You have to get together a lot of components to work with when you want to build your own tile server. You require a lot of hardware for the purpose and if you do it for a State or a small country the hardware requirement will be less but if you want to use for the entire planet the hardware requirement also will be very huge. For the purpose of data actually we are doing Bittu to take the openstreetmap data and put it into the file server which actually generate the map images. The important components that are necessary for the server are an Apache module that generated on the server, render which takes care of the priority events for the tiles to get generated, then the matinic library where the rendering takes place and PostgreSQL is the database used.

All of these components brought together to generate the database. They are using Ubuntu for the purpose. You will get the source code from the GitHub and can build it for your own use. The slide shape configuration is another feature and whatever colours we want to get or whatever features represent in the street map are actually coming from the slide shape. In the case of standard www.openstreetmap.org website you could see a file shape called Open Street Maps Slide Shape. This is a kind of CSS way of defining the slides and there you get mention of what colour a river

should have, how you represent a road and so on. You can build the software system and then there is the need for database. If you are working for the entire planet you take the data from the planet net sites and if you are working for the whole of India you will get It from the latest extract of the Geographic site. It is very important that you should have a lot of hardware requirements for doing all these things and the success of the process depends on the availability of such requirements. You can also store some required data from the local sources. When you done with all these, you have set up your own tile server. Now when you actually want see the tiles from the browser, you can see the lowest level of tiles without any library and without any extra mapping. You can use your tiles with one of the open street libraries to increase the database.

Some questions as to whether there are any restrictions or governmental control to use the database, were asked. He said that there may be some guidelines from Government and there are some restrictions in mapping the locations like defense area and important strategic places.

2.5.4 Introduction to Microservices : Mr. Unmesh Joshi

For the last few years a lot of big internet companies who do business through internet publish how they structure different components in their system like build, deploy and operate components in their system. They are making their server system in such a way to do big business so that the spatial data will also be huge. There is a specific way to build the server system. An important aspect of internet business is that the server should be always up and note down at anytime. Thus these internet business companies build their server service systems in a specific way and search services are known as Microservices.

In a microservices system the system is divided into multiple components which interact with each other smoothly. There are many detailed definitions like Agile Manifesto for the development of software. You need to have knowledge about your requirements and should have a detailed design. In a civil work like a construction of a building or a bridge you know the detailed requirements and you can make a blueprint out of it before the start of construction. There you can prove mathematically on paper as to what amount of materials to be used and how much pressure it can sustain and so on. But there are no such equations found in developing software. If you want to

develop a website as in Amazon, there are general principles that people are aware of, but you cannot prove in the paper to show that by writing a particular code you can make a website like that of Amazon. If you need to build a good software system you needed to value in individuals and interactions. You need to talk to people and to build a working software. You should have personal collaboration with people and you should be aware of the changes to be made and willing to do so. The most important thing is the requirement change. If your software need a requirement change, you should be ready to do it immediately. We can see the big internet business companies are doing multiple deployment daily. Thus responding to change is a key thing. You can take quick decisions by local decision making. Locality is lost when a new team joins and then the requirements, development, testing, and deployment are also change. Then the whole team will be responsible for making all the decisions from recruitment to deployment.

In micro services you partition your application into multiple collaborating components. Here you never start with a simple website and you partition that into multiple components. There is componentization through services. The most important focus is on searching around business capability. Your service should map with your business capabilities and build a team around that. Micro services allow team autonomy, allow to make own decisions in accordance with requirements and to work independently. The architecture will be made compatible with the desired team structure in it. He concluded his speech by answering certain questions relating to it from the participants.

2.5.5 The role of open source hardware in healthcare : Mr. Ashwin K Whitchurch

Mr. Ashwin K Whitchurch is the Chief Executive Officer of Circuits at Electronics Solutions Private Limited. He said that the same principle governing free software applies to the open hardware also. He continued his speech by quoting a statement of the WHO that 90% of investment in medical research only benefits 10% of the world's population. A lot of money is being invested for Medical Research but the common man will not be able to afford the benefits arising out of it, which is a very sad thing. They are working for the production of medical devices, namely, Soldier Monitoring System for the Indian Defense Service. Most of their knowledge in making the devices are common knowledge and they decided to make a principle that this knowledge can be applied to other areas without the breach of proprietary rights. The entire system is proprietary to the Indian defense and how certain things they did as non-proprietary was narrated by him.

There are unique regulatory conditions which is called Pristine Medical Conditions prescribing standards for the design of devices fixed by the Regulatory Authority. But in the case of low income countries, the regulations are only in paper and there is no strict observance of these regulatory conditions. Of course the matter of cost is there and the health professionals in these countries make decisions based on common knowledge and without measuring anything since they have no access to the machines. There is the practice of using used machines for the purpose but these machines break and it will cost more money for repairing it than for making it. The manufacturers may change the models for making money. The low income countries does not mean that they have no income at all and if machines affordable to them are made, then there is a big

market. The solution is that you have to innovate new models of medical devices that are affordable to these low income countries. Then he explained an example of a patient monitor developed by proprietary companies which is of a high cost. Here you cannot make any software updates when there is a need for that due to the working conditions and so this is like a black box. On the other hand they made an open source patient monitor using Raspberry Pi, which is functioning properly measuring blood pressure, ECG, respiration, temperature, etc. This is not a certified version and he explained about the working of it. So for making an open source hardware device like the patient monitor you have to buy the components, develop the software and build the open source device by using a Raspberry Pi, the cheapest open source computer available in the world. Right now this devices is being used as an educational equipment and in some hospitals, it is used on pilot basis to benchmark against the standard devices.

They developed another device used for detecting heart rate variations. One obvious application of this device is arrhythmia detection. They have worked on few algorithms using heart rate variability, which can detect certain forms of arrhythmia like atrial fibrillation which is a common form of arrhythmia. This device can monitor a number of events and protect high risk heart patients by detecting before any cardiac arrest happens. Another interesting application that they developed is Stress. Heart beat variability is indirectly connected to the autonomic nervous system functioning. Nervous system has two functions, that is receiving the information and giving back the information. If any one of these responses become unstable, stress happens which leads to a lot of psychological conditions. This will result in the increase or decrease in the heartbeat and the change may be temporary in nature. But the change of heartbeat is severe, the patient can seek remedies by conducting further checkups. The cost of the device is only two dollars.

Another Project they have taken up was for the development of a device for the detection of stillbirth. India holds the highest number of stillbirths among all the countries in the world. They tried out this device in the low income country, Malawi in South Africa. There are no obstetrician available there and only midwives are taking care of the pregnant ladies. Foetal monitoring is very common in developed countries and in India. Continuous monitoring is available in big hospitals. Most of the foetal death happens during the time of childbirth and because of the ignorance of the mother about keeping the right position. They were monitoring the foetal heart rate from the abdomen of the mother by using some low cost sensors. The cost of the device was so

cheap and was only fifty dollars. The software was written in Python. The heartbeat of the foetus is monitored and analysed and the mother is asked to change the position if there is some changes found in the heartbeat of the fetus. He concluded the speech by saying that these small ultra low cost devices have made a huge impact and will be suitable where no solution is available and will make a difference.

2.5.6 Build Your Own BlockChain with Free Software : Mr. Harry Halpin

Bitcoin is a BlockChain based decentralized cryptocurrency and each user has a a public or private key pair, he said and continued to explain the salient features of it and the transactions being carried out in Bitcoin money exchange system. The cryptographically stored messages are sent through the public or private keys for money transactions between persons. The transactions between users are stored in BlockChain. Software wallets store keys are on hard drive or smartphone and you can buy or sell bitcoin using the bitcoin wallets. The BlockChain is dependent on the hashes of the exact data put in blocks, so changes propagate and destroy the integrity of chain. He made detailed analysis of hashes, block in the BlockChain, fork, hash mining and so on.

You can create your own coin like bitcoin and for that you can simply fork the bitcoin software or use the free software Libbitcoin. You can create your own genesis block, which is the first block in the BlockChain and total amount. Then you can change the hash function and get rid of mining. There are lots of examples like Namecoin, Litecoin, Dogecoin, Freicoin, Zcash, etc.

The next generation processor to bitcoin is Ethereum. The language used is very simple like JavaScript. This is run by a known group of humans called Ethereum Foundation. It is more easy to evolve than bitcoin. It has its own currency called ether which converts to gas to run smart contracts. Each step in a smart contract requires so much gas to run and each node replicates the computation, being paid in gas. The programmers get paid when smart contract is paid. Some

questions were asked at the end of the speech and he answered them.

2.5.7 Cultural Event :

There came to an end of the day one of Swantantra 2017 with a cultural event held at the lawn near the Business Centre, followed by a dinner. The cultural event was headed by the Oorali Music Band of Thrissur. They sung folk songs with the accompaniment of various musical instruments. The rhythm of music was so attractive that the entire audience danced in tune with the music. The attitude of the foreign delegates and speakers showed that they also enjoyed the cultural event very much.

3 DAY 2: 21 December 2017

3.1 Plenary Talk: The future of Computing : Todd Alan Weaver

It was a talk about the future of computing and why you should be careful. You have to decide the future of computing. If you are given the choice of one ethical Utopia and an unethical dystopia, it is obvious that you will choose the first one. Many people take technological decisions which steering the community down a path forcing the unethical dystopia. This is happening because it is convenient to give up control. Any software, device, website or application controls the user is unethical. That is a single corporate organization controls your services. But the centralized services like Gnome where no single organization controls the uses of service are ethical. Personal data visually collected is unethical. If your personal data is stored and encrypted in a corporation's Cloud Servers, then you are giving up control of your digital life. Proprietary software controlled by corporations are unethical which means they use property binary applications with the corporation retaining the source code. Free software is ethical because the source code is made available. Forcing a corporate account linked to a financial account is unethical. When you are forced to create a centralized corporate controlled account and to link to that account financial payment system

simply to get a free application is unethical. Tracking, installing and using software is ethical. Likewise retaining personal data permanently is unethical. Why the security camera should retain personal datas like location, date and time permanently, he asked. Thus removing unnecessary personal data is ethical. If you have no control over your device and data you are creating an unethical future. Digital right is a mere physical right. In the physical world we have hundreds of physical and legal precedence for ethics and rights. You are knowingly giving up control for convenience in a digital society, he said. The phone knows more about you than you do. It has picture perfect memory of everything like photos taken with GPS active location, all shared with unethical corporations. There is nothing wrong in storing data in your device when it is in your control. We become cyborgs in future and imagine that we get an option for surgically implanted brain device with which we can read and write your thoughts visions and senses. Then you should worry because the company operating that device will not be doing it for your interest.

We can create an ethical digital society by following some simple steps. Decentralize and make sure that no single entity controls the users. The users should have their own keys for their data and nobody else. The Free software in which the source code released is another step. It has to be convenient to get adoption. The user should be able to keep the data without tracking. If the society decide to make convenient ethical products, then we can take back control. If every person use, support, recommend and make convenient ethical products, then you would already be in Utopia. He concluded the speech by saying that watch your plan for tomorrow.

3.2 VENUE 01

3.2.1 Electronic Health Records in low resource settings : Angshuman Sarkar

He started the speech by saying that there is not much amount of technology involved in the subject he is dealing with. If the mind is without fear the head will be held high with free knowledge and the world will not become fragments due to narrow mindedness, as stated by

Tagore in his poem, he continued. He works with thought works Global Health, a company having 500 employees spread across 15 countries and have 40 offices. Till 2012 they were doing social impact programs involving technology with good market intention in association with various research companies and other Institutions like Johnson and Johnson and UNICEF. They were not very close to the people who get benefit with the service. At the end of the programme their responsibility also ended and they were unable to assess impact of the project from the feedback. Since 2012 they began to conduct different experiments and gave focus to the projects that are build, maintained, supported and sponsored by them. The name of the project is called Bahmini, named after a remote forest village in Chhattisgarh. The Sub Centre health clinic and the organisation existed there inspired them to conduct the project. The project is an end of the year hospital management system which comprises of multiple existing established open source applications like OpenMRS for electronic medical records and patient management, Odoo for inventory, billing and financial accounting dcm 4chee, an established radiology system and OpenELIS for laboratory management. All these are integrated and used in 25 countries and there are 500 downloads in a month. This is a recommended HR software by many countries in Asia and Africa and it is also a strategic asset for large humanitarian organisations. This is in open source as an open system for the open community.

In 2012, they started the journey with Jan Swasthya Sahyog, a hospital in Bilaspur District of Chhattisgarh. An important question posed by many was as to why the cost of software is too high. Software which is free does not mean that it costs less but the operational cost of software is much higher than we pay for the software. People in small places do not have small problems. A local clinic also need standard quality softwares for clinical examinations. They also need advanced softwares, make it simple to the local needs, have access to the internet and such other infrastructural facilities and the result will be much expense. Low resources, poor knowledge, inadequate infrastructure and so on are prevailing there. Thus things are very different from major hospitals. A physician is the natural attorney of the poor in villages and now Jan Swasthya Sahyog is somewhat like a digitalised hospital, which uses EMR, billing, pharmacy, laboratory and radiology systems. It is also using for clinical care, operational efficiency and teaching or training. The digitalisation is used for leveraging connectivity and EHR for remote consultation with

specialists, data driven for research and advocacy. They are self sufficient and self reliant with the system and aiming for integrated EHR, integrated sub-centres and CHW programmes.

Another example he cited was Gudalur adivasi tribal Hospital near Nilgiris. It is a 50 bedded Hospital. They are using Bahmni since 2015 in EMR, billing, pharmacy and in lab systems. Bahmini reduced infant mortality rate to twenty out of thousand from three hundred out of thousand. They are self reliant and run it by the tribals for the tribals. 75% of the tribals have dedicated to the improvement of health. They have taken the challenge to teach others and even to teach the doctors visiting at the rural areas

The project done in Bangladesh was narrated and said it was a health information exchange. They have achieved the building of a platform in less than a year. They looked the e-governance at a different level that is patient at the centre and with a view to reach a time when the patient need not go to the doctor. The Health Services should reach out to the patients knowing that they need a particular medical service at a given time. They have implemented the Health Information Exchange system in the Ghazipur district of Bangladesh which is one of the most populous districts in the world having about 4.5 million people. The records about the patient like the hospital in which treated, the doctor who treated, the disease for which treatment is given etc. are shared through the Health Information Exchange. The patient gets a portable ID containing all the records of the treatment. The collected data are analysed by the health authority and so they will be able to identify the sensitive areas in which a particular disease is more prevalent.

