

# **PROCEEDINGS**

**FREE & OPEN SOURCE SOFTWARE  
CONFERENCE, OMAN 2017  
(FOSSC-OMAN'2017)**

**FOSS Deployment Strategies & Practices**

**Organized By**

**Communication & Information Research Center (CIRC),  
Sultan Qaboos University (SQU)**

**And**

**Information Technology Authority (ITA)**

**Held at Sultan Qaboos University**

**February 14-15, 2017**

## Deployment Strategies & Practices

The Free and Open Source Software Conference (FOSSC Oman) is jointly organized by the Communication and Information Research Center (CIRC) at Sultan Qaboos University (SQU) and the Information Technology Authority (ITA), on Free and Open Source Software (FOSS) to support the national initiative on FOSS. It is a two days event and aims to promoting awareness and disseminating the use and development of free and open source software for professionals, staff, students, and the community in Oman.

The conference is scheduled for every two years. The previous events was on February 2013 and February 2015 and the main objective was always to promote the open source software. The next conference FOSSC-Oman 2017 will be on 14th and 15th February 2017 and its main theme is "FOSS DEPLOYMENT STRATEGIES & PRACTICES". FOSSC-Oman targets ICT companies and professionals, researchers, faculties, staff and students and the broader FOSS community.

In harmony with the conference main theme, the organizing committee has invited a number of well-known experts who are actively involved in building careers, entrepreneurship and job creation, sustainability of open source communities, role and opportunities of FOSS in public administrations, open source for the public sector, scaling applications for global communities, business management, business information systems, e-collaboration, educational Management and other related subjects to talk in the event.

The FOSS conference is a good opportunity to discover, discuss and exchange ideas on FOSS in Oman and beyond. The event will also provide the opportunity to network different groups of FOSS users, benefit from insightful lectures delivered at the conference, and share mutual experiences and discuss potential implementations of FOSS.

The organizing committee is inviting managers, and individuals who have passion, researchers, educators, students, and experts from companies, public and private organizations to share their successes in the vast array of free and open source software that is transforming information and communication technology across the globe.

### Objectives:

- Support the National Free and Open source Initiative.
- Promote awareness, use, research and development of Free and Open Source Software in Oman and beyond.
- Strengthen communities and enhance the opportunities on Open Source Software for the ICT Industry in Oman.
- Provide an attractive and sustainable environment for networking FOSS users, researchers, developers and experts.
- Share experiences and exchange successful FOSS developments and applications.

## Parallel Activities

In parallel with the conference, there is an exhibition to show a case of the national and international open source solutions and products along with the creativity of the Oman Summer of Code project participants and the Oman Open Source Students. Also a number of workshops tailored with the needs of local communities have been scheduled in parallel session with conference. FOSS experts from Industry and private and government sectors will present these workshops.

## Conference Organizations:

### **About ITA:**

The Information Technology Authority (ITA) was set up by Royal Decree No. 52/2006, promulgated on 31 May 2006, as a financially and administratively independent national authority established to lead the implementation of the e.Oman initiative and bear its national vision and objectives. ITA is responsible for implementing national IT infrastructure projects and supervising all the projects related to implementing Digital Oman Strategy while providing professional leadership to various other e.Governance initiatives of the Sultanate. ITA works with a vision to transform the Sultanate of Oman into a sustainable Knowledge Society by leveraging Information and Communication Technologies (ICTs) to enhance government services, enrich businesses and empower individuals.

The FOSS Initiative was launched in March 2010 during the Free and Open Source Software Symposium in Muscat. The broad objective of Free and Open Source Software Initiative (FOSSI) is to encourage innovation, boost software development talent & skills and create the necessary resources and infrastructure to increase commercialization and industry adoption.

### **About SQU:**

Sultan Qaboos University (SQU), the National University of the Sultanate of Oman, provides a wide variety of undergraduate and graduate programs, research and extension activities through its colleges and research centers.

The first batch of SQU students were enrolled in 1986 and the University is playing the role of the national house of expertise, and shoulders the responsibility of providing advanced programs, based on knowledge gained from cutting-edge research of national strategic importance. In addition, SQU's central focus is to develop student learning, promote research and enhance faculty and staff professional development.

