

Summary Report e-AGE 2016

The 6th International Platform on Integrating
Arab e-Infrastructure in a Global Environment

Under the Patronage of
His Excellency Mr. Boutros Harb
The Lebanese Minister of Telecommunications

“Ubiquity and Cohesiveness of e-Infrastructures”

American University of Beirut
Beirut, Lebanon

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Main Office: Geothestraße 7 – 40237, Düsseldorf, Germany

Executive Office: P. O. Box: 921100, Bldg. No. 45, Abdul Raheem Al-Waked Street, Shmeisani,
Amman 11192, Jordan

www.ASRENOrg.net

Contact: info@asrenorg.net

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1. Overview

The Arab States Research and Education Network (ASREN) was launched in 2010 under the auspices of the League of Arab States and the UN Global Alliance for ICT and Development (GAID). ASREN is a legal not for profit regional Arab organization that aims to implement, manage and extend sustainable Pan-Arab e-Infrastructures dedicated for Research and Education communities and to boost scientific research and cooperation in the Arab countries through the provision of world-class e-Infrastructures and e-services.

Vision

“To boost scientific research, innovation and education levels in the Arab countries to the highest world standards by uplifting efficiency and productivity of research and education communities, and by setting up pan-Arab collaborative research and education projects and activities through high-speed networks.”

Mission

“To implement, manage and extend sustainable Pan-Arab e-Infrastructures dedicated for the Research and Education communities and to boost scientific research and cooperation in member countries through the provision of world-class e-Infrastructures and e-services”.

Objectives

ASREN’s main objectives are to:

- Build, maintain and consolidate regional e-Infrastructures dedicated to e-science and education across the Arab countries, by developing, managing and operating a regional network that interconnects the NRENs of the Arab countries.
- Create and sustain National Research and Education Networks (NRENs), by supporting them to implement leading-edge technological solutions while pursuing cost-effectiveness and favouring the exchange of expertise and best practices amongst NREN members.
- Facilitate collaboration and cooperation among scientists and educators in the Arab region by increasing the availability and accessibility of knowledge resources, promoting the development of content, facilitating knowledge exchange and transfer processes across the region and with relevant partners in Europe and worldwide.
- Promote the adoption and usage of e-Infrastructures and services among the scientific community, also through training and tutoring activities and strengthening regional partnerships and encouraging joint scientific research at all levels.

2. What is e-AGE all about?

Integrating Arab e-infrastructure in a Global Environment, e-AGE, is an annual international conference organized by the Arab States Research and Education Network, ASREN. Since the launch of ASREN in December 2010 at the League of Arab States, it was decided to organize e-AGE every year in an Arab country. e-AGE is in line with ASREN’s major objectives that are related to dissemination and awareness, promotion of research collaboration and joint activities, and establishment of research networks in the Arab region and worldwide.

ASREN started concrete steps towards interconnecting researchers and academics across the Arab States by launching its first PoP in London. ASREN is working with its partners to establish new PoPs in UAE, Egypt and the Maghreb region. ASREN is also supporting the development of NRENs in some Arab countries. ASREN gives special attention and more focus on users and how the e-Infrastructure can support their needs in terms of services and applications. More sessions will be dedicated to the users to present their research and education activities and then to identify how these users can be better served by NRENs.

3. e-AGE 2016

e-AGE is meant to be the launching pad for Research and Education connectivity and cooperation. It brings together ASREN, EUMEDCONNECT, AfricaConnect, GÉANT, AfREN and INTERNET2 stakeholders and the region's foremost innovators, leaders, scientists, and businesses to discuss and debate new models of innovation, integration of research and education networks, policies for sustainable development in education, means of knowledge sharing and dissemination, capacity building programs, and region-wide e- infrastructure deployment to tackle today's crises in climate change, global economy, food, water scarcity, alternative energy, and environmental issues. The forum can lay the foundation for a dream of many of today's leaders towards a global e-infrastructure for R&E, based on real life inclusiveness beyond any political protocols.