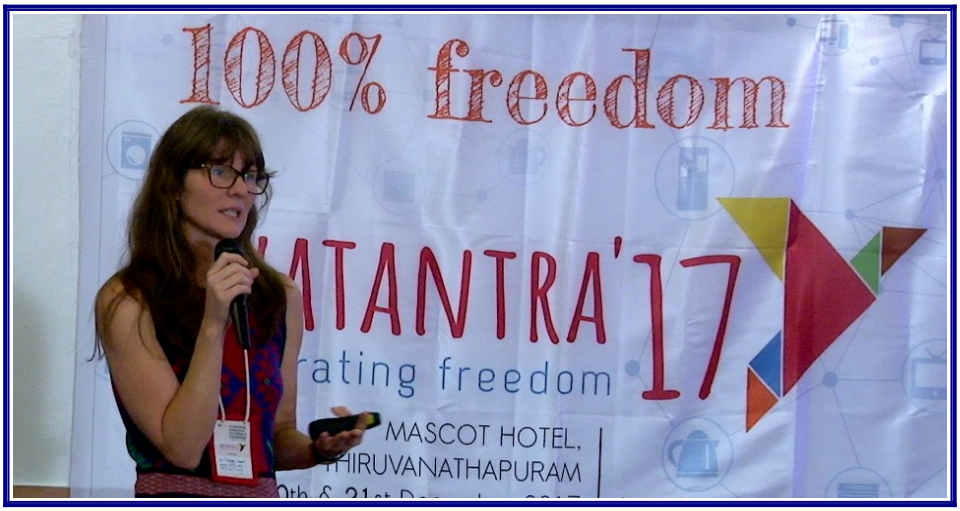
The project in Nepal was done in a hospital at the remote North-Western part of Nepal In a place called Achham. The project was made possible with the help of an NGO working with the Government .They have also another hospital at Charicot in Dolakha. They have achieved more results with the integrated EHR. Multiple sub-centres were already connected with the community programme with the involvement of various partners. They used CommCare, another technology and used bio metrics to identify patients.

MSF, an organization called doctors without borders is one of the partners of them for conducting several research work in the medical field. Innovation cannot happen without experimentation. The basic fundamental thing in a hospital is the lack of efficiency in collecting the data of patients and make use of the data for better treatment. The doctor is overcrowded by a lot of patients and he will not get sufficient time to take down all the details from the patients. Here comes the possibility of Digital Pen. Everybody in the hospital from doctors to paramedical staff need be trained to digitalise the results of examinations of patients like temperature, ECG, x-ray, pulse with the help of cost effective software and conveyed this information to the doctor through a suitable way, would do a lot for solving the problem. The ID of the patient is a challenge for using Digital Pen and exporting the digital content as image is a better option. The software used shall be in open source and see whether the right tools are used and it is suitable for the local needs. Healthcare is a complex domain and when you apply software, think in terms of the system and not in terms of the technology.

Unless you share all the general informations in a democratic way there is no use in doing all the above things, he said. Bahmni is always an open source product which is a consortium of seventeen organisations of Implementers, end users and network organizations spread across globally. He concluded the speech with the hope that more hospitals will implement Bahmni for better service to the people.

3.2.2 Internet Infrastructure,Values and Politics : Mrs. Mallory Knodel

She is working as senior technical coordinator in the association for professional communications and continuing there since the year 2012. She worked for the integration of Human Rights, people's standard approach to communication and technology work and the social movements around the world. She has dual role in the organization, one as an able administrator and another as a technical expert. They have around sixty members in the organization based out in Latin America, Africa and Asia. They have no headquarters for the organization and established in the year 1990. Earlier, some of their members began to provide internet connectivity and website's email services to the civil society Organisations in the world during the 80s. They have realised the value of working together. Family members from Australia, England, Nicaragua and California are working together for free internet services is a great thing, she said. One important point of the topic is how the continued collaboration will be beneficial for a subject like free internet services. We have to explore the possibilities of sustainable alternative infrastructure against proprietary software. We have to work together in a collaborative way and their organization is trying in that way. She suggests a vision of four layers.



The first one is social layer which recognizes institutions, organizations and people who are in the way of planning. ICANN is an important institution supporting the internet governance, which can be placed at the top level which is the social level. Second layer is the content layer and the third layer is the latitude layer which contains all the infrastructure, the machines used, software and so on . The fourth layer is physical layer which includes the servers and the like. The internet governance shall be in free software and ICANN has a very great role in

it. Another Governing body at the physical level is the ITU, the International Telecommunications Union. They are functioning to preserve the technological packages allocated and for the governance of it. Then the IETF, the Internet Engineering Task Force, which is the premier internet standard body developing open standards through open processes. It is a large open International community of network designers, operators, vendors and researchers concerned with the evolution of the internet architecture and smooth operation of the internet. The technical work of it is done in various working groups which are organized in several areas. Privacy issues and security issues are also dealt with in the physical layer. The feminist principles of internet are also being dealt with by them. She concluded her speech by saying that every entrepreneur have many problems and they have started to work together to find out solutions to such problems.

3.2.3 IT Initiatives of Kerala State Electricity Board Limited : Mr. Ramesh

He started the speech by extending gratitude to ICFOSS on behalf of the Kerala State Electricity Board Limited for inviting them to participate and share their experience in the Swatantra Conference. They have been participating in the past Swatantras and sharing their experiences may be because their experience is an inspiring one especially in the context of Kerala as well as in India. They have taken an extraordinarily effort to convert all their software platforms and development initiatives into free software, he said. KSEBL has a vision policy of providing electricity to the customers safety, adequately and sustainably at affordable cost.

In 2007, Government of Kerala approved an IT Policy for promoting initiatives in free software. ICFOSS is actually the result of this IT Policy. KSEBL also formulated an IT policy based on this. Before 2007, there were mainly two proprietary softwares available in the KSEBL, one developed in house by the KSEBL team and another supplied by an agency. With the adoption of the IT Policy of 2007, they decided to go for platform independence and vendor user and so shifted to free software. The main objective of the IT Policy of KSEBL was to become the forerunner of the power industry and so they had to concentrate on that area. The other objectives were, to enhance the quality of service to the common man, to create massive IT outists to common man both in services and infrastructure to incorporate IT, to bring efficiency and transparency to render better efficiency and effectiveness to employees, to attain better supervisory control, to take

care of advances in business and consumer preferences and to contribute towards digital India and e-governance Kerala.

When they started to develop free software, there were visible results in the culture of the employees. There developed an extraordinary culture of sharing the knowledge and information, capacity building, teeming out, helping others and caring others among the development team as well as among other employees. There is also a substantial saving in the licence cost. The first software developed was Oruma. It was a web-based software confined to sections and was not interconnected. During the development of that, they came to know that the knowledge in the software development in that area was zero. Then they approached SPACE and they trained them to adopt PostgreSQL as the database and PHP as the scripting language. The capacity building was the next task. There were enough human resource for the capacity building in the KSEBL. They developed teams in the areas of web development, communication, load balancing, etc. They initially started to develop the metre billing and collection software Oruma and applied the free software initiatives in other areas of KSEBL. Government of India put forward a scheme called R-APDRP and KSEBL was selected as one of the utilities. The total amount was rupees 218 crores and was divided into Part A and Part B. The part A was concerned with software development and IT and the Part B was for district wise automation and other things. They created a state-of-the-art data centre at the Vydyuthi Bhavan, Thiruvananthapuram and also a data recovery centre at Infopark, Cherthala, by using that fund. They are replicating data in real time now and if any disaster occurs In Thiruvananthapuram, they can come back in service within less than one hour by recovering data from Cherthala. Now they have connectivity to all the sections of the KSEBL and have created infrastructures like data centre and customer care centre, utilizing the fund. The main aim of the R-APDRP Project was for reducing the aggregate transmission loss to 15%. It had focuses on action, demonstrable sustained loss reduction establishment, enable an automated system and for collection of accurate baseline data. For managing the electrical network, the collection of accurate baseline date was needed. So to generate accurate baseline data and to measure the energy flowing through the system more effective, they had to build an IT energy accounting. The R-APDRP was not in existence during the development of Oruma which was developed at that time due to the situation demanded an immediate requirement of the software. The data was spread over 600 sections all over Kerala and the security of it was the main issue then. So when the R-APDRP Project implemented, they went for a centralized electricity billing software. They aggregated the data Into the data center, a lot of rework was done and an elaborate course of migration was done. Thus by 2015 they migrated all their sections into centralized data. At that period Oruma net was concerned with the billing of low tension consumers. They developed another software called Energize for the High Tension categories. This was developed by outsourcing to the Tata Consultancy services and these two softwares together cover all the consumers of KSEBL. They used PHP, PostgreSQL, Linux platform, Debian and Ubuntu for servers.

On getting inspiration from Oruma, they have started other IT initiatives. They developed a human resource management system which include Payroll, PF, pension, employees information, attendance and everything connected with it. They have also implemented the online transfer system without any manual intervention. There is a centralized accounting software called

Saras. This is actually started as a revenue accounting software covering everything and now it is on the way for becoming corporate accounting software for KSEBL. Energize, the software developed by TCS is in the maintenance phase and is being maintained by the KSEBL IT team after making so many changes in it in accordance with their needs. There was a Supply Chain Management which is also an outsourced one. A lot of funds are moving through the supply chain area but the software performance was very poor. The KSEB IT section took over the project and a lot of up gradation done and now it is just up to their needs. The next aim of them is to go for an ERP.

Now almost six kinds of online payment facilities are available in KSEBL. The software for credit card, debit card, net banking, RuPay card online payment facilities were developed internally by the KSEBL. There is IT team integration with three payment gateways and direct integration with five banks, namely, SBI, South Indian Bank, ICICI, Federal Bank and Canara Bank. There is also anywhere payment facility where the database is centralized and the consumer can go to any section office and make payment for another section office. A cash deposit machine is there at the centralized customer care centre at Vydyuthi Bhavan and another one in the Powerhouse. There is a single window payment facility and customer care centre at Vydyuthi Bhavan, Thiruvananthapuram with fifty employees working in it. To report a complaint, there is a toll free Customer care number 1912. This dialed number will be taken directly in to the customer care centre and it is documented and reported promptly back. After the complaint is cleared, there will be a call and an SMS. You can make complaint through SMS, WhatsApp, walk in or through email.

There is an outage management system called Urja Dooth developed for giving alert in the outage in a section office. You will get an SMS alert of such outages, if your mobile is registered with the Urja Dooth. This is a program of the Central Government called Urja Mitra to aggregate all complaints in a single network. Seventy two lakh customers are getting service through this network. Urja Souhritha is an automated spot billing software. If the bill got approved you will get an SMS with details such as the amount to be paid, the last date of payment, the date of disconnection, etc. Customers can make payments through any common service centres across India like Apna CSCs, Friends, Akshaya Centres of the IT Mission etc. Another newly introduced facility for payment is National Automated Clearing House. You can automatically pay your bills by giving a mandate to the Corporation Bank by depositing sufficient amount there. They have developed a mobile application for avoiding delay in processing the applications of service to the customers. Safety Reporting and Accident Monitoring Tool is a mobile app developed for monitoring the safety and availability of the safety tools for KSEBL employees working in the field. The customisation of the Spot Billing machine was done by the IT team of the KSEBL.

There is no private policy existing in KSEBL and there are some security problems and so they are not allowed to share their consumer database with anybody and so not accessible to public now. But they are trying to publish everything under the GPL licence in future, he said as answer to certain questions asked in this regard from the participants.

3.2.4 UNESCO and its Free Software Policy : Davide Storti

He is native of Italy and works for the promotion of UNESCO's Open Training Platform. He started the speech by asking the audience to say something they know about UNESCO and explained that it is about Education, Culture and Science. Later it added Communication information also into it, It was originated during the Second World War with intention, 'since war begin in the minds of men, it is in the minds of men that the defenses of peace must be constructed'. It is very powerful and strong world organisation today, he said. There is Freedom as well. ' State parties believing in full and equal opportunities for education for all, in the unrestricted pursuit of objective truth and in the free exchange of ideas and knowledge', is the idea behind the functioning of UNESCO. The information regarding what is happening in the world and to make choices are being dealt with UNESCO. It has a long story of working in this area. They are creating information exchange formats, biographic standards for exchanging information from books, strategies, etc.. These are all done by using software. They found the free software to be useful for information management and sharing of knowledge since it is freely available, the source code is known, people can develop software in accordance with their needs and informations can be disseminated more effectively by using it and decided to promote the use of free software.

With the idea of promoting free software movement for public good the UNESCO started to develop tools for their use. They searched the FOSS portal for identifying the FOSS tools available. They have identified the FSF portal for their free software needs. Then they started working to get the recognition that software plays a role in development where the software is for the welfare of nations and for the society. They decided to advocate for the free software movement. The people are not going to learn about coding very soon but are able to get solutions from FOSS for education, science and culture related activities. Their software need was mainly for libraries. They started a project of Open Street Map since there happened an incident of earthquake but the people were not able know what was there before the earthquake.