Sultan Qaboos University consists of nine colleges namely, the College of Agricultural and Marine Sciences, Arts and Social Sciences, Economics and Political Sciences, Education, Engineering, Law, Medicine and Health Sciences, Nursing, and Science. These colleges have specific target plans which guide them in designing their programs in their areas of specializations. Each college is comprised of highly qualified faculty members who are actively involved in teaching, research and community service.

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## Message from the Organizing Committee,

It is our great pleasure to welcome you to the Third Edition of the Free and Open Source Software Conference, FOSSC-17 Oman, jointly organized by the Communication and Information Research Center at Sultan Qaboos University (SQU), and the Information Technology Authority (ITA).

The main theme of the 2017 event is **“FOSS Deployment, Strategies and Practices”** which is a continuation of the previous conference efforts and in line with the proposal of the National FOSS Strategic Deployment Plan drafted by SQU and ITA last year. In this pathway, the organizing committee has invited a number of well-known worldwide specialists who are actively involved in various FOSS deployments, strategies and cutting-edge applications and developments. This is to build an attractive and sustainable environment for networking FOSS users, industrials, researchers, developers and experts.

Twelve invited talks on the conference theme are scheduled for the conference, in addition to a main keynote address, ten workshops, and twelve technical and research papers will be presented.

The work for this event took almost two years, and the organizing Committee is therefore greatly indebted to all invited speakers, workshop presenters, reviewers and all members of various conference committees from SQU and ITA for their worthwhile efforts, time spent and quality assistance to make FOSSC-17 Oman a useful addition to their activities and to SQU-ITA achievements as well.

The committee would like to wish all success to the scientific and technical presentations, discussions and networking and look forward to meeting all in the next FOSSC-19 Oman event.

**Prof. Hadj Bourdoucen, Chairman  
Organizing Committee.**

# Committees

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## Conference Chairs

- **H.E.Dr. Ali Bin Saud Al-Bemani,** Vice Chancellor, Sultan Qaboos University (SQU).
- **Dr. Salim Sultan Al Ruzaiqi,** Chief Executive Officer of Information Technology Authority (ITA).

## Advisory Committee

- Rahma Al-Mahrouqi, DVC PSR
- Saif Al Hiddabi, TRC
- Omar Al Shanfari, ITA
- Ahmed Al Naamany, MCBS
- Ali Al Shidhani, TRC
- Hassan Al Lawati, ITA
- Hadj. Bourdoucen, SQU

## Organizing Committee Chairs

- Hadj. Bourdoucen, SQU
- Hassan F. Al Lawati, ITA

## Scientific Committee

- Hadj. Bourdoucen
- Mohamed Sarrab
- Khaled. Day
- Mostefa Mesbah
- Zuhoor. Al-Khanjari
- Fahad. Betishiginah,
- Dawood. Al Abri
- Ahmed. Al Maashri
- Nasser. Al Zidi
- Hafedh. Al Shihhi
- Ashraf. I. Saleem

## Coordinating Committee

- Hadj. Bourdoucen
- Khalil Al Maawali
- Mohamed Sarrab
- Mahdi Amiri Kordestani
- Fahad Al Saidi

## Publicity Committee

- Sumaiya AlKindi, ITA
- Rahma AlJadili
- Samia. Loucif
- Mohammed Al Rawahi
- Muadh. AL-Hinai
- Ibrahim Al Zakwani

## Organizing Committee

- Pyata Hanumantha Rao
- Muadh. AL-Hinai
- Ali Al Adawi
- Khamis Al Hadhrami
- Ibrahim Al Wardi, ITA
- Tofool Al Dhahab, ITA
- Asad Al Adawi, ITA
- Abdullah Al Dawoodi, ITA
- Jokha Al Shabibi, ITA
- Adeeb AlManthri, ITA
- Ahmed. Al Farsi, CIRC
- Ahood. Darmaki, CIRC
- Younis. Al Kharusi, CIRC
- Ibrahim Al Zakwani, CIRC
- Mohammed Al rawahi
- Zahra Al Siyabi
- Badria A Zahwani
- Al hassan Al Sobhi
- Hassan Al Hosni
- Rashid Al Ouhibi