In e-AGE 2016, the main focus has been on connectivity, users, applications, and services as well as the inclusion of stakeholders in research and education and related services. The purpose is to enable and facilitate collaboration to encourage the use of resources and and share of knowledge. More discussions, sessions, panels, meetings and workshops were facilitated to present and exchange research and education experiences and innovations. Therefore, the theme of e-AGE 2016 was "Ubiquity and Cohesiveness of e-Infrastructures".

e-AGE 2016 included the following events, workshops and meetings:

- The main conference e-AGE 2016, 1-2 Dec, 2016
- The 9th Event on Euro-Mediterranean e-Infrastructure
- The 6th Annual Meeting of ASREN
- EUMEDCONNECT3 and AfricaConnect2 Project Meetings
- AfricaConenct2 Coordinators Meeting
- Internet2 SIG Middle East Meeting
- ASREN's workshops on "Computer Security Incident Response Team (CSIRT)" and "Identity Federation Infrastructure"
- OSSCOM 2nd Annual conference, 1-3 December, 2016
- AROQA 8th Annual Conference, 1-2 Dec, 2016
- AROQAs' workshops on "Processes and Procedures for ABET Accreditation: Hands-on Steps for the Implementation of Continuous Improvement Processes" and "Benchmarking of accreditation processes in HEI - Challenges, Criteria & Approach".

4. Participants

As a Platform on Integrating Arab e-Infrastructure in a Global Environment, e-AGE 2016 was attended by more than 150 academics, network professionals, researchers, scientists, and high

-level decisionmakers from governments, enterprises, NGOs, embassies, academia, and civil society. The e-AGE Platform became a very important venue for networking among experts and scientists from all over the world.

Representatives from many countries participated in e-AGE meetings including Algeria, Bahrain, Belgium, Canada, Chile, Cyprus, Denmark, Egypt, Germany, Ghana, Iraq, Jordan, Lebanon, Malawi, Morocco, Netherlands, Oman, Palestine, Saudi Arabia, Singapore, Slovakia, Somalia, Spain, Sudan, Switzerland, Tunisia, the UAE, the UK, and the USA.

5. Highlights from the Opening Ceremony

5.1 Session (1): “Opening Ceremony and Welcoming Remarks”

Yousif Asfour, CIO at AUB, opened the ceremony by welcoming distinguished guests and excellencies, he added that AUB is honored to host this global and regional event, to help in developing research and education in the region.

Yousif added that the best way to deliver research and collaboration services is by joining the research and education’s global community and building an NREN. He declared that AUB has partnered with the global and regional NRENs in order to bring services to its community. He said that AUB is Lebanon’s representative member of GÉANT and ASREN, and based on those relationships AUB was able to bring edugain to the Lebanese research and education (R&E) community via the new 320 Mbps connection to GÉANT through ASREN. This connection has led to productive discussion with ten other Lebanese institutions for the formation of a Lebanese Education and Research Network, LERN.

Yousif concluded his speech by referring to the event as an opportunity to bring their Lebanese colleagues together with their counterparts from the rest of the world to share experiences and to explore more ways to collaborate in building a strong regional R&E community.

Salem Al-Agtash moderated the opening session of e-AGE 2016 jointly with AROQA 8th Conference and OSSCOM 2nd Conference

In his opening, he said: “Under the Patronage of His Excellency Mr. Boutros Harb, we begin today with the official opening of the 6th International Platform on Integrating Arab e-Infrastructures, the 8th annual Conference on Quality in Education, and the 2nd Annual Conference on Open Source Software Computing as unique platforms to create dialog, exchange ideas, and work together to build strong communities in universities, businesses and organisations and create a sustainable bridge for research, education and technology with our partners in all over the world, and in the context of the European funded projects; EUMEDCONNECT3, AfricaConnect2, MAGIC and OSSCOM.”

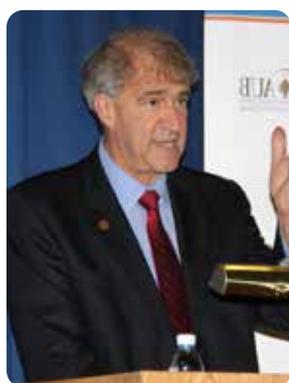
He added: “We are honored with your participation and thanks for joining us today in Beirut, our Chairman and inspiring leader His Excellency Dr. Talal Abu Ghazaleh has laid the bases to setup successful effective and yet sustainable quality of education and e-infrastructure organisations that links Pan Arab research and education institutions at the regional and global levels. The European

Commission, GÉANT and the National Research and Education Networks of Morocco, Egypt, Tunis, Algeria, Sudan and Jordan, the founding members of ASREN have had a great impact on the setup of the Arab regional networks in the context of the EuroMediterranean with the generous continuous funding schemes since 2004. With our partners in Europe, Africa and the rest of the world we will continue to build our research and education communities with a noble objective that is centered on strengthening our friendship and partnership in science, technology and research.”