FOSS is not for software alone, he said. The concept of FOSS is applicable to the two other areas such as educational resources. The concept of it that the content can be shared,

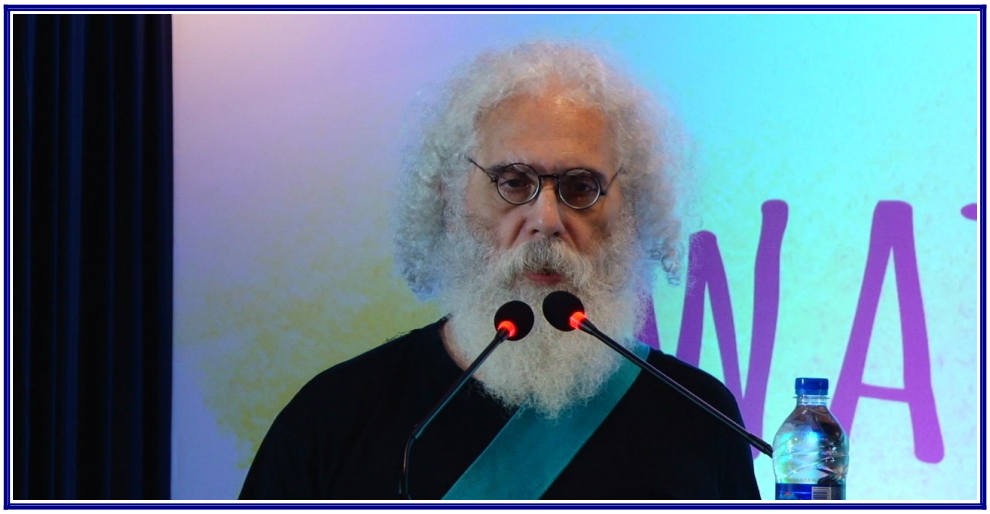
changed, improved, transferred and reused are applicable to other areas also. They started thinking out how support can be given for the promotion of FOSS. UNESCO adopted an Open Access Policy. Thus in the year 2014, they launched the Youth Mobile Initiative for software education with the the objectives to let the young girls and boys to understand the technology and to understand what is behind the box and what is in the Black Box. They started a bottom-up approach by providing support of projects on the ground. They also conducted specific programs for girls keeping a strong gender equality focus. With the above aim they started twenty six projects in different countries, mainly in Africa, to support the initiatives taken up by such countries. Africa Code Week 2016 and 2017 and e-skills 4 Girls (G 20 initiative) are some of the initiatives. This was the basic coding experience they had imparted to the thirty six African countries in a short span of time. That was a huge massive exercise involving decision makers, teachers, volunteers and such others for that fantastic thing to happen. Germany was added to G20 initiative since they wanted to do something specifically for girls. Many countries like UK, South Korea, Australia, France are made coding a subject in the school curriculum and UNESCO started thinking to get into this direction and decided to support the training of teachers in coding and possible such other means.

Preservation of documentary heritage, the history of humanity is another important thing being done by the UNESCO. These are in digital form and they made a great library of source code, a new essential infrastructure for software source code, the Software Heritage. The vision behind it is that the software embodies our collective knowledge and cultural heritage. The aim of Software Heritage is for collecting, preserving and sharing the source code which are not limited to FOSS but others also, provided there is access for the same. The idea of FOSS that the same can be shared, altered, re-used and can be used for non-profitable purposes, is applicable here and there should not be one owner of this Software Heritage, he explained. Some questions related to the archives available with the Software Heritage of UNESCO and he gave answers to that.

3.2.5 Free Software and Music : Juan Carlos Gentile (Hipatia)

He said that he had not much graphic with him and he was a musician. He was born in South America, Uruguay. His father was an Italian man and he lives in Italy. He has dual citizenship and that means a double foreigner in two countries. Since being a South American he cannot keep far away from the society and politics since South America is very much troubled with military dictatorship which is very common there. If you are close to social problems, then you will be immediately inside free software and so he thanks to be South American. He followed inside free software due to more than one reason. One is politics and the second one is because of music. He is a classical trained musician and started playing classical piano European music when he was three and a half years old, with his father who plays the violin. He was playing some Morton music with fingers and he was lucky that in the middle of his music career one of his fingers got cut and that disturbed him a lot to continue playing piano. He then decided to put more energy from science to earth and continued the music by turning into computer music. He was Pre-internet, Pre-computers and was using small calculators but no wireless no internet with some error in the calculation. Then came the first computer and the first Internet that he could install with the help of a friend at the University. With the help of the scientific background he had, he turned into computer music and

dedicated himself to teach music. Then he finished work at the Computer Centre of the Columbia University and went to New York to listen jazz music. For computer music you cannot do music without writing code. Just like the creation of animation motion picture, the musician will be more time in silence in the middle of music sounds for creating computer music. What happened there was that they were sharing code continuously and then if they do not share code with you, they do not have the music done. There is extremely a high liaison of sharing from them, a liaison of sharing or music because you can imagine that you take a call from another one who has an idea and you are modifying into music coding and then you give it back to him. This is the second reason why he came to free software. He then came back to South America during which time there was the beginning of the World Software Forum. In India there was one in Mumbai in 2005 and that was the first time he met Mr. Arun. It was the first time when they created the Conference of Free Software Free Society. In South America the left win election in the south part of Brazil and he was for a while hacking the governmental system in Argentina. He was taking some rooms and computers from the University to make a laboratory of free software for children. He conducted an experimental teaching to the children that lasted for one Summer. They could completely change the thousand five hundred students of 5 to 12 years old in the school to free software because of the result of of that work done in the summer. He was called by the Brazilian Government to make a school networking in Rio. They have the resources and the money and he had the experience but if the experience plus money are not contributing for the adoption of free software, nothing is going to happen. They tried the networking of schools for many months buts the result was zero. Later he was invited to Venezuela to become the Adviser for migration of their oil companies into free software. The interest here was much more bigger than for the school in Rio. But nothing could be done for changing them even the Government had stated it an excellent project done by Mr. Anand Babu, an Indian person who was a programmer and member of the Free Software Foundation of India. He was very worried about society and politics also some thought about his personal results. He asked where all we can correct and what should we take to make everything excellent.



His speech is dedicated to music and that comes from statistics and creation. It was the free software that put him in a condition to be creative. The proprietary software can also be creative but you have a bigger difficulty which drives you to the creator of the software. His advice for people who want to use music with the computer is that it is mandatory to use free software. In

the history of music the basis has been of course the instrument. If you play the piano, you cannot make a chord which is bigger than your hand's possibility. The electronics brought lots of new possibilities, of course the MIDI system. It is already parallel to the creation of the computer and the computer is leading the MIDI, the musical digital interface. Then computer and MIDI come together. You can create millions of electronic sounds by using computer but you must have skills for creation. You know amazing musicians in India and they practice many hours for music. Only the free software can make you as a composer of the 17th and 18th Century. Do not use the computer to test the work done by the real musicians. He said that he wish to introduce some kind of softwares created by people who had developed the history of science, something that comes from thinkers, most of them created in the United States and John Towning is an example who created the FM Synthesis. Most of the softwares like Sysanth were created by the Universities. He finished his speech there and invited Mr. Timoti, Mrs. Karen etc. to the dais for a discussion since all are interested to know what can be done for a change.

Mrs. Karen Sandler posed a question as to what could be done in free software if we get a chance to go back with time machine. Mr. Davide Storti representing UNESCO responded first. He said that the developers have neglected the free software at some point of time. He is personally wish to have more free software tools to be developed but due to some political reasons that are not happening as expected. A few years ago he was in a nice position of being leading the project on the Information Management Tools which was used by hundreds and thousands of people in the world and that was enough to make it sustainable and it was made really in open source. Today UNESCO is officially supporting free software for the sustainable development in the world and help you some way to go for this kind of freedom. The ideas of free software discussed can be conveyed to all the countries in the world through UNESCO but the actual difficulty is when these ideas are put into action. There may be some political, industrial, legal, or economical difficulties which resist the progress of it. There was opinion about collective freedom. Developing something for your personal use is unethical in the perspective of software freedom philosophy.

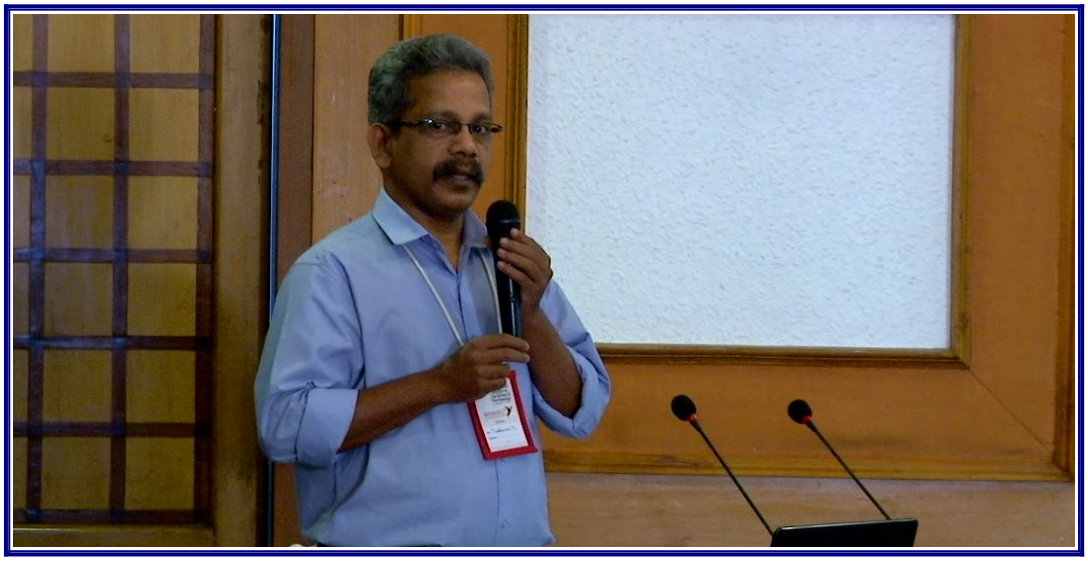
People are not actually associating free software with the philosophy of sharing it with the community and collective freedom. Krita, a professional free software programme, was in existence ten years back. The Big Portfolio Website was also there. But game development could be much easier if the artist had a free knowledge of these things at that time. Now the Krita artists have grouped together and made a forum and also the Paint Programmers also consolidated as a forum and working by sharing the ideas together. A question was asked as to what should be done now, not to think of what should have been done twenty years back for the development of free software for not asking such a question after twenty years from now. Mrs. Karen replied that free software stands for the proposition that no one and nothing are perfect and so still we would be asking what should have been done after twenty years from now. Another question was whether the dependence of computers would affect the way for composing or influence your way of being an artist since the artist is using new technologies. The answer was that an artist is not fully dependent on technology. But of course it will help him to make the creation more effective and worthy. A musician is not the part of an instrument though he actually depending on the technology for deriving more effect to the music. The computer gets feedback and uses a lot of sensors and the computer measures it in

different parameters like speed and diffusing in the loudspeaker system sort of specialization of the sound. But this cannot be done with people. You can do this much differently by using a computer. He concluded his speech with a positive note and said that education is something you want to change and they have decided to help each other, help to improve Gcompris, derive help from the UNESCO and the like for the propagation and development of free software.

3.3 Venue 02

3.3.1 ICT Integration in Primary Education-Challenges and Experiences : Mr. Manikantan. N

ICT integration in primary education is not going to be a very technical content, but it is about the requirements of users like the primary teachers, the students and the educational society, Mr. Monikantan said. So, knowing the real requirements are very important for developments in this case. They have done some projects for the last three years in various public schools in Kerala. They have an experience to share with you and there are many challenges faced by them which may be interesting and you can contribute to this to resolve many of the challenges they faced. Then he narrated the details of ICT implementation status in Kerala.



Kerala is receiving attention across the globe compared to the developing countries and the other States in India since it has achieved a lot in implementing computer based education and digital integration into education. Starting from the standard 1st to 12th they have done extensive use of computers in schools. There are 60 lakhs school students in Kerala and almost all schools have computer labs, though the number of computers and other facilities vary in different schools. We have ICT textbooks for Primary, Upper Primary and High School Students. There is a system of training all the teachers starting from the Primary to the Higher Secondary level. An expensive training happening and the system is reaching all students, all the subjects and everybody. They have lesser infrastructure which needs to be improved. Even though the situation is good and promising, there are few concerns. Many things happening at the ground level, but there is lack of

integration in reaching out it to the students and the curriculum transaction is not taught fully using ICT. In many of the schools still lecture type of classes are following even when changes were made in the national curriculum as well as in the State curriculum. Teachers have trainings and hand books are there, but teachers at rural areas are following the conventional method of teaching. In spite of the availability of a lot of computers, softwares and training, the capability of the teachers to use computer software is not found to be as per the expectations. So, they have to re look the way they teach them and train them and there is need for a review of it. ICT has all the facilities such as computers, other digital equipments and education softwares and so there is the advantage of reaching out to all types of students. We have teacher training institutes, B.Ed training courses and even though the curriculum integrated ICT into it, practically the teachers coming out of the institutions are unable to use the educational softwares and to conduct classes by using it.

The infrastructure issues are easily addressed by raising funds with the help of Government, many communities across the State, local committees and by various other ways. Another concern is the lack of development of local contents. Everybody has the final aim to pass the examinations and the system still concentrates only on examinations. Whatever you do with the computer in the classes will get ignored when the examination is a priority. Out of these issues, the process integration, customization of local contents and teacher professional development are the three key issues. A group of teachers and other professionals of Palakkad have formed an NGO society called Sweet. This NGO had studied, involved various people and discussed about the contributions to be made in association with various networking communities. They have done some educational package for children in the Primary schools, gave training to the teachers, created a lot of teaching aids and educational toys. Rhithu is a development firm under this society.

The process of integration is the most important thing involved in the teaching learning process. What is happening from the moment the teacher enters in the classroom is important here. This involves the management of students, the resources in the classroom, time, etc.. There are some administrative tasks teacher has to do in a planned manner through a proper defined process. Meeting each student who are of different learning styles is very important. So a defined process of planning is very important. How a plan can be prepared, what are the important inputs which goes into the process of plan making and what are the essential factors to be included in the output are the ingredients to be considered. There should have a method for evaluation of success criteria. There are theories like the constructivist learning theory and the multiple intelligence. These should be considered before going into making a teacher’s lesson plan. The role of parents and others should also be defined in the lesson plan. Such a plan is important in the ICT usage where the digital resources are to be involved.

The Moodle is generally used for e-learning purpose in which each learner becomes a user with own user name and password. Here they are using it for primary school students starting from the 1st standard to the 7th standard. Preparation of a lesson plan for a week by the teacher and getting it approved is important. For the effectiveness of the process they decided to work closely with the teachers and understand their problems and to explain as to why this is developed, what are the important factors to be considered while making a lesson plan, etc.