# Conference Schedule

## Day 1: Tuesday 14 February 2017

08:00-09:00 am | Registration Opens

### SESSION 1: Opening Session

09:00-09:10 am | Introduction  
 09:10-09:20 am | SQU speech, H.H. Dr. Mona bint Fahad Al-Said, AVC-ICo  
 09:20-09:30 am | ITA speech, Dr. Salim Sultan Al-Ruzaiqi, CEO  
 09:30-09:40 am | FOSSC'17 Organizing Committee speech, Prof. Hadj Bourdoucen, Chairman  
 09:40-10:00 am | Keynote Speaker, Prof Brian Fitzgerald  
 10:00-10:15 am | Exhibition Opening/Coffee Break

### SESSION 2: FOSS Deployment in Governments

10:15-10:45 am | Open source in Governments, Chris DiBona  
 10:45-11:15 am | French expertise in E-Government, Alexandre Zapolsky  
 11:15-11:45 am | The Malaysian OSS Deployment Strategies and Practices, Tan King Ing  
 11.45-12.00 pm | Coffee Break.

### SESSION 3: FOSS & Government

12:00-12:30 pm | Open source tools for Cybersecurity, Dr. Bader AlManthri (ITA)  
 12:30-01:00 pm | FOSS deployment in Ministry of Health, Abdullah AlRiqadi (MoH)  
 01:00-01:30 pm | FOSS Deployment Roadmap in Oman, Dr. Ahmed AlMaashari (SQU)  
 01:30-02:00 pm | Panel Discussion, Prof Brian Fitzgerald, Bader Al-Manthari, Abdullah Al-Riqadi, Ahmed Al-Maashari, Alexandre Zapolsky, Tan King Ing, Hassan Al-Lawati (Moderator)  
 02:00-02:30 pm | Close of Day 1-Lunch  
 02:30-03:00 pm | Linux+ Certification Competition (Evaluation exam)

## Day 2: Wednesday, 15 February 2017

08:00-08:30 am | Registration Opens

### SESSION 4: FOSS Model Practices 1

08:30-09:00 am | Inner Source, The Bazaar Inside the Cathedral, Prof Brian Fitzgerald  
 09:00-09:30 am | Deploying FOSS in the classroom with Wikipedia, Tighe Flanagan  
 09:30-10:00 am | Use of IoT in monitoring and control of water treatment and distribution network, Mukesh Arora  
 10:00-10:15 am | Coffee Break.

**SESSION 5: FOSS Model Practices 2**

10:15-10:45 am	Open Source Security, Huzaifa Sidhpurwala
10:45-11:15 am	Humanitarian OpenStreetMap Team (HOT), Yantisa Akhadi
11:15-11:45 am	The role of Open Source in Making of Verve Platform, Dilip Thomas
11:45-12:00 pm	Coffee Break.

**SESSION 6: Paper Presentation**

12:00-12:10 pm	<b>Development of QoS Monitoring System: Application Demonstrator.</b> <i>Hadj Bourdoucen, Ahmed Almaashri, Mohammed Al-Kindy, Mahmood Al-Zadjali, Abdullah Qamar, Mike Venter</i>
12:10-12:20 pm	<b>A Framework for Preserving Data Integrity during Mobile Device Forensic in Open Source Software Environment.</b> <i>Ishola D. Muraina, Mustafa Muwafak Alobaedy, Huda Haji Ibrahim</i>
12:20-12:30 pm	<b>A Survey On Embedded Open Source System Software For The Internet Of Things.</b> <i>Mahdi Amiri-Kordestani, Hadj Bourdoucen</i>
12:30-12:40 pm	<b>From Relational Model to Rich Document Data Models - Best Practices Using MongoDB.</b> <i>Vinu Sherimon, Sherimon P.C</i>
12:40-12:50 pm	<b>Sultan Qaboos University between E-Learning and Massive Open Online Course: Future Vision.</b> <i>Iman Al-Kindi, Zuhoor Al-Khanjari, Naoufel Kraiem</i>
12:50-13:00 pm	<b>A Survey On Connectivity And Cloud Automation Technologies For The Internet Of Things</b> <i>Younis Al-Kharusi, Ahmed Al-Farsi, Mahdi Amiri-Kordestani, Mohammed Sarrab, Hadj Bourdoucen</i>
13:00-13:10 pm	<b>Adoption of Free and Open Source Software Using Alternative Educational Framework in College of Applied Sciences.</b> <i>Raya Al-Hajri, Ghada Al-Mukhaini, Rajasekar Ramalingam</i>
13:10-13:20 pm	<b>Open Standard Data Exchange Model for Higher Education Institutions in Oman.</b> <i>Muhammad Azeem Qureshi, Nithesh K. Nandakumaran, Govindasamy Baskar</i>
13:20-13:30 pm	<b>USQO-FOSS quality model: Utilization based Software Quality Observatory for evaluation of Free and Open Source Software.</b> <i>P. Vijaya, Satish Chander and G. Raju</i>
13:30-13:40 pm	<b>Projection of Students' Exam Marks using Predictive Data Analytics.</b> <i>Ben George Ephrem, N. Balasupramanian, Huda Al-Shuaily</i>
13:40-13:50 pm	<b>Interactive E-book Development Using FOSS.</b> <i>Manal G. H. Al Raweehi, Wadima A. S. Al Ansari, Prakash Kumar Udupi, Vikas Rao Naidu.</i>
13:50-14:00 pm	<b>Interactive Education Application Development Using FOSS for Government School in Oman.</b> <i>Marwah H. A. Al Farsi, Prakash Kumar Udupi, Vikas Rao Naidu.</i>
14:00-14:15 pm	<b>Closing Session</b>