The term e-infrastructure refers to high speed networks for science, which we need to build across the Arab Region, thanks to the European Commission for their generous support during the past twelve years now these networks embrace open exchanges, collaborative participation, open access and community development, the challenge that remains the limited bits per second, capacity and cross border connectivity to make our research and education institutions interconnected for our young generation not to be left behind in the digital age, with the League of Arab States, the International Telecommunication Union, TATA Communications and several other partners we launched the Arab initiative to establish a 10 Gbps link that reaches the 22 Arab countries.

We meet today with more than 200 participants representing businesses, universities and governments from all over the Arab region, Europe, North and Latin America and Asia in a framework of panel sessions, workshops and presentations with more than 30 research papers in e-infrastructure, quality of education and open source technology. With high speed networks, quality of education an open technology we bring great potential for creativity, innovation and opportunities to our citizens across the Arab Region”.

The opening continued with the following opening keynotes:



Dr. Mohammad Harajli, Provost, American University of Beirut, Lebanon

Provost Dr. Mohammad Harajli commenced by welcoming HE Mr. Boutros Harb, HE Dr. Talal Abu-Ghazaleh, and the distinguished guests. He expressed his pleasure to welcome them to the American University of Beirut. Dr. Mohamad Harajli emphasized the importance of these events to the development of communities, and AUB is proud to host the activities of technology, infrastructure, and quality of education. He acknowledged the contribution of ASREN and the EUMEDCONNECT3 project to establish 300 Megabits per second (Mbps) link to the GÉANT Research and Education Networks via ASREN's PoP in London.

He added that the major goal of AUB's strategic plan is to reestablish the universities unique position as world class teaching and research institutions. As an institution that fosters productive dialog and innovation at cross roads of civilisation, thus contributing more effectively to an increasingly globalized and technologically enhanced world.

Dr. Mohammad asserted that AUB will continue its leading regional role in supporting e-infrastructure for research and education communities in Lebanon and beyond, by supporting the development of the Lebanese Research and Education Network and by providing technical support and assistance to other networks in the region through ASREN.

At the end, he recognized the organizers of the events and HE Mr. Boutros Harb the Minister of Telecommunications for his patronage.



HE Yasser AbdulMunem, Director of Education and Scientific Research, League of Arab States, Egypt

HE Yasser Abdel Moneim expressed his sincere thanks and appreciation to HE the Lebanese Minister of Communications, Mr. Boutros Harb, and Ms. Stéphanie Truillé-Baurens, International Cooperation Officer at EC, also to HE Dr. Talal Abu-Ghazaleh and Dr. Mohammed Harajli.

HE Yasser Abdel Moneim welcomed distinguished guests, experts, and all participants. He expressed his gratitude to HE Dr. Talal Abu-Ghazaleh on good organization and hospitality. He also conveyed the greetings of His Excellency Mr. Ahmed Aboul-Gheit, Secretary-General of the League of Arab States. He added, technology, culture, and literacy are identified as priorities for development to support youth across the Arab region. The efforts of the League of Arab States in the enhancement of education have been emphasized. He presented the League's vision that is both unconventional and inclusive to enhance educational approaches to meet the millennium development and sustainable goals for development and prosperity across the region.

He stressed that education is the core of economic prosperity that they hoped to achieve. He said: "We must focus on quality of education in the Arab World to improve and develop its outputs and to achieve all requirements and needs of communities that are commensurate with the labor market. A country that working to develop its educational system is a state that excels in all areas and at all levels, whether social, cultural, economical or political."



HE Dr. Talal Abu-Ghazaleh, Chairman of Arab States Research and Education Network, Jordan

HE Dr. Talal Abu-Ghazaleh expressed the utmost appreciation to all who contributed to the success of the conferences under this important and timely patronage. As AUB Alumni, he expressed his gratitude to the American University of Beirut for hosting the conferences, to the League of Arab States for their continuing support, to the European Commission for their generosity and great contributions, to the sponsors of the events, and to all delegations, speakers, and authors from all over the world. He also expressed his appreciation to the president of the Lebanese University for

the host of open source software activities in the OSSCOM project framework supported by the EC Tempus.