Non-digital activities were also made part of the system along with the the Integrated digital content package mentioned above. The non-digital activities means a students are not expected to be always using computers in the class but they are also expected to do some other activities like working on projects, playing outside etc. and to integrate these activities with the computer usage in the class. So they have included a lot of practical activities like project work in the classroom, games, different learning objects, playing outside are also integrated to the teaching learning process. As per the teaching learning process, the teacher selects a particular subject and the unit or chapter on which class is going on. A list of activity packages are given at the bottom of the curriculum textbook and handbook of the particular class, linked to the digital content. The teacher can click and open the screen and move it to show the students in the big screen and just follow the instructions such as how to use the digital content, how to evaluate it, what are the interactions to be done during the usage of digital content, what are the questions to be asked and to what kind of students etc. These are explained and examples are given on each digital activity. The activity objective for each one is indicated along with multiple intelligence types associated with it.

The next point is the activities that are carried out. The development of the Learning Management System faces so many challenges. A critical challenge is the integration of content development tools and the contents itself and the applications. There are a lot educational tools and applications available for using along with Ubuntu packages. All the laptops in the schools are installed with Ubuntu packages, which were done by the IT@School. But using all the applications in a web based manner is not possible. When you want your teacher to use it, you need to have the access from a browser. The present assessment tools available in the package is in Moodle and are nearing customization. People have a lot of contents available on the internet. But the problem is that your local priorities are not considered, your language and culture are not considered when the contents downloaded and showing to the children. The contents are coming from somewhere else and so the local community has anything to do with it. The teacher is just using and consuming something and not creating anything as expected from him. This is a serious issue. The teacher has to develop contents suitable to our children, as per the work plan. Most of the interactive games available through internet are designed for the interaction between the player and the computer. But the situation is different when we apply this in a classroom where the whole class is watching the same. So a lot of thought should go into the case of game development for the schools.

A team of experienced teachers and others like graphic designers are there to make the contents as per the plan structure and make the context in the lesson plan structure. The teacher can just think and select the available tools or contents that were created and modify the same according to the need of the situation. Currently they are using this method of training and some other supporting tools required for making animations and interactive activities are also used. For example, for subtraction under ten, the teacher is very happy to use this method and receives very good feedback. Similarly, games are developed by the teacher based on the inputs. They conduct workshops and visit schools and thus get a lot of inputs. Some of the contents are local contents like videos of singing, or dancing or playing of students in the schools and they want to add as learning content in their server only. The main challenge is that everything should be web-based because

they have an architecture which work on a LAN and have access to schools. A HTML5 register content is required. Android development tools are required since the teacher needs to make some changes.

The teacher development was the major task faced by them, as has been experienced everywhere. A teacher is expected to learn the content development tools and create contents in accordance with their need. The teacher is also expected to be a highly committed and motivated person to learn new things and make a lesson plan through experiments. They should be well aware of the usage of internet. They work closely with the teachers to understand their issues and try to resolve the things through discussions. A school itself can create a simple LAN with an existing computer used as a server, Wi-Fi setup and internet connectivity. They have desktops, laptops and Raspberry Pi which are the three clients available in the classroom. The hardware deployment is another challenge because of the cost of ICT infrastructure for the primary schools. Some other alternative solutions need to be found out to tackle the issue. The energy consumption cost is very high and so there should be some considerations to tackle that issue, he said.

3.3.2 Spoken Tutorial : Mr. Kannan Moudgalya, IIT Bombay

He introduced himself and said he is a Professor at IIT Bombay and was going to talk about collaborative cotton generation in India through Spoken Tutorial. The Spoken Tutorial is an audio-video tutorial which teaches how to use the Synaptic Package Manager. Then he began to play a video tutorial in Malayalam describing the use of the Synaptic Package Manager in Ubundu. He was using a laptop which costs Rs, 10,000 they have just started promoting. That machine runs in Debian. The most important thing is that spoken tutorial is created for self learning to teach Open Source Software. It is dubbed in all the twenty two languages and downloadable and can be used in offline mode. He showed this in Sanskrit language also. The disadvantage is that video is in English and so those who understand English only can follow the video. The advantage is that if you dub audio only in English there is only 5% effort required for creation. We can use normal keyboards and normal computers and no need for special keyboards or screens. Another very important advantage is that we can do the same quality video in all languages because the videos are not touched and only the audio is changed. So you get the same quality video which means that if the original video is in English, it will be suitable for self learning. Every language dubbing is suitable for self learning because only the sentences are replaced by the corresponding language translations and that does not change the self learning aspect of the videos.

The main focuses of Spoken Tutorial are improving employment potential and also to help students who are weak in English. But it is not to promote languages like Malayalam, Tamil, Hindi and so on. A large number of about 60 software topics are there including Linux. They have created 900 tutorials, each one of them having ten minute duration originally in English and also created some tutorials in foreign languages, for example, in Arabic, Persian, Thai, etc. They have been using this to train people across India and trained 4.2 million students for the last 6 years. 10% of them were undergraduate students, whether they are undergoing the courses like BA, BSc, BCom, MBBS, etc. They did this for 1000 colleges 500 districts out of the 650 districts in India and

there are 31000 college level lab courses that are using Spoken Tutorial as a part of their curriculum.

No login is required for access to data and that was one of the policy decisions they made right at the beginning since they found that 90% of the people are not allowed access if login is installed. Providing access is more important than getting data with which how many people are using it. Now they have 30 million offline page views. Something called create your own is a software training of them. They have trained half a million students in the most popular basic level C++ programming language. A demonstration of making a zip file of a shopping card and downloading and using it offline was made. The downloaded zip file can be copied in every machine. It opens from a file system with the same look and feel of the same web page but everything is packaged into the zip file including that required database that go with our selection process. Because of that most of our students are actually using the offline mode. He conducted this workshop in Myanmar where they had frequent power cuts and no internet connection. But all the laptops were already charged and installed with open source software. The Spoken Tutorial was downloaded using the offline version and so there was no power problem.

In India, in some institutions resources are a lot better but are inadequate. For example, in the recently completed training program of IIT Bombay, about 120 college teachers who came from all over India attended. They were trying to do Moodle and they had Moodle experts from Hyderabad. When all the 120 college teachers tried to connect Wi-Fi it did not work. The computer centre said that the problem actually is that all the 120 people are accessing Wi-Fi from one room and if you distribute them in the same building it may not be such a big problem. He run a programme called Massive Self Learning Silent Latex Workshop. Silent because everybody should listen to it using the headphone and they also had set up a forum to ask questions. They answer the questions through the forum. There were 250 people, everybody listening to different Latex videos at different points and somebody listening to English somebody listening to Marathi and so on. He would say that they could do it in such a way that they could make any internet band with collapse, because the available point is actually very limited. So here because of the offline there are reasons to believe that their reach increased at least 50 times.

The most unexpected benefits that they got was that it improved the self confidence of learners enormously. When they gave self-efficacy questionnaire and so on they found that the self confidence of trainees improved a lot and the reason they said is that they learn the topic by themselves. They listened to the video, learned and reproduced every command and became capable of understanding everything without any help from others. You are capable of learning by yourself is a tremendous thing. That is the reason why the Dravidian parties in Tamilnadu became very famous because their leader Anna said, “Unnal Mudiyum Thampi” which means you can do it. That is the most important thing for telling to the public. That self confidence seems to be the most important unexpected thing that got from the Moodle Training for 120 college teachers undergone at IIT Bombay. Two days ago they conducted a workshop on Git in which teachers of English,Commerce, Economics Engineering, Science,Management, etc. participated. They were coming from average colleges but they asked many questions. They actually found some mistakes in their exercise and they had to sit in the afternoon to re-do all the slides and to give them back. He would say that it was because of their improved self confidence level. It is a very interesting thing to see them happy that they have done the ground level. This does not mean that they are scared at this basic level and allowed to go and explore by themselves, but they have developed a confidence to do things by themselves.

They have another project called FOSSEE, Free and Open Source Software for Education which was initially called free and open source software for engineering education because they were in IIT engineering institution. But the funding agency said that focus need to be given to other educational branches also and thus changed the name of the Project like the present one. They have several projects, for example, Python, Scilab, eSIM, OpenFOAM, OpenPLC, Sandhi etc. and the name of the website is FOSSEE.in.

The next item he explained was about the Textbook Companion Project. We have a lot of manpower in the form of students. But unfortunately the students are not good at documentation and can be used only for helping documentation. So they found a solution to solve the inverse problem. Students are good in coding and so they were given code for the existing documents, ie, text books. Take hundred textbooks and for every solved example give Scilab code, if the software is Scilab and if the software is python, then give python code. By doing this, it becomes a textbook companion, ie, Scilab textbook companion for that book. They gave 10000 rupees for each student who did for one book. Now they have created scilab textbook companions for 570 books which means 65000 examples have been coded by thousands of students across the country. They hosted all The 65000 examples in the internet. Then he demonstrated the functioning by taking the chapter, Frequency Domain Analysis in a familiar book called Automatic Control Systems and said that all are hosted in the cloud. He said that with the help of textbook companion one can be able to use Scilab and there will not be any complaint regarding the ignorance of using it. Then people need not go for the use of Matlab which is several times expensive than Scilab. You can make search out of 65000 examples and thus this is a valuable resource for search.

They help colleges to migrate labs from Matlab to Scilab. They will also help colleges which want to migrate to Scilab and have expertise, by providing money as honorarium to do that and Certificates. They have just started the textbook companion project and are looking for

experts from outside to run the textbook companion activity.

The next one is Collaborative Content Creation. We want to identify classified people into three categories, namely, power users, trainers and promoters. We need to come up with the criteria, we need to select them assess them and we want to do this in a collaborative way by using peer assessment. They gave a list of 38 softwares to the 120 college teachers and gave five options that they could say like, I do not want to use it, I will begin using it, I will be a power user, I will be a Trainer and I will be a promoter, to know where they will be after one month and after six months. The third option is yellow belt, the fourth option is green belt and the fifth option is black belt. The result was very amazing that half of them said that they want to be black belt in Moodle which shows the increase in their aspirations and the confidence level. This is something that we want to do and set up for the whole country.

It is a common complaint that there is no recognition of college teachers though some are doing amazing work. There is one person who said that he created a Moodle server. So they send a proposal to MHRD for conducting a survey for identifying those who are interested in software development from the 120 college teachers who were participated in the Moodle training programme. It is high time that we get together in a collaborative manner and contribute to the open source. It has been said that India is mainly a consumer and not contributed too much to the open source community. But through their work they have been contributing a little bit.

A laptop made by them which run on Debian has been demonstrated and its features were explained. He was using the laptop for presentation. Even though 29 tabs were opened, the device was still working with good speed. It has 2GB Ram and completely optimized. They are going to promote it for below Rs. 10000 and hope to provide as a convergence device. Because it is unfortunate that 90% of our students have access to smartphones but only 10% of them have access to computers. The phones are good for consuming information, doing WhatsApp, playing games, talking to somebody and listening to music but not good to use as a writable device. You need a computer with keyboard for that purpose. The amazing thing with the device is that he has been using it since morning without a charger and battery now has 57% charge. What is important is that our children need computer to design better systems. He believes that it is a fantastic device in which all the softwares run. Unfortunately in electronic systems there is no connection between cost price and selling price. The electronics selling price is three times greater than the bill of materials. But they can work with a small margin though the volume is large in the case of this laptop

Some questions were asked at the end of the talk. One of the questions was whether any mobile based educational free software has been created. He said in the negative and added that he is sad in that aspect due to a small incident. A college teacher from Maharashtra called him one day and asked whether there can be more spoken tutorials on Scilab, because students are very happy with the spoken tutorials but only basic level are there and what about advanced level. He told him that they are finding it difficult to create more tutorials and he advised him to iearn from documented PDF file. Then he said two things. One is his students want to watch only videos and

they would not read anything. The second thing is that they download everything on to mobile phone and they listen to it. So, all their tutorials are being listened to in mobile phone. The problem is that our next generation is not going to read it. He then answered a question regarding the backing of the laptop he introduced for promotion. He said that the problem with any low cost laptop is that if it stops working, it is very difficult to get it repaired. Because margins are vapor thin and they are unable to provide after sales support. Until the laptop becomes a viable product and lot of people began to buy it, no after sale service will be made available.

3.3.3 The Role of Open Digital DIY Manufacturing Across Countries and Cultures : Marco Fioretti

He commenced his speech by pointing out the challenges faced by the society mentioned by the previous speakers of the Conference like black boxes implanted in our body and the manufacturing of unethical products by the companies. He introduced himself as a member of the Free Knowledge Institute which is a small foundation born in Netherlands ten years ago, aimed at the promotion of free knowledge to the society. Their goals are to promote freedom, knowledge and technology for a free society to make sustainable through collaboration and empowerment. We have noticed that things are not going completely well today in the world, he continued. We have extreme poverty, job uncertainty due to many factors which leads to precariousness in all spheres of life, mass migrations, problems due to climatic changes, disasters and the like. Everybody is running just to stay where they are when they are lucky but sooner or later they are stood fast by somebody who is just cheaper. This is something happening for decades and still happens and every time it becomes faster. We are filling the seas with the plastic and before getting into the sea harming the environment with it. People are working in extremely dangerous situations in their workplaces. These are not problems affecting a region or country but affecting the whole world. For example, in Italy a fire killed many workers in an illegal factory and the report of shock expressed by the United Nations with the news of poverty and bad health conditions prevailing in the rural United States. Thus the same problems are everywhere but with different degrees. In the Amazon warehouses and the textile industries in United Kingdom robots replaces workers. That means we are converting workers Into robots. In UK there is no labour problem that affect the introduction of robots but this will not be the situation in several other countries in the world.

We have many huge programmes like Internet of things, Smart City etc. for which Government and Corporations are spending billions for money. But one hardware manufacturer is engaged for operating the programme by spending a lot of money and the result will be very discouraging. One of the reasons why he is happy to come over here and share the view is that India and Asia are reported to be ready to embrace the modernity. But Asia is doing this by losing its own culture. India have great power as a nation and possibility and obligation to find better solutions. Many important decisions are taking place here and not in the Western media. This can be achieved through human cooperation from the top Government level to the bottom. Digital manufacturing is a huge revolution which is a sensible one and works with food, water and the things everybody needs every day.