## Parallel Activities & Workshops

### Day 1: Tuesday 14 February 2017

11:00-11:45 am	<b>Title: Linux Kodachi</b> Organizer: Warith Al Maawali, Founder and CEO, Eagle Eye Digital Solutions
11:45-12:30 pm	<b>Title: OMREN (Oman Research and Education Network) Project</b> Organizer: Musallam Said Abdullah Al Farsi, Project Manager, TRC
12:30-01:15 pm	<b>Title: Open Source Social Cloud Platform</b> Organizer: Céline Zapolsky, Chief Business Development Officer, Linagora Company
01:15-02:00 pm	<b>Title: Cloud computing and big data, the future innovation catalyst.</b> Organizer: Abyres Group of Companies

### Day 2: Wednesday 15 February 2017

09:00-09:45 am	<b>Title: FOSS in healthcare, a full stack application development and deployment experience</b> Organizer: Ministry of Health
09:45-10:30 am	<b>Title: House of Open Source Technology Project</b> Organizer: Fahad Al-Saidi, Senior Project Specialist, ITA
10:30-11:15 am	<b>Title: How to use Wikipedia in the classroom</b> Organizer: Tighe Flanagan, Senior Manager, Wikipedia Education Program, Wikimedia Foundation
11:15-12:00 pm	<b>Title: 3D printing using FOSS</b> Organizer: Othman Al Mandhari, Co-Founder & CEO, InnoTech
12:00-12:45 pm	<b>Title: Humanitarian OpenStreetMap Team (HOT)</b> Organizer: Yantisa Akhadi, Project Manager, Humanitarian Open Street Map
12:45-1:30 pm	<b>Title: Using Open-Source to Address Modern day security problems</b> Organizer: Yasir Nafees, Director, Eon IT

## Invited Speakers

**Brian Fitzgerald, Chief Scientist, Lero**

**Title: Inner Source: The Bazaar Inside the Cathedral**

**Abstract:** Over the past 20 years, the Open Source Software (OSS) phenomenon has revolutionized the software industry with the emergence of a host of innovative ‘category killer’ open source products. However, the next wave of revolution will come from adopting the open source processes and practices within organizations. Many leading organizations around the world are now seeking to implement inner source. This talk discusses experiences and lessons learned.

**Chris DiBona, Director of Open Source and Making & Science, Google**

**Title: Open source in Governments.**

**Abstract:** This talk discusses the use of open source in Governments, including his early experience with the US government. The talk will review current trends in open source use and opportunities presented to the world’s governments. He will not only cover traditional topics like Android and Linux but will explain how projects like Tensorflow, Go, Kubernetes and more can be productively used to create more responsive and scalable government services.