He also welcomed the delegation of the European Commission and European partners from EUMEDCONNECT3, Africa Connect 2, and MAGIC with great appreciation for their technical and financial support since 2004 and beyond, as well as to the delegation of the Arab countries – Algeria, Egypt, Jordan, Iraq, Lebanon, Morocco, Oman, Palestine, Somalia, Sudan, Tunisia and the UAE, as partners in developing the Arab research and education network, and quality of education. His Excellency, finally welcomed the delegation of the US Internet2, and representatives of regional research and education network from Asia Pacific, Europe, Latin America, and Canada, with them we will continue to work to develop coordination and interoperations towards a global network for research and education.

HE Dr. Talal Abu-Ghazaleh expressed his gratitude to the commitment of the European Commission for their continuous support and generous funding to developing research and education networks in the Arab region as well as to OSSCOM in the framework of Tempus. He also expressed his gratitude to the commitment of the 80 university and school members of AROQA for their continuous support to developing the Arab Organization for Quality Assurance in Education.

His Excellency announced the launch of the Lebanese international research and education link via the American University of Beirut to the European GÉANT via ASREN PoP. This builds on a long planning and discussion with AUB and other partners in Lebanon including the national council for scientific research – CNRS. In addition, he announced the launch of the 155 Mega bits per second STM1 Palestine international research and education link to be established via the Ministry of Higher Education and Scientific Research to the European GÉANT via ASREN PoP.

His Excellency described the continuation of Jordan's 155 Mega bits per second STM1 link that connects the SESAME project and soon the Jordan University of Science and Technology. ASREN is also coordinating with UbuntuNet Alliance to interconnect the Sudan Research and Education Network to the European Research and Education Network. He also asserted the on-going coordination with the League of Arab States to establish the "Pan-Arab Connect", a long-term Gigabit Ring interconnection with all the Arab Countries and with Europe and the world .

In closing, Dr. Abu- Ghazaleh concluded his speech by saying "This event is an opportunity to consolidate our efforts together towards developing a better network infrastructure, a better open source communities, and a better quality education for a prosperous future of our young people."



HE Boutros Harb, Minister of Telecommunications, Lebanon

HE Mr. Harb commenced his speech by expressing his gratitude to participate in the opening of the three conferences, e-Age 2016, AROQA 2016, and OSSCOM 2016, in their beloved city, Beirut.

He expressed his strong interest in advancing the Lebanese network infrastructure to support not only research and education communities, but also the citizens of Lebanon as motivated in the telecom vision 2020. He noted that Lebanon is acknowledged among the first three most dynamic countries in terms of the ICT development and the second biggest mover in the year

2015 on the Network Readiness Index. These developments will of course strengthen innovation and entrepreneurship movement in the Lebanese mobile Internet ecosystem supported by high-speed networks and open source technologies. He declared his support for the Lebanese Education and Research Network (LERN) for which highly discounted connectivity prices will be provided.

He added, “We live in an “eAge”. We live in an era where information and communication technology is no longer a “nice-to-have” commodity, but a basic necessity to foster economic development, improve levels of research, education and training. ICT infrastructure development is seen vital for entrepreneurship and small businesses that generate new ideas, new business models, and huge opportunities.”

His Excellency concluded his speech by wishing a successful conferences and fruitful discussions, and he was confident that the outcome of the meetings would be of great value and impact on the future of our youths and our economies.

5.2 Keynote (1):



Stéphanie Truillé-Baurens, “International Cooperation in an Era of Information Explosion”, International Cooperation Officer, European Commission, Belgium

Stéphanie Truillé-Baurens started by expressing her sincere thanks to the Lebanese authorities to host this event, to the American University of Beirut for their warm welcome and for being such a great host to all and to ASREN for organising this event.

Stéphanie Truillé-Baurens identified regional and global cooperation as important means for development and prosperities of societies in an era of information explosion. She pointed out that ICTs are now part of our daily lives and digital technologies, including the internet, are being adopted in the whole world at an unprecedented rate – faster than any other technologies in the past. The reason for that trend is that E-infrastructures are an important tool as they give access to unique facilities and data. They are also extremely valuable to increase the efficiency of many services, in areas such as health, education and governance.

She outlined the importance of the United Nations 2030 Agenda for Sustainable Development Goals, with focus on “the spread of information and communication technology and global interconnectedness with great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies”.

She added, “connectivity and affordability that many take for granted do remain a problem both across and within regions and there are large variations in connectivity between high and lower income countries and between cities and rural areas. This is why the European Commission is supporting projects which aim at improving infrastructure networks and at

connecting European research and education institutions with peer institutions in partner countries, examples of such projects include EUMEDCONNECT 3 for Mediterranean countries or AfricaConnect 2 for African countries.”