You can have first positives and first negatives and all kinds of errors In manufacturing devices outside traditional making. It is a blessing for us because with this possibility we can save millions of poor people with the cost of one hundredth the coast of commercial ones. It will refinance the creative ability of individuals and at the social level people everywhere can be given the same quality of life with a much lesser cost. Creating devices according to the need of the community is a better way to mitigate the problem because the community alone knows the real problem. Imagine in a case where you order a washing machine and you assemble the parts, customise it and use for fifty years with repairs done by yourself, and then there is no waste of resources. A sort of assembly line in each community at the level of neighborhood, village or university something that can produce sequences of unique goods would change life.

The first Star War movie impressed him very much because the farmers in it were very poor people who have robots and space ship like machines. But they were independent farmers having control over their lives. In reality now we can make this vision true with the help of technology. Let every village do have drones, electronically controlled watering devices and whatever they actually need. This can be made possible if we move to the next level. The cooperatives, NGO’s, City committee or the like authority to run in a sustainable way for three years by offering services through sharing, common groups, do it yourself and the like in a sustainable model could be something good for the community. Their first interest is to see how you could remain sustainable for doing something good to the society like running a fablab, to make tractors, washing machines and so on needed for the society. They have models of successful projects and revenue models for analysing how do they work and document them In order to make other projects and devices and also figure out what other combinations become successful for the need of the given user. Now they are working on promoting how to make it actually sustainable.

Digital do it yourself even at the community level is good. Even at the community level because it gives people and community more ways to be creative, pollute less and more self reliant. Of course this can happen only if the Do It Yourself Project is free as in freedom and only if they use truly open technology, which can be customized to local needs. For example, you can have a 3D printer or any machine like that has many user interfaces in each of the many Indian local

languages only if powered by free and open source software. It will not happen if it is not in free software. No other way we could get it closer to the people without free software and obviously it cannot be in the secret of someone. This learning each other kind of manufacturing governance make sense and ease economically sustainable only if the throw away products are replaced by the products which are designed to be repairable to last for fifty years. For example, imagine repairable tractors are being made for and in a village, then the individual farmers could pay informally for it from their labour exchanging food, seed or something like that and use it for several years by making necessary repair work or even transforming it to the state- of- the- art product. We have to make some rules and regulations to figure out these changes legal. The digital do it yourself technology is based on cheap existing doable stuff. The Technology are in existence for the last 20 years and so it is not technological innovation but innovation only matters. The advantage is that the same technology chips in open source software, which are extremely cheap, can be used for the countries in different parts of the world. The technology is same everywhere but the way we use and manage it is different. We have to use the open and flexible technology in a way to respect local diversities and real needs. For example, an arduino board designed in open source for watering during seasons may not be suitable for the different parts of the world due to climatic conditions. The program should taken into account the local festivities. This is also the case with an accounting software and the importance of the same should be in free software. You can obtain a pirated software used in the western countries, but then you are forced to do business in accordance with practice prevailing in the western countries. The business model is different in countries like India and so you need to use a localised version of it for which a free software version only serve the purpose. The Western people learn from the rest of the world and they have the privilege of being the first for making technological innovations at most of the times. So let us share with an open mind to reach a critical mass, still working, respecting the environment and human everywhere preserving the diversity. We need social infrastructure, laws and regulations and local administrators that encourage this way of providing goods and services that make it possible for businesses, exchange services outside the formal economy using free software, free as in freedom and free hardware. There should have transparency in the creation and the products should survive the original creator of it. We should be able to document creations under open licenses and pressure for the use of other people who need it. We need to share knowledge and distribute this knowledge among teachers, civil servants and NGOs. He then invited everybody to work together with them to promote this course of action and development.

3.3.4 Building Firewalls, Access Points and other Network Equipments using Free Software and Open Hardware : Nishant Sharma

He introduced himself and said he had some contributions to the FOSS community by translating Debian installation to Hindi, as an Open Street Mapper and worked at deep-root Linux. He founded a company called Mukthi Technology where they are building network equipment's by using free software and free hardware. Then he continued to explain how a network generally looks like. When you connect a device to a Network, you either plugin the cable or use a wireless network. You connect either using a wireless access point or to the switch. So the cable goes to the switch and then the switch goes to a firewall and the firewall connects to a modem or router which takes you into the internet. Thus a typical network contains four kind of devices, a

modem or a router, a firewall, switch and a wireless access point. The modem or router which is provided by ISP and depending on the technology that ISP is using the up link might be of copper, fiber or Ethernet. This modem is connected to a Firewall which is behind to your router which controls effects that coming into the network or going out of network. A firewall can do additional things like traffic shaping, proxying, access control, inclusion, reduction and it may do a lot of balance multiple Internet connection as well. Switch is a different kind of hardware which may have four ports. The wireless access point simply extend your wired network over the radio either using 2.4 gigahertz or five gigahertz on license band and they are further classified by the speeds that can provide to this stations defined by the IEEE standards. All of them are sold as appliances. A computer appliance is a computer with software or firmware which specifically designed to provide a specified computing resource. They are generally close in seed and not serviceable by the user or owner. It is like a home appliance and they do not want you to open or tinker with it. So a network appliance is a hardware and software package together where the vendor controls the usability, whether the vendor will provide you or not an upgrade or support. They have a CPU, memory, storage, peripherals like USB port to extend the devices. When you open a wireless access point or a router you will find that it has a CPU, Wi-Fi codes and Ethernet codes. There are different chips and ram and storage are in one of the chips. A firewall looks like a box from outside and when you open it up you will find out that it has a CPU and all the other things found in a computer.

Network hardware has a very long life and decades old hardware still works. When a hardware becomes old it dies and then you may claim the warranty if it has a warranty or purchase a new one. If you wish to upgrade the network, your equipment may not have port to upgrade the network or may have grown out of the number of users it can support and you will be forced to replace it. Another thing is the end-of-life of the equipment which is generally enforced by the vendor by saying that they have a new version and the old version will not be supported by them. We want to renew our license in order to get support and will decide whether to buy a new hard hardware and they might buy back the old one, though the same will be still capable of working. We have bought the equipment by paying a large amount of money to the vendor and the vendor is not ready to renew the license. We are not allowed to open it up, change the software or re purpose it to use for something else. So the amount we had expended as a capital expense for purchasing that equipment which are operational expenses becomes recurring. When we come to the stage of multi vendor scenario in this age of interconnected networks, we purchase hardware equipments which

talk to each other, from some other vendors. When the network grows, the vendor tinker with the protocols and changes the definitions of certain languages and consequently network fails. An example is Wi-Fi extenders. If you have brought an access point and you want to extend the network branded A and if you want to extend the Wi-Fi to another corner, you have to buy extension with the brand A provided by the same vendor and you cannot buy the Band B device. Another example is about the case of smart cities. As long as you have internet of things devices from the same vendor, they talk each other happily. If you are ready to surrender your home or city to make them smart your home might become smart. Every vendor is trying to build their own ecosystem and if once you are locked down to a vendor, it will be very difficult to get out of that trap.

Another important aspect with proprietary devices is GPL violations. Many proprietary equipment vendors use open source software in their products but they do not release the source code. If you visit the website GPL- violations.org, you could see so many cases of GPL violations against which the courts have given verdicts in favour of the open source software. The most important one was the net filter which is the Linux Kernel firewall. When this case was pursued, the router manufacturers were forced to release the source cord.

Privacy, vulnerability and the like are some of the other issues. Now a days you can buy a smart home router from the Google. When you are talking about privacy or preventing data being shared from your phone or your computer and when you have a smart router in your home which connects all devices into the internet, then even if you disable the data sharing on your personal devices, from the rest of the devices they send a traffic through that home router and Google can analyse that data, though not at a micro level. A lot of vendors provide telemetry Information or analytics. They want to pull the logs and other information from your device to their clouds web. They process the informations and provide you with the report, but you do not know what they are getting into the cloud.

The vulnerability is being identified everyday. A lot of proprietary software vendors are not forthcoming for acknowledging and fixing those vulnerabilities. Even if they do, your box will have an expired license and you will not be able to get the updated firmware for the equipment and so you will not be in the safer side. The solution is that you have to take the ownership of the equipment and network. First we have to decide whether we need to take the ownership of the equipment and network or not. Once we decide we have the need then identify suitable hardware and the software components. We can then build the equipment and deploy them. You have to fix the problems and can thereby be stabilized them in a while.

Open source hardware is just like open source software where the design is publicly available and can be studied, modified and distributed. But the problem is that we do not have off the shelf open hardware available or we do not have a lot of choices with such kind of hardwares that we can use for building network equipments. In that scenario you have to use sufficiently open hardware of your choice for re purpose the hardware or extend the intended use of the hardware as decided by the vendor. So there can be a server hardware or a desktop computer or a laptop, a

Raspberry Pi and its derivatives or the off the shelf Wi-Fi router which can be used to install free software. Open WRT's website has a very long list of supported devices.

He explained the steps of building a Wi-Fi access point. Open WRT is the software to be used . To identify the hardware by considering the budget you can choose one from the Open WRT wiki or from the table of hardware. The benefits that you derive from running a wireless access point is that there is no matter who the hardware vendor is. You are running the same software in all devices. They are inter operable and if tomorrow you have to change the device, you will be running the same software in another device also. So you have to learn to manage a particular kind of software and It does not matter on what hardware it is running. You can build additional features if there is a USB port, you can connect a USB camera and can stream video in addition to providing Wi-Fi network as well. If you want to build a Firewall or a router, you can either choose a Firewall from the software list or can try to build it from the scrabs. Once you have the control over the gateway, hardware and software, you can build additional features on the device. For example, in this anti network neutrality era, if you want to bypass the controls being imposed by the ISP, you can make your gateway and router of your own to overcome it. To ensure privacy, you can block trackers and advertisements by simply installing an add blocker in the Gateway which will not allow tracker domains for access from a browser. It is easy to use VPN boxes. You can create a Raspberry Pi device which connects your network from a remote location. So instead of installing individual VPN clients on individual machines you can just have a box. You connect it to 4G and it gets connected to the internet and the VPN server and the devices can be connected behind it either to the Wi-Fi or LAN which will be easily accessible at home or office network from anywhere. He concluded the speech by saying that everything dependent on your requirement and imagination to identify the software which can fulfill your requirements.

3.3.5 The Journey of Gcompris : Timothee Giet

He is a French graphic artist, author, free software consultant and co maintainer of Gcompris. He is also a software user and contributor who contributed to a lot of free softwares, mainly to Krita and works as part of the Keri Development Community which is one of the biggest free software development community in the world. He began to talk about the Gcompris software, the history behind its development, how it evolved, where is it now and where it is going. Gcompris was started by a French software engineer called Bruno Coudoin in the year 2000. In the beginning it was a small size project for children. He was not satisfied with the existing educational system for children. So he wanted to create something in free and open source software that you can control for the children. Thus he decided to go into one of the biggest free and open software institution with a lot of contributors from all over the world. It is now using in schools and everywhere covering more than 140 activities from reading, counting, geography, graphics, logic games and so on. initially the French schools were reluctant to accept the software because they want some commercial support. The original version was retained using GTK+ framework, C++ and python. But in 2014 GNU decided to port the application to Quick using JavaScript because then it was easy to support Tablets and modern operating systems that could not be supported with the old framework. It was also

easier with Quick to improve the user interface to make it compatible with touch screen to create animations very easily. Gcompris migrated from GNOME Community to the Keri Community. So all the repositories and infrastructure are now in the Keri community website. This gave him a chance to meet Mr. Bruno during September 2014 at Keri Academy and started the journey to work for the community. There he got the opportunity to collaborate to upgrade the graphics to make it looking really good. In December 2014 there started a campaign to support his work in GNU Linux . It was not hundred percent successful but was enough to pay two months work to create the main graphic guidelines and to integrate with the main venue interface. In January 2015, there came the first release and are still using the eighty six activities out of the 140 activities from the old version. In July 2015 there came the release of another version which shows higher speed at which the project is progressing. He does the works for the graphical design, maintenance of website, interaction with social media,undertaking tasks like bug fixing and so on.

In December 2016 another version was released with hundred and thirty one activities. It was a very important release because It was at that time they decided to drop the old digitized version for the new one. It was difficult for getting support for the old version because it was getting obsolete and also no one in the given team was ready to work for something became worthless. At that moment they updated the website with all the assets from the new version which was a big work because the website was generated automatically using the information from the software source. It was important because a page showing more than hundred activities with descriptions are to be translated into all the languages they are supporting and they are very huge pages having about thirty languages. In August 2017 they released the 0.80 version reaching hundred and thirty seven activities which is almost completes the port.. They have seventeen fully supported translations and eleven partially supported translations including Hindi. He expressed hope that he could visit SPACE this week where the Malayalam version is being prepared which can also be made upstream in the website. In September 2017 they released 0.81 version with no new features but it is important because this was using the new software rendering at the level in Quick 58.This allows you to support all the worthy packages and also in every Windows systems. In October 2017 they made a package for Raspberry Pi which is a good and cheap hardware very useful for schools since they could only afford such a package. This is still a beta version and not much testing were done

One of the problems faced by them is that Windows XP is still using in many schools of several countries. They can not support Windows XP any more with the new version and the only option is to provide them with the legacy old version now and to advise them to switch over to Linux as soon as possible.

They have decided to release the next version 1.0 and distribute it through Gcompris website and App store. A few items are yet to be completed especially the amnii special panel used in schools to assign tasks and activities and to see the visuals and this was very convenient in the old version. There are some missing activities such as requisity and another one to create animations which were very useful in the old version. The work is in progress and expected to be completed in that year itself. They need to complete the graphics berth at least for the main activity

components because they have a huge dataset with more than thousand images. They have audio files in many languages in the old version and they use most of the audio files, but since some texts and descriptions have changed, they have to check each video files to see weather it will be fit for the new version. If somebody is interested to record voices in Malayalam, they are welcome for contacting them and they would be happy to integrate that in the new version. They have to update the website and manual before the release of the new version and to continue the same after the release of it. They have a very good complete manual for the old version and to make it updated for the new version. He invited some interested contributors and said that they are happy for working with them for the updation of the manual and and the website. These persons need not be developers or knowing how to make code, but should be interested to find out some time in writing. Anybody can make some feature request and they will be happy to add in the new version. There is a very good team for translation in the Keri Community and they are doing the work. They will also be very happy if some people from different States of India come forward for translating into their respective languages and they can integrate it in the new version. He welcomed the developers for bug fixing. The highest priority is not adding new features in the new version but to complete the ports and making Gcompris looking good, he added.