**Tan King Ing, K.M.N., Open Source Consultant, Abyres Group of Companies**

**Title: The Malaysian OSS Deployment Strategies and Practices.**

**Abstract:** Malaysia has been implementing The Public Sector OSS Program since 2004 with impactful contributions not only to Public Sector Transformation but also to the National Growth Agenda through the creation of a local exporting OSS industry and a vibrant OSS community that accelerates the growth of a knowledge-based economy. This presentation discusses how the two-pronged strategy of the OSS Master Plan and the Open Source Competency Centre led by the Government and supported by the local ICT industry and the universities within a shared Governance framework has constituted a winning national OSS deployment strategy. The presentation also discusses the outcomes, challenges and future direction of the Malaysian OSS Program.

**Alexandre Zapolsky, CEO and co-founder, LINAGORA**

**Title: French expertise in E-Government**

**Abstract:** According to the United Nations E-Gov Survey Report 2014, France ranked 4<sup>th</sup> over 193 countries in online services delivery and 1st in Europe. Service-Public.fr is the typical showcase of French expertise in E-Government through administrative simplification for citizens and companies. One of the major contributions to this success is French policy to give priority to open source alternatives in a systematic fashion.

**Dr. Bader Al-Manthari, Director General of the Information Security Division at ITA****Title: Open source tools for cybersecurity**

**Abstract:** Open source software may not sound compatible with the idea of strong cybersecurity, but the Information Technology Authority in Oman sees such software, which anyone can tinker with, as a possible tool for defending government networks from both online thieves and professional cyber spies. Open source software often gives users the right to change its code to suit their purposes, as well as to share or give away copies. That means the Oman government could modify such software to suit its cybersecurity needs.

**Abdullah Al-Raqadi, Director General of Information Technology, Ministry of Health****Title: Open Source adoption in Oman Ministry of Health**

**Abstract:** The MOH was struggling with the locked propriety (HIS) software used at Royal Hospital - a model found quite unsustainable and inextensible to around 250+ other institutions due to spiraling cost, lack of flexibility, and freedom in customizing and extending the software. Ministry had just made the strategic decision and set-up an in-house development team to develop a (HIS) for its use to avoid the huge licensing cost incurred for a third party software.

The emergence of an open source operating system for our backend servers in the form of Linux was an incredibly fascinating promise to us, which resulted in setting us a high-availability cluster server for running the Al-Shifa HIS at Al-Nahda Hospital in 2002 and a network domain with samba software. We discovered not just a reduction in our TCO, but some unexpected benefits freedom of choice, security, flexibility, customizability, interoperability and maintainability of our infrastructure. Since 2010 most of our software development activities are fully or mostly dependent on open source stack.

**Dr. Ahmed Al-Maashri, Assistant Professor, Sultan Qaboos University****Title: The Long and Inevitable Road to FOSS Deployment in Oman, Opportunities, Challenges, and Caveats**

**Abstract:** Many governments around the world are encouraging and supporting the national adoption of FOSS in public and private sectors. FOSS solutions offer a number of benefits, including a high potential for job creation through local software customization and the establishment of SMEs, the growth of local IT skills, vendor lock-in prevention, improved security, reduced licensing, installation, and running costs. In Oman, ITA has taken the lead - along with other institutions such as SQU - in raising awareness about FOSS and paving the way for adequate infrastructure and capacity building. To consolidate the efforts of ITA and other institutions and to ensure the continuity and sustainability of FOSS adoption, it is necessary to develop a roadmap that would lay a solid foundation for a set of initiatives for a FOSS deployment at the national level.

**Tighe Flanagan, Senior Manager, Wikipedia Education Program****Title: The Wikipedia Education Program**

**Abstract:** For over ten years, teachers have been using Wikipedia to teach their students 21st century reading, writing, and research skills. At the same time, these students have made valuable contributions to Wikipedia and its sister knowledge projects, improving and translating articles, illustrating concepts, and even adding video and sound recordings. The Wikipedia Education Program emerged at the Wikimedia Foundation to support people around the world deploy Wikipedia as a teaching tool inside their classroom for the mutual benefit of the students and free knowledge.

**Eng. Mukesh Arora, Chief Operations Officer, IMTAC LLC****Title: Use of IoT in monitoring and control of water treatment and distribution network.**

**Abstract:** Water treatment plants need a source of water that could be a river, pond or sea. Depending on the distance of the plant from the source of water, the natural water flows through channels or pipelines to the input of the treatment plant. The input water flows using gravity or is pumped into the pipelines. Smart water applications using Internet of Things (IoT) that is part of a larger Smart City building blocks, provides following critical solution.