Stéphanie concluded by acknowledging the participation to this event of representatives of other regional Research and Education Networks: GÉANT for the EU, WACREN for West and Central Africa and the UbuntuNet Alliance for East and South Africa. It shows that this is not only about technical networks but more importantly about human networks.

5.3 Appreciation and Recognition

In recognition and honor for their efforts and their role in the success of the e-AGE 2016 conference and activities, and for their continuing support to ASREN, HE Dr. Talal Abu-Ghazaleh, ASREN Chairman, along with Yousef Torman, ASREN Co-Managing Director, have given the appreciation shields to the following:



American University of Beirut for hosting the event represented by Yousef Asfour, CIO at AUB



HE Yasser Abdel Moneim, Director of Education and Scientific Research on behalf of the League of Arab States for the continuous support in the development of research and education in the Mediterranean region.



Stéphanie Truillé-Baurens, International Cooperation Officer on behalf of the European Commission



CNRS-L as a Partner, represented by Hisham Hajj-Hassan, Lebanon



GÉANT as a Partner, represented by David West, Project Manager, UK



Ubuntunet Alliance as a Partner, represented by Boubakar Barry, CEO, Senegal



WACREN as a Partner, represented by Pascal Hoba, CEO, Malawi



NORDUnet as a Partner, represented by Lars Fischer, Strategy and Policy Officer, Denmark



RedCLARA as a Partner, represented by Tania Altamirano, Academic Communities Coordinator, Chile



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*Ministry of Telecommunications, represented by
Walid Karam ICT Advisor to the Lebanese Minister of
Telecommunications*

6. Highlights from the Sessions and Discussions

6.1 Session (2): “e-Infrastructures Developments in ASREN’s Region”



Yousef Torman, “ASREN Updates 2016”, co-Managing Director, ASREN, Jordan (Chair)

Yousef highlighted the progress and recent developments in the Arab Region saying: “given the challenges and complicated situation the region, we can see a lot of progress and tangible development in the e-Infrastructures in the region. New NRENs have developed and more services are provided to the research and education communities in the region”.

He also said that ASREN now proudly has more partners and supporters from all continents.. More projects and collaboration are taking place now with these partners like the AfricaConnect, EUMEDCONNECT3, MAGIC and NEAR Projects under which ASREN is committed to bring more value to the region and be able to extend the collaboration beyond the region.

ASREN also continues to pay special attention to user needs and to getting research and education communities engaged through the use of the e-Infrastructures with examples from SESAME and AfriGEOSS.



David West, “Perspectives of AfricaConnect2/ EUMEDCONNECT3 Projects”, Project Manager, GEANT, UK

David West commenced his speech by expressing his delight to participate at e-AGE 2016. He emphasized on the European Commission’s commitment to support regional projects at this region now and for many years to come, this comes from their belief in having good experience and knowledge to share and also for more selfish reasons which is to ensure having maximum connectivity internationally for the users across Europe.

David West has pointed out that the countries of EUMEDCONNECT and AfricaConnect projects in this region have faced some issues, largely from the Arab Spring, which clearly affected the networking, and which are now being recovered from.

For the EUMEDCONNECT3 project in the Arab Mediterranean Countries, he mentioned the connection of Lebanon for the very first time to the global research and education networking community, the connection of SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) in Jordan to GÉANT and to the global R&E networking infrastructure. He announced that the European Commission has agreed to extend the term of the EUMEDCONNECT3 program for three more years starting from December 2016.

For AfricaConnect2 project in North Africa, which is run by GÉANT and ASREN, he emphasized on the good progress on: the connection of Algeria, considered the most persistent international

connectivity in the region; the presence of real prospects for the reconnection of Tunisia and Morocco; and the upgrade of existing links for Egypt.

David West concluded: “we at GÉANT remain strongly committed to help support the activities in this region, and we see this as a continuation of a long term partnership between Europe and the region.”



Yousif Asfour, “AUB Contributions towards Lebanese Research & Education Network”, CIO, AUB, Lebanon

Yousif commenced his speech by giving a short brief about the American University of Beirut, which was founded in 1866. AUB is chartered in New York, and it is private and Independent which means that it is self funded. He said that AUB strives to achieve excellence in education, particularly in teaching, learning and research.