3.3.6 Blender Open Movie Production Pipeline : Francesco Siddi

The story of Blender, the animation software in Open Source Software and the creation of Open Movie Pipeline were narrated by Mr. Francesco Siddi here. The Blender is an open source 3D content creation tool. It was made open source in the year 2000. Originally it was an inhouse software. It is very common that this kind of software is used to create 3D Computer Graphics to be developed in a very specialized manner to produce commercial contents of perfect software like the proprietary software. It was developed not to share outside with somebody for profit but was for the use by a handful of some highly skilled specialized artists to sit together for making special contents. And of course it was a competitive tool which they did not want to share with anyone. But it eventually became an Open Source Project because it was essential for the purpose of survival. It adopted a very interesting development method which is called like content driven development, which means not just the developing the software per se but developing the software with some input, with some real life use like how actually makes the software usable, how to make software powerful, how can make your choices and where to go. Though Blender is developed as a powerful animation software with graphics, we can actually make sure that it works very well for many other choices. It is being used for Grammy award winning TV series, Hollywood movies, Indian movies, visual effects in Amazon series, the Man in the High Castle produced by Amazon Studios, Captain in the Galaxy and the like. It has a lot of input tools nowadays and the studios in America are using it and also used as an internal training material in USA, the European Space Agency and as a high quality visualization for scientific experiments and Google expeditions. They have a learning experience design for classrooms and with a simple smartphone and cardboard viewer a student can enjoy and learn Blender which will provide a great experience for learning. NASA is also using Blender and in Mars Programme it is used to provide the real experience to the viewers. NASA also allows to share a lot of materials through online GitHub repository and you can download models of spaceships and the like which are in the Blender format. Pirates is made in Blender and award winning games are made in Blender which

can be downloaded from the App store. Blender is a very special tool like any other tools in the hands of a capable artist, scientist or a craftsman. What makes the Blender very special is really due to its content development method and they do with the Blender of the movies, the Blender Institute and Blender Animation Studio. The Blender Animation Studio is currently the main contributor by making tools for development by making open movies and short films for the last ten years in Amsterdam. They have traveled all over the world to find out expert artists to work together on a project to make good quality animation films which is an open counter. But in some point it started stalling which means that it was hard to grow in quality because every time you assemble and disassemble a thing it takes some time before and after for things to do stabilized and so you need to make something more stable. So they use Blender cloud for sustainability and gets access continuously for their open content.

Blender is always free and there is no subscription attached with whatsoever to it and this allows you to get support from other people or agents to work. The excellent movies they created is an echo to bring the message of good film making. There are a great way to show what open source software can do and what open content can be. The teaser of the film Agent 327, which is their biggest project showed there for the audience to prove the quality of the animation using Blender. He then explained the quality of the short film and added that the hero, Secret Agent in the film is not like James Bond since the budget is very low when compared with James Bond films. Even then the things made worthy by putting a lot of artistic resources, a lot of action and a lot of research. The animation style is so good that much attention was given to its minute details as to how the cities put together and how to make it tangible or believable. The characters have the real look and feel that are actually walking around in this world. The film is a best example as to how Blender looks like when the character is set up for animation, how the character can be manipulated and posed. Every character have their own different expressions like how they smile, how they walk etc. and they have a personality of their own. This will explain you the computer graphic animation you really want to understand. It is important to understand who is the character, how does he move, how quick does he think, what kind of mechanics, what kind of body does he have and all of such things are part of research work while you try to make an animation movie.

The Pipeline is a series of processes that are needed to obtain the final frame of the

film. A lot of steps have to be taken and a lot of people have to perform different kinds of duties for that to happen. In the world of commercial software and in the world of many big animation studio, the Pipeline sometimes look like a very simplified version. The complexity of the pipeline is tool based and so a lot of people have to be specialized in different tools to perform their different tasks. Rendering and compositing are all different parts of the film making process and he began to show how does it translate into Blender Pipeline. In Blender, all the modules are integrated and so all the different tasks can be performed here. The interesting part of this is that an artist can pick up Blender and learn how it works and can learn the core interaction principles. Then he will be able to make transition to other areas. What is also more interesting is that Blender integrates for support to a lot of open source film making technologies like Python which are coming from very big animation studios that decide to release those specific libraries as free and open source software which are compatible with vendor license. In the world of commercial software the Blender had a very hard time as an adopter because of its closed mentality towards Free and Open Source Software and there was a very big stigma for free tools and there was also a lack of tracks. There were also lack of understanding as to how exactly the tools work.

Some interesting features of Blender that does not have in many other animation softwares were explained. An artist will be able to sketch out a story before it is being developed into a 3D animation film and it has such a power that it can be put together to create a quick video. The difference between using Blender and a traditional animation drawing tool is the full power of 3D articles and so it can act at three dimensions if you want. The smoke effects, 3D effects and geometry can be combined to save a lot of time to an artist using Blender. Some of the other free software tools that can be used in combination with Blender were also explained. Flemingo is a tool which is used for managing the final frames of the film. They work with open content which means whatever they do in the process will be published and shared with an open license. Anyone can freely download it and share it even for commercial purposes. This is a gyratory source of learning because there are not many places where you can find how real computer graphics are made. It is very important to share the technical contents like the real computer graphics to others.

There asked a question as to whether the plugin for motion capture add on has been updated. He said that there are a lot of factors like making of cheap animation pictures affect the updation of it. There was also another question as to how long does it take to do a feature film. He said that the Agent 327 was made with a duration of over one year. For an action feature film there should be a crew of sixty to eighty people working for two years. For the entire production of their new high end animation film a crew of 500-800 people worked for 3-4 years with a budget of 10-20 million dollars. One animator can animate four seconds per week for this kind of real world computer animation. Animation happens very slowly and if something goes wrong it will be very difficult to manage this kind of production, he said.

3.3.7 Vector and Cut-Out Animation for Everyone with Synfig : Mr. Timothee Giet

Mr. Timothee Giet made an interesting speech about Synfig software, his success in the development of it and its usefulness in the animation technology. Synfig studio is a vector 2D

animation software created by Robert Quattlebaum, with which you can just create vector arts and animate it automatically with interpolation or you can also use it to animate existing assets like images, import them and animate them automatically. The software was really crushy and not stable at all and so no one could use it and they would revert and leave after making one drawing. He decided to collaborate again to make it possible at some point that other users would be able to use it. He managed to make a few drawings with that, send those drawings to the developers and they really liked those drawing and it was really motivating for them to continue. He started contributing and collaborating with them, testing the software and after around two years of work they got to a point that it was really happy with the results. He considers that was successful and that really showed that the free software only be as good as for the relationship between the developers and the real users to get really good feedback. So he really hope that introducing Synfig to more artists will motivate them to create content and in turn that will motivate more developers to contribute to the subscribers because they had really a small team of developers and they could really benefit from more contributors.

He narrated the history behind its origin. Originally it was a fractal and vector image editor created by a guy named Robert Quattlebaum. The name was Synfig written a bit differently with the old logo and a fractal image made with it back in the time may be in 2003 or 2004 and it evolved in to an animation software for the studio project of this person. The name of the studio was Voria and he released it as a Free and Open Source Software product when Voria activities stopped in 2005. It has been maintained slowly across the years and now it is maintained by a guy called Konstantin Dimitriev, who is part of a team called Morevna Project who is doing animation with Synfig, Blender and Krita. So he became interested to contribute to the software to contact them and decided to see what can be done. He then began to show a demo by saying that you can do really simple things with it even if you are not an artist. He said that he would not go in details in launching software but would just show you quickly the workflow. If you want more information he would give you some information to learn more about it after the demo. Then he began to animate the banner of the Swatantra Event. He made the assets like the full banner, the background, the

logo, the title and the sub-title. He said he can just drag and drop all those inside Synfig there. He would change the size of the canvas to be exactly the size to 800 x 398 pixels and zooming out a bit. He started by dropping all the assets, resized everything to make it easier and selected everything so as to create a group layer. He adjusted the values in the asset. Animated the title like the title go from down to top and the bird from the left to the right and the sub-title making appear at regular intervals of time. You can use the keys to adjust and to make changes. If you want to animate something you just have to activate the animation mode and so it will record the points in time. He had done the animation for two elements and said, if you want to preview you can press play but usually it will lag a bit because of all the extra elements displayed on top of the animation. So the best way to preview your animation is to use file preview up. You can set up different frame rate and the beginning and time. Then he displayed the preview window, and said that would play at the correct speed. So second animation he wanted to do is on the the sub-title “freedom” at the beginning. He made it invisible and made transparent by changing the amount to zero and then again he wanted to fix it to zero so it will appear later at 48 seconds. Now the sub-title appearing and you can add some more things quickly if you want, for example the bird logo to move randomly. He would just add one very cool feature from Synfig like selecting the logo. The transformation thing there was the angle and with this angle value you can change to make it rotate, and so right click, convert and add a random conversion on it and then it will automatically add some random values to it and by default it will be at random values of just one of these reduced values. If you want it to rotate faster you can change the speed by using the net key. He said that, that was a bit more alive, a simple example of animated title which anyone can replicate very easily.

The second example shown was just animating a cut out character using bones . He said that was a bit more advanced but still very easy and anyone can do that with a bit of experience. He then closed the document and began to create the new animation. He would create a new one by imparting some assets for the cut out character, a sheep from his drawing in Gcompris. He then cut it into several parts and with the 3D film that he could switch. He trimmed out everything in the same size so everything will be positioned properly. He would not have to place everything manually afterwards, so he just dragged and dropped everything and grouped all those layers so he could resize the sheep. He just had to rearrange the layers towards the proper depth order like he need, the head first, the legs should be under the body, the hands, foots arms should be at the positions he wanted. Everything was placed at the right place. He had three heads and to switch them, he grouped them in a switch group so he could select the three head layer. Right click group layer in to switch there, now you can select the switch layer and there you have a menu where you can select any of the three heads. He took the first one, resized again and moved it down. He added a special layer to add bone to it. He had the skeleton and put that inside the group there. So the first bone will be the main bone to control everything. Then he could just add new bones. Right click any of the handles and create child bones there. So a child bone for the body and then another child bone of the body for the head. When you move the body, the head will move with it. It is not very important to be very precise here and need to create two child bones from the body for the arms. He would create child bones from the main one or so the body can move without moving the legs. It is very simple to connect the bones to the images. He started connecting the main bone to the body by control and click the body so both the bone and the body selected. Click on the main centre of the body and at the green point and then right click the green point of the bone you wanted

to link and thus link the bone there. You can move parts of the body by selecting the bone and rotate it with the blue end and by right clicking. He would do the same for each items like the arms, then the hands linked to bone and finally the legs linked to bone. Thus everything set up properly and if he move that all the body and the hands would move. If you use the blue enter, it will just rotate without any transformation which you can also stretch and squash the items. If you use the orange enter there for example just to increase it or stretch the arm, you can very fastly create animation. He said that this is a very simple animation for everyone but for advanced animators there are also really advanced and crazy joining tools, vector joining tools which you can find out in Synfig that you cannot find in any other joining vector doing applications. You can create outlines with variable widths with control points for the width of the line and it is really easy to use. You also can create some gradient curves which is something you cannot find anywhere else.

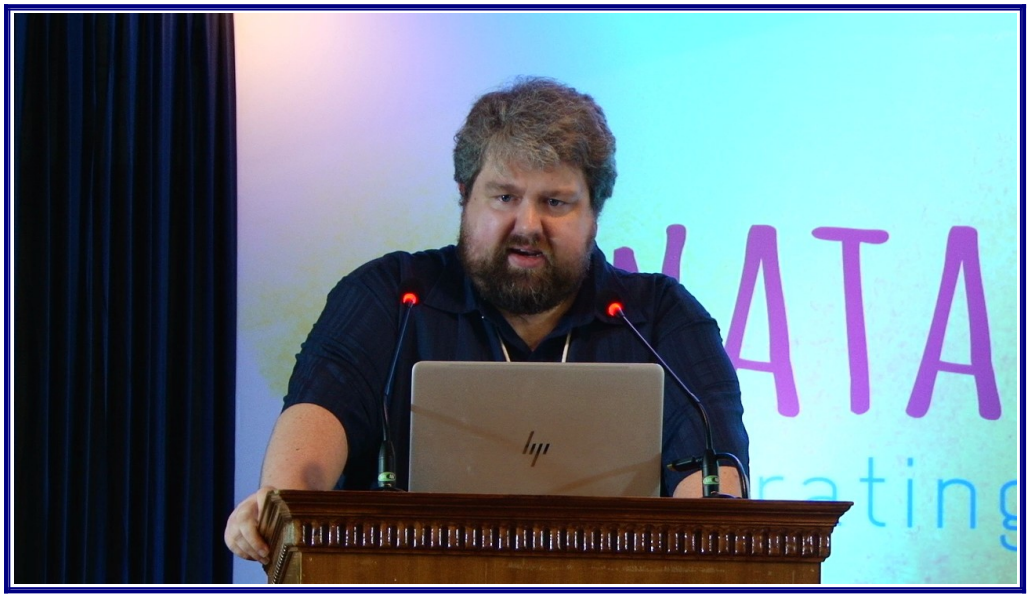
One of the most important thing of Synfig is that the learning curve fostering fee is very very lower than for Blender since it is fully dedicated for 2D animation. He recommended to start trying to use Synfig instead of Blender and just use Blender when you need extra functionality. If you want more information you should go to the official website synfig.org and you should also look at more in the project.org for more advanced examples. For those who really want to learn deeply and more seriously how to use it, there is a training course available made by the maintainer Konstantin Dimitriev and he sells it on Udemy which you can also buy. A question was asked to know whether there is any way to do lip sinking and import sound in. He said you can import sounds, there is a sound layer, so you can even import several sounds that will stack together but it is better usually to have one proper sound track and then it can be used in conjunction while it can be used together with another software called papagayo which is dedicated for lip synch and then you can quickly create some bunk of assets for the different mouth positions in it. If you write the text in papagayo it will directly load those assets and synch with the your audio file. Another question was whether it is possible to export this to HTML5 or export to web. The answer was you can just export as video for example it will work as a video, direct video. if you want to create interactive scenes like flash then you will have to add, it would be better to render separate frames for each element and then use some kind of scripts to add. He was again asked to explain whether there is any scripting facility available in Synfig interactivity. There is no kind of interaction script like you can find in flash in Synfig and so that is really specialized in just the visual animation but you can actually do really much more animation quality just for visually what you can do in flash with Synfig. He said that there is no direct facility actually. With the random convert, you can covert a lot of different function to add some kind of scripting. You can also integrate some manual, but it is really hard one to choose. You can also easily import SVG files from Synfig for example inscape also an option to export to SIF which is the Synfig file format and so there are both ways to import vector graphics directly to work with vectors instead of Bitmap images.