1. Water level sensing
2. Flow monitoring and Valve actuation.
3. Pump on/off control, running hours monitoring and energy conservation.

This presentation discusses technical and functional aspects of the above using IoT solution. The IoT software is cloud based and it intelligently monitors and controls the above applications. The software is based on Ubuntu and MySQL and is visualized on an industry standard virtual server backbone.

**Yantisa Akhadi, Project Manager, Humanitarian OpenStreetMap****Title: Humanitarian OpenStreetMap Team (HOT)**

**Abstract:** In the past five years, Humanitarian OpenStreetMap Team (HOT) have been playing a key role in spreading, teaching and inspiring the use and contribution of OpenStreetMap data in Indonesia. This program focuses on disaster data preparedness has contributed significantly to open geographic data at the national level. This talk addresses the program story how it begins, grows, and its future course.

**Huzaifa Sidhpurwala, Principal Product Security Engineer, Red Hat****Title: Open Source Security**

**Abstract:** Detractors of open source software often point to its broad developer base and open source code as a potential security risk. Unlike any other closed-source software deployment, open source software often comes under more scrutiny. Ever since FOSS came to be widely used in the enterprise, there have been doubts, questions and even concerns

about its security. This talk addresses some of these myths and talks about how open source can be more secure than closed source!

**Dilip Thomas, Founder, CEO – Aikon Labs**

**Title: The role of Open Source in Making of Verve Platform**

**Abstract:** Verve is a stakeholder engagement platform. It was conceived, designed and built entirely by the team of Aikon Labs based in Pune, India. The talk aims at young software engineers and those who are aspiring to make software products to have an understanding on how they can depend on creating essential building blocks of their products using FOSS. Various challenges faced in choosing the technology platforms that have lead them to a series of successes and failures will be addressed in the talk.

## Workshops

**Warith Al-Maawali, Founder and CEO, Eagle Eye Digital Solutions**

**Title: Linux Kodachi**

**Abstract:** Many of the Internet users have basic knowledge of protecting their online privacy. The idea was to create a simple yet efficient Operating System to secure your online identity simply by plug and play. Linux Kodachi was developed to provide an easy way for average users to encrypt and anonymize Internet traffic, which will eventually keep the users safe from intruders. The talk will cover the importance of online privacy, why open source tools for online privacy, how open source projects were utilized for online privacy and how these tools were integrated into a single Operating System.

**Musallam Al Farsi, Project Manager, The Research Council (TRC)**

**Workshop Title: Oman Research and Education Network (OMREN)**

**Abstract:** OMREN (Oman Research and Education Network) Project is a TRC (The Research Council) initiative to build a high-speed network between universities and research centers to enable collaboration and innovation. The presentation will show how OMREN utilized OSS in most of its solutions to provide the needed services like single sign-on, Video conferencing and network management. The presentation will also give an insight about how it managed OSS systems with minimal resources utilizing collaboration between developers and users and some industry best practices.

**Céline Zapolsky, Chief Business Development Officer, Linagora Company**

**Workshop Title: Open source social cloud platform**

**Abstract:** OpenPaaS is a reliable social platform in the cloud, built to encourage collaboration and teamwork inside an easy and great user experience. OpenPaaS aims to reconcile our new communication trends and integrates all the tools each of us needs to build a great enterprise social network.

**Saifuddin Nair bin Abdullah, Chief Technology Officer, Abyres Group Of Companies**

**Workshop Title: Cloud Computing & Big Data, The Future Innovation Catalyst.**

**Abstract:** Since its inception, information technology has been exclusively available for technology companies, large organizations, government, and educational institutions. That was until the emergence of cloud computing in a process many call the “democratization” of information technology. With an ever-expanding reach to the masses, a significant reduction in cost and an abundant choice of applications available, you can be truly empowered to leverage the best of existing technology, often without spending a penny on an initial investment. Future innovation has a catalyst, definitely is big data and cloud computing is the enabler to empower big data analytics.

**Tighe Flanagan, Senior Manager, Wikipedia Education Program****Title: How to use Wikipedia in the classroom**

**Abstract:** Incorporating Wikipedia into the classroom provides a very different kind of online experience for your students. By giving students more control over a project's outcome, you are encouraging them to be producers, rather than just consumers, of information. This reversal of roles ultimately helps student master content.