He said: “In order for us to address the ascendancy of research at AUB to achieve our mission, there are two things that we need to do; the first one is the ability to develop services quickly, and the other one is to enable collaboration with other institutions in Lebanon and the region. For us to do that we need to change the way we think about this, especially in the IT department and our support services, we need to start thinking in terms of transforming our role from being service providers to becoming service brokers, which means instead of building our own services and running them by ourselves, we start looking for these services that exist somewhere else, and try to adapt those services and integrate them into our infrastructure, and the best way to accomplish all of that is by joining the NREN community.”

He continued: “Joining the NREN community provides us with an academic collaboration platform. It is a place where we can contribute to technology and service development, and it is a chance to participate in the global and regional connectivity initiatives. To Join the NREN community we started by joining regional NRENs such as ASREN, GEANT and Internet 2. We plan to use NREN services at AUB, and then deploying them to other institutions in Lebanon in order to facilitate the establishment of a Lebanese Research and Education community.”

He concluded his speech by emphasising that AUB is committed to regional developments for education and research.



Johnathon Chapman, “Middle East Internet2 Special Interest Group”, Consultant - Global Relations, Internet2, USA

Johnathon highlighted the importance of coordination between GEANT and Internet2 partners in the Arab region towards building consensus for a robust pan-Arab network. He gave a summary of the presentations and activities from the Internet2 Middle East SIG meeting held at 30th November immediately prior to e-AGE 2016 conference.



NRENs in the Arab Countries:
Aouaouche El-Maouhab (Algeria)

The Algerian Research Network-ARN is based on 10 PoPs, and has 2 international connectivity through GEANT, the European Research Network with 2.5 Gbps, upgraded since January 2016 under EC AfricaConnect2 cluster 3 project, and the Internet commodity with 1 Gbps Mbps that will shortly be upgraded to 2 Gbps. It was very important for us to have this continuity to be able to build services which we think are important for the community.

The most important infrastructure at our network is the DZ e-Science GRID, which has been developed since 2006, and we have progressively added services to this infrastructure. Now we are aspired to build communities in different fields of science, which is very difficult to organize, so we have started with some communities is physics and chemistry and so on.

Variety of services are provided at the DZ e-Science GRID infrastructure with certificate authority and grid resources that are mobilized on the ARN network. ARN is a member of Africa and Arabia ROC in EGI context . Science gateway and identity federation ARNANE are now installed and operational. The identity providers-Idps related to grid services support users to access grid resources in the Algerian and European sites. The ARN Science Gateway gives users the possibility to access many applications. And cloud infrastructure services.



Dina Barakat (Egypt)

EUN is the Egyption Universities Network, and the umbrella of the EUN is the Center of Knowledge and Electronic Services (EKSC). It is one the main building blocks of the Supreme Council of Egyptian Universities (government organization under the Ministry of Higher Education). The center currently comprises five units; Egyptian Universities Network, National e-Learning Center, Digital Library Unit, Central Unit of Information Technology Training and Management Information System, and Decision Support Systems Unit.

The EGYPTION UNIVERSITIES NETWORK was established in 1987 to provide services to the academic community in Egypt, like high quality network that connects all 24 Universities in Egypt. EUN provides technical support and consulting to the academic community, providing value added services by contributing in some European projects such as EUMEDGRID-Support project. It also provides a grid computing infrastructure in addition to EUMEDConnect phase 1 and 2, managing and operating the (.eg) Top level Domain infrastructure and services, hosting and managing the equipment of the higher education development projects and all the servers allocated to the other units and operating Video conferencing system to facilitate communication between all the Egyptian Universities.



Maged Mohamed El-Sadek (Egypt)

ENSTINET is a public information services organization, Its objective is to assist Egyptian problem solvers and decision makers to access and apply quality data and relevant and current information for development. ENSTINET provides the Egyptian research community with a full 24/7 online and on site access to global information resources via the INTERNET.

On the local level, ENSTINET has been developing and maintaining a local database for years. These databases contain both the literature published in Egypt in the field of science and technology, and directories to assist researchers. The completion of ENSTINET services suit was through variety of information services i.e. online Database. Document delivery, data development, Internet services, training, video conference are additional important functions of ENSTINET for education and training in the field of information technology.

An important accomplishment of ENSTINET was to plan for Egypt-wide access to the world's resources of recorded information, by playing a significant role in the formulation of a national data communication network that opened access to these resources via the internet.



Omar Aljarrah (Jordan)

The Jordan University of Science and Technology - JUST was established in 1986 as a public university. It is located in Irbid and has a spacious campus spanning 11 square kilometers. It enrolls around 24 thousand students with 4 thousand international students. JUST comprises 12 Faculties 55 departments offering 42 undergraduate programs and 85 postgraduate programs. It has State of the art library to serve students, faculty & researchers with self-service for circulation.