3.3.8 How FOSS is Democratizing the Spread of Content, from Production to Consumption : Mr. Nathan Betzen

Mr. Nate Betzen is the Product Manager for Kodi, the open source media centre which has thirty million active users. It is one of the top ten most used applications on Android set top boxes. He said that open source software is used worldwide now and has conquered content

consumption and distribution. We believe in free software because of software piracy, he said. He then continued the talk about Open Source Threats, Trademark Law, Copyright Law, Non-profit Creation and Governance etc. FOSS is spreading in the present world for unity. More accurately, FFMPEG, a latest application in the history of mankind. FFMPEG is used by softwares such as VLC media player, xine, Plex, Kodi, Blender, Google Chrome, Linux version of Firefox, CHC, Multimedia xpert, JavaCV, OpenCV, Graphical user interface front-ends,YouTube etc. It is used literally everywhere which is the most important program in terms of audio or video consumption in the world. On the basic side, there is an X264 which is not as important as FFMPEG in some ways because in the whole video encoding everything is done in two ways using the X264 and the hardware camera.

The biggest name in consumer facing content is OBS. If you watch video streaming in the YouTube you will understand that OBS is the king of video streaming. There is a very likely use of OBS in a video recording in Conferences using free software. The web is controlled or ruled by the Linux. Most part of the web is Linux. Microsoft is using linux,YouTube is running on Linux and so on. Kodi is an amazing web browser which is used by thirty million users worldwide. This is not a plain media player like VLC or a web browser like Firefox but it is a true web browser for your remote control. It is designed around an idea that if you use the websites in the modern world for the media or content, that shall be easy to operate. In Kodi, most of the web pages do not need to change. You just write a quick addon. It could also write a more involved addon that displays the website. It has crowd source compatibility for your site. It has lot of potential negatives for those with business models. Kodi does not support closed binaries of any kind or Adobe or Acrobat. The advertisements designed for web pages do not display unless specifically designed for the Kodi environment. It is tricky to handle e-commerce without a second screen handy.



With Kodi, it is super easy to play videos by the users and so a lot of companies are interested to work with them to provide genuine content. It is so popular that there is an upside piracy because Kodi can be downloaded fast. The piracy potential takes money out of the hands of

content providers. But it teaches them what people really want and how they want to get it. People hate barriers. In America they get to watch game of thrones today but probably this may happen in India by four months from now. Piracy breaks down all these barriers which is awesome because those barriers should not be there. The way the world moved is very strange because twenty years ago this does not exist. There was no idea that if you want to rent the next Star Wars movie, you had to go to the Star Wars blockbuster DVD rental store. Now going outside for the same is insane and so many pirates do the job of consolidating all the contents in a single place for the users. Then he made a demonstration of the working of the OBS.

The major threat for Open Source Software distribution is DRM Laws. DRM has changed the way doing things and now it has become possible to incorporate it into networks, Firefox,Google Chrome and the like. The DRM used to be a closed proprietary system that only existed in own applications that had to be provided separately. But now all these organizations can incorporate it themselves. The funny thing is that DRM itself is not really a big deal since there are millions of people watch pirated contents like Game of thrones everyday. That means DRM does not do anything though there are encryptions. Everybody secretly knows that the DRM Technology is irrelevant, but the DRM Law is everything. The reason why companies want DRM is held absolutely nothing to do with Copyright. It is because DRM Law makes it legal to do commerce everywhere in the world. You should be able to record Netflix. You can keep local copies of stream content. Also you can keep Netflix streams, Hulu streams and YouTube streams in the same library. Owing to some strange reasons India is like a shining beacon in the world of Open Source Software. India is not a signer of most copyright based treaties, which means India could expand fair use rights to protect users and basically ignore DRM. He has been asked questions about Kodi and DRM Laws and he gave satisfactory answers to them.

3.4 VENUE 03

3.4.1 Algeberaic Data Types and Pattern Matching in Scala : Mr. Mushtaq Ahmed

He introduced himself and said it is very difficult to understand and appreciate Scala if you are not a programmer. The most popular programming languages used are Python and Java.

Java is famous for simplicity and Pascal is a functional programming language, he continued. Scala is a functional programming language like Pascal in some other ways. Like Pascal, Scala is a static type language unlike Python which is an interpreted language. He conducted the session like that of a hands-on session with the available laptops of the participants. He explained the various features and peculiarities of Scala and the algebraic data types and a pattern matching by using this programming language. Several examples were given and comparisons and similarities of Scala with Java and such other programming languages were explained. Hands-on sessions for a period of three days are necessary for explaining all the features of it, he added. Then he asked some questions about the understanding of the subject and there were positive response from the participants.

3.4.2 PostgreSQL in the Database Landscape : Mr. Nikhil Sontakke

He is a PostgreSQL consultant, contributor, trainer, organizer, advocate and working in it for the last more than ten years. Elephant in the room is a phrase which means that there is a big problem exists and the idea behind PostgreSQL is to think as a group collectively to overlook that big problem, he said. For the development of an application for the Government, the decision makers in the company have to take decision as to what stalk to be used, the platform to be used, the database to be used and the amount of money to be spent for the development of such an application. Database is an infrastructure component of any serious application with the strength of sustainability. A very strong database is needed for the Government especially when they deal with very sensitive Informations like the salaries of employees, the health data of the people, the Aadhar, about criminals, FIR, Certificates, educational qualifications and so on. There are very good and strong proprietary databases available, but they are quite expensive. The question is very similar to the spread of Linux operating system when there was the popular Windows operating system. Why should we spend a lot of money for an operating system which is a fundamental infrastructure for every application needs, when there is Linux moment which is amazingly flourishing and doing so well, he asked. We need to download it and copy in a CD and start to using it, is the revolution happened here. In the case of database also the question is why we should spent a lot of money for a database or for licensing a database when there is some alternatives available in the open source. PostgreSQL is a nice database having an elephant as its logo. Elephant is known to have a good memory and so it is used as a symbolic representation to show that it never forget the data. The history behind the evolution of PostgreSQL and the research work conducted for it were explained.

MySQL is the cousin database of PostgreSQL . Now Companies, Governments, European Space Agency, Astronomical institutions etc. are using PostgreSQL . He is now getting involved to it by contributing to the code, organising conferences, conducting trainings and making consultations. There are a lot of emphasis on the next generation features or technologies which make invention to become mainstream. The most important feature is that the database is made extensible and thereby people will be able to write more data types and to add their own indexes. It is intended to be a modern database with all the features needed such as figures, notifications etc. It also gives special emphasis on the trash recovery and robustness and so there will not be any

complaint for data loss due to some corruption. The database can be unlimited and it is limited by the support of your operating system. The PostgreSQL has all the most required essential features of any modem enterprise level database.

This is not a static project and development of it is taking place over the past years by people adding a lot of new features. They obtain feedback from the community and customers and that next set of adding new features will be based on the above feedback. it is a very vibrant live project and it supports all the database features you would require for serious usage. The most Important thing about PostgreSQL is its defining feature, that is, licence. The licensee is very simple when compared to other proprietary versions of database. There are no divisions of license like light version, medium version or enterprise version and so there are no layers for restricting use. Everybody can use all the features in the PostgreSQL . The next important and powerful thing is the copyright. It belongs to something called as PostgreSQL Global Development Group. This is a group of people and not a private limited or public limited company and so you cannot buy the copyright from anybody. So nobody can claim copyright and because of this PostgreSQL will remain free for ever unlike MySQL, which is owned by Oracle. You can use this for being modified and distribute the software for documentation or for any purpose you want. Therefore a lot of startups tend to use PostgreSQL for the purpose of database.

So many companies are now using PostgresSQL for their needs and some companies like that of him are giving training for migration from proprietary database to open source. A lot of public discussions are happening about the contributions to be made in PostgreSQL . You have to prove that such contributions are worthy enough for adding in it. The point in time recovery of lost data is an important feature of PostgreSQL . You could be able to recover a lost data at a particular time due to human error or something like that. There are also features for logical replication of data and for backup of data. In the extensibility aspect of the the PostgreSQL , it allows you to create functions using a wide variety of procedural languages like Python, Jawa etc. and because of this extensibility the support for a new languages is very easy. In PostgreSQL everything is table driven and because of that you can extend it easily. You can store Bitcoin in PostgreSQL due to its

extensibility. This extensibility of it can be used in Bio informatics for the data collection of microorganisms in the water which produce oxygen and also for index type data creation for Aadhar and the like. You can search data by using keyword searching option in infrastructural index type data creation. It is used by the National Informatics Centre for various data indexes. This can be used for GIS informations, Open Street Map, searching for nearest hotel for stay etc. He concluded his speech by expressing happiness that the future of PostgreSQL is promising since there is a lot of momentum happening and the contribution to it are increasing. He is also happy that ICFOSS is trying for the completion of PostgreSQL and for the adoption of it in Kerala as well.

3.4.3 Malayalam Computing: Mr. Santhosh Thottingal

He is working as a senior software engineer at the language engineering team of the Wiki media Foundation. Malayalam language computing is a very wide area in which we need to incorporate all the features we see in the English language computing, he said. We shall be able to use Malayalam in the desktop computer, mobile phones, laptops etc. with features such as typing, font type, searching option, machine translation, understanding the meaning of the word, speech synthesis, conversion of speech to text and so on. In short, what is possible in this respect in English language shall be made possible in Malayalam language also is the scope of Malayalam computing. Malayalam has its own complexities as a different language. He continued his speech by saying that he is a member of the Swatantra Malayalam Computing, an organisation working in open source software and he wishes to talk something about the activities and achievements so far they have in area of Swatantra Malayalam Computing, some problems solved and some problems yet to be solved.

In future you may not write or type some matter using keyboard but may use the voice recognition. We must use normalized Malayalam for computing purposes. There are voice recognition applications available in English and we could ask the computer to know as to how long distance will be there to Palakkad and how much time it will take to travel there by car. He wants to tell to the free software community about what could be done by us for the above thing happen in Malayalam computing, how far we have gone in this direction and what else could be done to achieve the above goal. Google is now doing some such speech recognition features and so some people may think that in future Google will make more such features and we can make use of it. This attitude is not correct since Malayalam has its own features and specialties and so there shall be a single entity to control our language to be used in the computer to achieve self sufficiency. Swatantra Malayalam has the above goal in Malayalam computing. How to write our language, how to type it, how to sort it, how to search it, how to understand it by the computer etc. are to be in the control of a common ownership with algorithms and documented source codes. The meaning of controlling your language by an organisation using a proprietary software is that they are controlling yourself. Your identity is your language and so there is no difference between you and your language. We are the people to determine how to write Malayalam and so we should learn the technology. So there should be alternatives for which the Swatantra Malayalam Computing is working for the last more than ten years**.**

One of the main differences of the working of Swatantra Malayalam Computing is that they are not making any product like an IT company. They are only making the basic infrastructure which helps to build fonts, typing applications or speech recognition applications. Understanding Malayalam in computing is understanding the Malayalam by the machine. There is depiction of Unicode data in Malayalam in clear terms and without any mistakes. The Swatantra Malayalam Computing with the support of many other Malayali volunteers have taken more than ten years of laborious effort to make this complex work possible in Unicode data without any rendering mistakes, he explained. Some sentences of Malayalam were shown as example and he said that were written in Manjari font. These fonts were designed by many artists by retaining the beauty of the letters in Malayalam. Now there are about fifteen Unicode function fonts that can be used in Malayalam by everybody, out of which twelve fonts were developed by the Swatantra Malayalam Computing. There are a lot of methods available to type Malayalam in computer and in mobile phones. It was Swatantra Malayalam Computing who introduced for the first time the Indic Keyboard to type twenty four Indian languages including Malayalam in the mobile phone. They have also made standardization for typing. Swatantra Malayalam Computing is focusing on building the basic platform or the basic infrastructure for the Malayalam language computing and they are not making any products like that of in an IT company. So anybody can write freely an application or website on the top of it.

The machine has to understand the words in a sentence. The Malayalam language is so complex that semantics is very important and the rules regarding ‘sandhi’ and ‘samasam’ are to be observed to convey the meaning of the words. We need to go deeper into the Malayalam grammar for giving correct meaning of the words. There is need to build the foundation for building machine translation, interaction with the computer, spell checker, grammar checker and Idea machines which help us to get answers to the queries about train times, distance to places and the like. He explained the difficult task involved in Malayalam language computing due to the linguistic specialties of Malayalam by citing certain words as examples. There are no Malayalam speech synthesis systems and speech recognition systems available in open source software. The

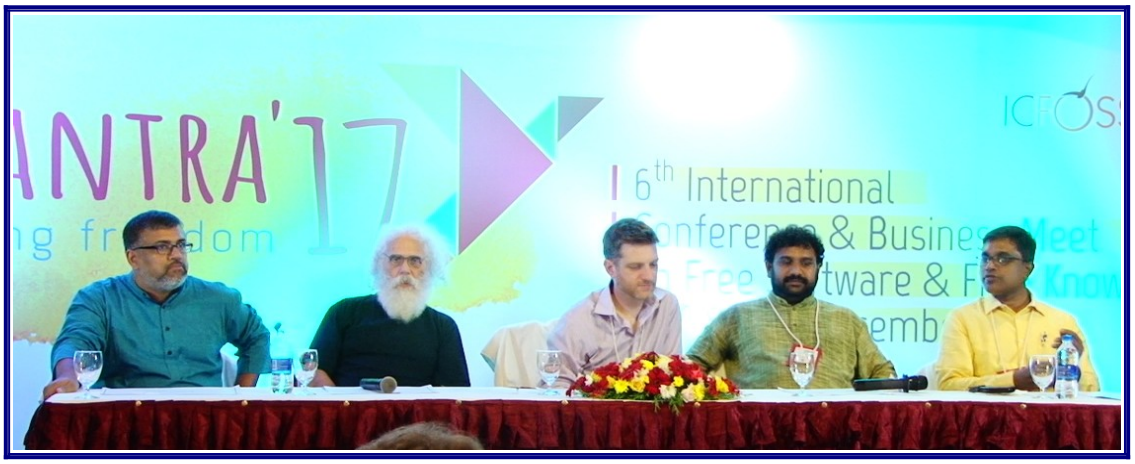
source code for the twelve fonts developed by the Swatantra Malayalam Computing is available in the Github.