**Ministry of Health****Workshop Title: FOSS in healthcare – a full stack application development and deployment experience**

**Abstract:** Ministry of Health open source development and deployment technology experience will be showcased including the following:

- OS, HA and Networking: Redhat and Oracle Linux, Redhat Cluster Manager, Samba
- DBMS: PostgreSQL, Oracle MySQL
- Web and App Servers: Apache Webserver, Apache Tomcat and JBoss
- Java Development: Spring Framework, Hibernate, Maven, Eclipse IDE
- Testing Tools: junit, jMeter, Selenium
- Source Control: Git
- UI Development: AngularJS, HTML5, CSS3, Bootstrap, Grunt
- EAI: ActiveMQ, Apache Camel

**Fahad Amer Al-Saidi, FOSS Project Specialist, Information Technology Authority****Workshop Title: House of Open Source Technology Project**

**Abstract:** House of Open Source Technology Project is part of the FOSS Program of the Information Technology Authority (ITA) to support local FOSS communities in Oman and link them with international communities. The approach is to identify some international active FOSS software/projects and extend or customized them by Omani FOSS developers. Those developers are taken from the local FOSS communities for a particular period, and they are mentored by an international expert, hosted in Oman.

**Othman Al Mandhari, Co-Founder & CEO, InnoTech****Workshop title: How FOSS and open source societies contribute to the industry (3D Printing Industry)**

**Abstract:** 3D Printing industry is booming all around the world, and FOSS software is playing a crucial part of the industry. This workshop will demonstrate how FOSS and open source societies contribute to the industry. Examples in this workshop are the FAB Foundation.

**Yantisa Akhadi, Project Manager, Humanitarian Open Street Map****Title: How to utilize OpenStreetMap (OSM) data**

**Abstract:** Usage of OSM data includes mainly map visualization, geocoding, routing, statistics and spatial analysis in general. The OSM data processing step involves quality assurance, monitoring, homogenization, and consolidation. This process is mainly based on a stack of tools as well as a set of rules and ontology.

**Yasir Nafees, Director, Eon IT**

**Workshop Title: Using Open Source to Address Modern day security problems**

**Abstract:** This workshop highlights the topic of how to address critical security issues using Big Data, LogPoint – better together, building on the Best of Relational with the Innovations of NoSQL; in addition to expressive query language & secondary Indexes, scalability & performance, enterprise management & integration. It also investigates on how to use Open Source to address modern day security problems.



## Selected Papers

Page	Paper Title & Authors
17	<b>Development of QoS Monitoring System: Application Demonstrator.</b> <i>Hadj Bourdoucen, Ahmed Almaashri, Mohammed Al-Kindy, Mahmood Al-Zadjali, Abdullah Qamar, Mike Venter</i>
22	<b>A Framework for Preserving Data Integrity during Mobile Device Forensic in Open Source Software Environment.</b> <i>Ishola D. Muraina, Mustafa Muwafak Alobaedy, Huda Haji Ibrahim</i>
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48	<b>Adoption of Free and Open Source Software Using Alternative Educational Framework in College of Applied Sciences.</b> <i>Raya Al-Hajri, Ghada Al-Mukhaini, Rajasekar Ramalingam</i>
52	<b>Open Standard Data Exchange Model for Higher Education Institutions in Oman.</b> <i>Muhammad Azeem Qureshi, Nithesh K. Nandakumaran, Govindasamy Baskar</i>
55	<b>USQO-FOSS quality model: Utilization based Software Quality Observatory for evaluation of Free and Open Source Software.</b> <i>P. Vijaya, Satish Chander and G. Raju</i>
61	<b>Projection of Students' Exam Marks using Predictive Data Analytics.</b> <i>Ben George Ephrem, N. Balasupramanian, Huda Al-Shuaily</i>
67	<b>Interactive E-book Development Using FOSS.</b> <i>Manal G. H. Al Raweehi, Wadima A. S. Al Ansari, Prakash Kumar Udupi, Vikas Rao Naidu.</i>
71	<b>Interactive Education Application Development Using FOSS for Government School in Oman.</b> <i>Marwah H. A. Al Farsi, Prakash Kumar Udupi, Vikas Rao Naidu.</i>