Scientific research spending in JUST is around 5% of total budget internally. In terms of accreditation, we have our engineering program accredited by ABET, our medicine program accreted by the WHO, and all other programs are now undergoing international accreditation. We have a number of research centers of excellence like; the Nanotechnology Institute, Princesses Haya Biotechnology, Pharmaceutical Research Center, Queen Rania Al-Abdullah Center for environmental Science and Technology, Innovative projects, and the Nuclear Research Reactor.

The Jordanian Universities Network – JUNet was established in 2003, it was very active and a leading NREN in the Arab region. It hosted the Regional Operation center for Grid services in the Arab and African region, was a member of the EUMEDGRID computing network, was connected to EUMEDCONNECT project 1&2, and it was the key institution to create and establish ASREN, in addition to providing services to the universities including license consolidation, internet services, video conferencing, capacity building and more. Currently, JUNet is not connected to any research and education network and is not active in global/ local NREN communities, it is only limited to connecting the Public Universities, with limited services to volume licensing and internet consolidation.

As a university it is a part of our vision to develop and enhance international teaching and research partnership, and expand student and staff mobility, to support the development and technology empowerment of faculty and staff by providing continuous training and skills development, and to join international research networks and improve global collaboration. In order to achieve this, JUNet needs to play a major role as a national R&E network, and to connect with the global research and education networks and EUMEDCONNECT3. This is one of our strategic goals at this stage. We also need to connect research centers like SESAME, King Hussein Cancer Center, Private Universities and other R&E institutions so that they can access computing and other provided services.

SESAME is a key regional research facility and should be accessed from other networks in the region. It is now connected to the EUMEDCONNECT3, but not connected to our network. King Hussein Cancer Center is also a key player in the upcoming global project on biotechnology and health. We have started the implementation of eduroam services, and we will help to implement it in other universities in Jordan.

We will seek the help of ASREN to establish National federation of identity infrastructure, and we are willing as a university to play a key role in this to lead the Jordanian universities to connect to the JUNet, to be active members, to create awareness among faculty members on the trends of conducting global research and education using the advanced e-Infrastructure and technology, and to help them to collaborate with researchers at the global levels.



Walid Karam (Lebanon)

The establishment of the Lebanese Research and Education Network was originally sought back in 2011 by the Lebanese National Council for Scientific Research – CNRS, but the efforts were not complete, because of the lack of the internal connectivity in the country. This was then re-initiated by the Lebanese Ministry of Telecommunications again at the end of 2014, and the efforts continued in 2015. Now we are almost there, with 11 institutions, including CNRS and 10 major universities in the country.

For the landscape of higher education in Lebanon, we have one public institution, which is the Lebanese University, the largest by far comparing to all other private universities. We also have about 45 registered universities, many of them are small private universities, with different angles in the approach of educational research, which is considered one of the main challenges we face in the connectivity efforts. Now, we have managed to bring on board the largest and the most prestigious 10 universities in addition to the CNRS. We are working in harmony closely together to provide the required connectivity. AUB has been playing a leading role in that by connecting to GEANT and ASREN, and by providing the eduroam services to other universities.

One of the challenges that we are trying to overcome now is the local connectivity between the universities. We are running a pilot project, which should take place in the next few months, to connect using microwave connectivity type of technology among the universities. It is a low 5 Mbps, and universities will be given priority. We are hoping that we can eventually get a nationwide network for the universities in the closest time possible.



Abdulmonem AL Kharusi (Oman)

OMREN is the Oman Research and Education Network. It is a project initiated by the Research Council of Oman and has been giving a task to help the Research Council to enrich research and education in Oman, to enrich the collaboration and communication between Universities and colleges, to improve the research capacity, and to optimise the Internet cost that is currently paid by each university and college. There are about 70 universities and colleges in Oman, 30 percent of them are private and the others are government based college institutes and universities. There is a huge distance between the south and north of the country, with about

1500K distance with lots of mountains, which made it very difficult to have our own cables, so we have to tie up with local providers.