Some questions related to Malayalam language computing were asked and he gave answers to that. Then, Dr. Rajeev, Programme Head (e-Governance) of ICFOSS added some explanations on the questions asked and he said that the morphological processor in Malayalam is happened so seriously now only after ten years of its commencement. There was developed an analyzer earlier for academic purposes. He expressed happiness and congratulated Mr. Mr. Santhosh Thottingal for the work taken up by him now. There will be technical difficulties in converting into Unicode using ISM since some of the fonts are ASCII encoding and having different encoding for each fonts. The oldest database is the one started as a part of the project of the Information Kerala Mission. There are lack of standardization and so the conversion possibility is limited. There is no method to convert the Malayalam ASCII data fully into Unicode. The Government is promoting the development of fonts and CDIT is the first organization under the Government to develop the Nila series of six fonts. There was support from the ICFOSS to Swatantra Malayalam Computing for developing the latest version of fonts. Now ICFOSS has a great proposal for upgrading all the Malayalam fonts in association with Swatantra Malayalam Computing which is nearing finalization. Moreover, the Government is supporting creativity for the above purpose, he added.

4 Panel Discussion : Software Freedom Challenges Ahead

This was an interesting session of the event in which representatives of SPACE, FSF and some speakers coming from abroad were participated. Mr. Arun of ICFOSS commenced the discussion by giving a brief background of the subject for discussion. He stated that so many are aware of free software and also heard about why free software should exist from the speeches of Mrs. Karen Sandler and other speakers. The Panel Discussion is focussed on the question why the free software is relevant today. It is the importance of the free software and our awareness to use it are the guiding factors for us to think why we should use the free software, he continued. During the time when the importance of free software became a subject matter for serious discussion, in Kerala also this became a matter of discussion. The free software movement started in Kerala in the year 1996. The internet came here about one year before and the Google established only after one year from that. Thus such discussions about free software and formation of user’s community happened here such an earlier time. Now you can download from internet, Linux or such other software without difficulty and will work without any difficulty. But this was not the situation during 1996, when the free software was very inconvenient. This inconvenience was taken forward by some people who thought that there are some important values like software freedom to be protected and proceeded. There were the objectives of countering the monopoly of Microsoft and save money by avoiding the purchase of proprietary software. These had their own values at that time but was momentary. The free software gradually became prominent and transformed into a mainstream thing as was happened worldwide. We introduced free software in the schools through IT@School, in the Electricity Board,several Government organizations and so on.Thus the use of free software increased so much world wide. We thought that the free software became victorious and the future will be based in free software. But if you look back you can see that so many changes happened in

the software world. The most important change is that if formerly your computer activities were being done in your own computer, now it is done by the computers installed in a remote area unknown to you. It is interesting to note that these computing activities are being done usually in free software also. Thus somebody found out a new method to curtail your freedom by utilizing the possibilities of the free software technology Thus there arose a situation where the freedom matters the most. The basic problem as to why the software should be free, posed by Richard Stallman and others during the last part of the 70s and during 80s is still remaining as such. The basic principle is that the control of the computer should be in the hands of the person who use it. Increase in the use of free software alone will not solve the problem regarding software freedom. As the matter stands now, the term software freedom can be better renamed as computing freedom. With the above words he invited the panelists to suggest solutions to address the problem.



Generally people learn about proprietary software or free software due to the workplace they are in. A challenge in questioning certain contradictions that exist. Organisations which make decisions will affect a large group of users. Sometimes we use Technology and the means will not agree with that. What is the point of putting an email on the cloud if you care only about free software. The privacy issues and software freedom tissues are affecting larger organizations in a much larger way than the individual users. So these organizations have to introspect on the way by which the things are done there.

The things become very complex that we do not know weather software we are using is free or not. Now the giants Google and Ubuntu came and they know how to put you in trouble in relation to software freedom through internet or some other medium.

Enormous growth in technology happened during the last 10 years. Facebook started in the year 2004 and iPhone introduced during 2007. Between 1996 and 2001 the free software movement was driven by a group of dedicated people who were inspired by the belief in freedom. But they were not being paid for the work they have done. The funny thing is that in future the free software became a source for making money by doing business. A lot of people came forward to join in the free software due to the freedom that they enjoy to alter, amend and distribute in free software.They found it a successful way of earning their livelihood through business.

We need freedom of our devices like laptops and smartphones. It has been used more and more for surveillance and tracking. Earlier we had to look at the software part of it but due to the stories of RMS and the printer driver that actually now started the inter free software movement, we have to consider the hardware part also. Because the source code of a printer is not known, we can not get the driver in Wi-Fi, you are even tracked in the BIOS. We need to build our own hardware and also we need to be able to compete with big players to become successful. That is a big challenge and we need a lot of effort for it. The other side of it is interaction with Web Services, cloud, or the network stuff. Even the people who understand the importance of freedom are not willing to take small inconveniences. For example we have Diaspora instead of Facebook, but we are not ready to use Diaspora in our smartphone only because we want to save space in it. The sad thing is that even the discussion among the free software groups happens in WhatsApp or Telegram or on Facebook. It will take time to see the impact of what might happen with all these changes but we must be more creative to convey this idea to the people.

When we look at specifically to Indian scenario, we can found that it is the free software community behind all the free internet freedom movement. Look at the net neutrality battle or the privacy battle, it is the leaders of the free software community work together and we can create success with such battles. We are losing freedom when we become passive users of devices. These are problems to be solved. We are now facing a gradual shift from copyright licenses to Apache and other permissive licenses. This is also a great problem because freedom is very important for human race and so free software is the solution to that. An important thing we need to be addressed is the patent problem. Fortunately for us the law says computer programs per se cannot be patented. But we have seen that the bigger companies are trying to ensure that patent can be brought back through back door. We have also seen that the guidelines have been changed and the software companies spoke the Government and got it reversed. Again patent is coming back in some other way. So we have a compromise text again pushed by the big industry. The software policy of the Central Government talks about the mandatory use of Open Source Software in all its transactions. You need to go for free software when it is available and you can go for other closed alternative when it is not available in free software. We also need to support more women employees come forward in the free software community as a solution for an internal problem.

People go for convenience and so a low end user probably prefer to use of Microsoft or Mac product due to customer experience. So it is high time to think about the user experience also while talking about free software. One paradigm shift posed by machine learning and artificial intelligence in free software is the lack of big data to train the system, even though the software is big. Then, if the data is available, there is no high end hardware to run it, which will be affordable for big industries and this is a serious challenge faced by the free software community. Data security is an important problem to be stressed rather than software freedom because giants like Google and Facebook are taking away individual datas. Even the Android phone cannot be trusted because most of the data is being taken by private agencies. We have one battle about making free software popular but data security is still an issue. There asked a question as to how many percentage of programers using free software. But there was no specific answer for that since such a

data has not been collected so far. One among the audience stated that there are some problems in using free software. The first one is that there is no guardian for free software. When we use free software we stuck with some problems. There are solutions and support in paid software but the same is not available in free software. Unix is a strong security server but such a server is not available in free software. If the free software was so good, it would have grown very great height than the closed softwares during the last twenty years from its origin. We have to mitigate all this problems for the growth and popularity of free software. One of the panelists said that there are commercial solutions available for free software from Redhat, if you get subscriptions from them.

When we talk about freedom there are two aspects for it, that is, freedom from and freedom for. We are fighting for the freedom from proprietary software, from control and from tracking. The other aspect is freedom to do something, freedom to solve problems, freedom to help others. We have rightly solved the first problem by using free software, but for the second aspect, you have to do much hard work. We should be inclined to do or build things. There is no natural curiosity or inquisitiveness to build something and so we have to build the society where people are naturally inclined to do or build things. It will take some time but we have to start it from the young age. The hacker ethics is a very important part of that. We must choose to channelise the hacker energy into technology to do something new in free software. Free software enables us the freedom to do something whatever we like and so we have to make use of it.

One of the great challenge is the difficulty in convincing people as to what happens when they lose their data due to somebody else's control. Most of the people do not really understand the fact that the data is being recorded forever and some other person can read that. We have created Islands of free software in a large ocean of the software world, but we need to create an ocean of free software and there can be the corporate as islands. There should be intense discussions in the Conference as to how this idea to put before a larger society,

Mr. Arun concluded the panel discussion with words that we have put the question before all of you and the scale and magnitude of the battle before us is clear, though we have no answers for many of them. The good thing for the moment is that we are back starting to discuss problems that we stopped discussion a decade back. The questions are open and we need to find out strategies and solutions through multiple paths. We all together can fight it out without bothering about the result of winning or losing. Then he thanked all the Panelists and those who made meaningful interventions during the discussion by saying that it will be a new beginning.

5 Treasure Hunt

ICFOSS conducted a Treasure Hunt for the promotion of Swatantra 2017 during November 2017. The competition was classified into two categories. One for the students and the other for general public, especially for technologists. The response was much more greater than expected and got 1065 registrations. This competition was a long journey of 15 days before Swatantra 2017. Most of the questions were indirect questions and many competitors answered a lot of them correctly. Thus the competition became a great success.

Sri M. Sivasankar IAS, Secretary, IT and Secretary to the Honorable Chief Minister gave away the prizes to the winners. The following are the winners in each category :-

Student Category

First Prize	-	Mr. Amaljith E V
Second Prize	-	Mr, Saurav V. Balki
Third Prize	-	Mr. Arun Raj
Complimentary Prizes	-	Mr, David N. Shenoy
	-	Mr. Michael Jyotish Paul

Professional Category :-

First Prize	-	Mr. Nikhil Markandeya
Second Prize	-	Mr, Rakesh V
Third Prize	-	Mr. Thusal Gupta
Complimentary Prizes	-	Mr Mujib Rahman K
		Mr. Michel Jyothish Paul
		Mr. Kannan V.M.

6 Valedictory Function

Most of the speakers and the Secretary to the Government, IT Department were present for the valedictory function. The speakers made a feedback of the Conference and there was unanimous opinion that the event was a great success. Mr Arun M, the Programme Head (Research & Academics) of ICFOSS, who is also the Convener of the Conference expressed great happiness over the grand conduct of the event and conveyed gratitude to the speakers and the participants for making the event a great success. He also congratulated the team of ICFOSS who made hard work, other organizations, individuals and all others who cooperated for the smooth conduct of the event.

The Secretary to the Government, IT Department made a brief speech during this concluding session of the Conference. He commenced his speech by saying that he was there for the opening session and then there for the closing session of the Conference. The Ambiance was quite exciting, your remarks, comments and suggestions are well taken, he continued. We have three major requests and the first one is what he said in the opening session. We have a vibrant community and an ecosystem supporting free software. Now we would also like to have some real activity happening in the enterprise sector so that there are jobs created and for which a larger

stakeholder network being created. That will actually ensure that their enthusiasm reach a substantial momentum and we can show and establish a model and then take it forward. We had connected with few of the speakers who had come forward for that event and he hope that there will be very meaningful engagement in the next couple of years. Their ideas or mainstreaming their projects can be taken up. The point number two is basically the IT policy. The State had declared and IT policy. The Government is elected for a term of five years and so the policy stay for five years. It is a fast changing field and we would need to update ourselves more frequently than to update just once in five years. We have brought out a set of sub policies and we are committed that it will be updated on the 1st of April every year. So, first of April, 2018 will do a rapid round of updation and he requested everyone present there to contribute to that very intensely so that it becomes a crowd sourced element of what could be the activities to be done under the overall policy framework. The overall policy says that we endorse and support and we need to internalise the free software totally. We definitely could look at it and add to it as to how practically to do the things given in the sub policies. The third one was primarily about the Conference. When the feedback session was going on, the general feel was that we started discussing sometime back and we keep discussing. But the intensity of the discussion or frequency of the discussion never happens. Swatantra is a triennial event which happens once in 3 years, he said and then **made an important formal announcement that the Swatantra will happen once in every 2 years in future and the next Swatantra will happen in 2019 much more ahead of Christmas, that is, in the early part of December 2019.** We have sufficient time to connect and keep connecting and so let us try to build this ecosystem and made this ecosystem vibrant and meaningful for the next event, he added. Then he thanked everybody who contributed and became part of the Conference, for their trust, belief and investment in the organizers of the event. He requested all to continue to be part of the network and continue to watch, monitor, advise and grow with them and ensure that they stay on course.

The conference concluded with a happy note that something great have achieved so far in the field of free software and with the hope that something meaningful and fruitful could be achieved in future with the co-operation and collective effort of the free software community.

7 Steering Committee

1. Sri. Amarnath Raja, Partner and CEO, InApp Technologies
2. Sri. Sathish Babu, Co-Founder and President, InApp Technologies
3. Sri. Raj Mohan Kovilath
4. Sri. Prasanth Sugathan, SFLC, Delhi
5. Sri. Anoop John, Zyxware Technologies, Thiruvananthapuram
6. Sri. Raj Kombiyil, Professor, Amritha Institute of Technology, Kollam
7. Sri. Anivar Aravind, SMC
8. Sri. Biju, CDIT
9. Sri. Gopakumar, Free Software Movement of India.
10. Sri. Umesh, Asst. Professor, College pf Engineering, Aranmula.
11. Sri. Arun. M, ICFOSS
12. Dr. Jayasankar Prasad. C, Director, ICFOSS
13. Sri. Nagarjuna
14. Sri. Balasubramanian
15. Sri. Srinivasan R, ICFOSS- Convenor