We ran through different financial challenges that we overcame by merging with other projects like, Virtual Science Library Project. It is a database that connects OMREN to world wide publications needed for our universities and colleges. The other project is a unified information system that is hosted at OMREN network. This project resulted in increasing the number of stakeholders, including the Education Counsel, the National Center of Statistics and the Ministry of Higher Education,



Hassan Bouhaddou (Morocco)

MARWAN is the Moroccan National Research and Education Network. Since its inception in 1998, MARWAN has been a driver for Moroccan universities to develop new services in education. It connects almost all Moroccan universities (about 120 institutes) and high schools. Phase 4 of MARWAN will begin in February 2017 with an aim to give more quality services and more bandwidth to universities.

In order to provide good services to our universities, we have to enhance the infrastructure within the university itself. We are working on a project, which aims to enhance the infrastructure, to install WiFi to cover all Moroccan Universities, and to host additional services like, eduroam and identity federation. We are also working on another project on cloud called Open, with the initiative of the Arab States Research and Education Network - ASREN, which aims to increase mobility of students and faculties. We aim to install cloud based on open source platform that will be used by all universities connected to MARWAN, and we will make sure to share this experience with ASREN.

Regarding the connection to GEANT, MARWAN has been connected to GEANT for 6 years, and we are working now on overcoming the cost problem to start in the process of reconnecting.

Taleb Alhaj (Palestine)

Palestinian National Research and Education Network has been developed since 2004, with the support of EUMEDCONNECT1 and 2. The objective is to develop the Palestinian Network, in order to exchange information and to link with the national and international research networks.

We are now working to make PaIREN advanced, low-cost, and as an infrastructure for the academic and research community, also to make it able to adapt the technology for serving academic research infrastructure and to overcome the geographical barriers, and facilitate the Information exchange.

Our vision is to host it on the Computer Center / Ministry of Education & Higher education, and to construct a model and network to link all public schools with the ministry Computer Data Center. PaIREN is now facing many challenges, including communication restrictions that are imposed by Israeli occupation, lack of sustainable funding, lack of appropriate infrastructure, lack of skills and resources and the appropriate network utilization.



Abdullahi Bihi Hussein (Somalia)

SomaliREN has been established as a trust in 2009, it has been founded and owned by 7 member institutions, and now we have 14 members. It is a member of UbuntuNet Alliance and ASREN. Although no network was built throughout its existence, the NREN was operational – serving the members. It sought and facilitated graduate scholarships for the members, facilitated the procurement of digital libraries and setup of e-repository platforms for internal use. SomaliREN assisted in the build-up of the campus networks and training related to campus network design and implementation. SomaliREN has three Strategic Pillars, and they are all focusing on building

connectivity and infrastructure, community and content.

Now we have a membership of 14 member institutions, 7 of them are the founding members, and we have 5 new applications. In terms of connectivity, we have planed a rollout for the first segment of our network. In terms of the local network connectivity, the first segment, which focuses on Mogadishu and around it, will be ready within three to four months. In terms of international connectivity, procurement for a link to connect to UA network is in its final stages. In terms of community building, we launched a program called Research Capacity Development Program, which focuses on building the research capacities of the member universities.

In 6 months, we hope to complete the rollout of Segment M, and to have at least one effective use case for the NREN's network infrastructure to be ready. In 3 years, it is expected to complete the rollout for Zone S and Zone P, and to be able to provide video conferencing facilities to the members. In 10 years, we hope to have redundant links with UbuntuNet Alliance and ASREN. We feel that the NRENs affiliated with the two or more RRENs will one day be the bridges that form one Global REN.

Kalid Elbadawi (Sudan)

The Sudanese Research and Education Network – Sudren, was established in 2004 as a project of the Ministry of Higher Education and Scientific Research. In 2005, SudREN was connecting 30 members, and currently it is connecting 99 members. The total Internet bandwidth has increased from 300Mbps to 450Mbps. SudREN is a licensed ISP (AS# 37197) with, 3 IPv4 blocks

(/16 block, /17 block, and /18) and 1 IPv6 block (/32). SudREN is a member of UbuntuNet Alliance as well as ASREN.

SudREN provides activities like, connectivity, deploying IPv6, open access for Scientific journals services, capacity building, video conference and hosting services, and integrated library and digital libraries Services, SudREN is annually organizing Sudan Network Operator Group (SdNOG) meeting.

For future plans, Sudren aims to increase the total Internet bandwidth to 1 Gbps in 2017, to increase the number of POPs, to activate IPv6 for all members, and to develop a Professional Training Center.



Mohammad Mabrouk (UAE)

Ankabut is the United Arab Emirates' Advanced National Research and Education Network (NREN). It offers connectivity to academic institutions. We have 6 PoP routers in UAE in each of the main cities, with a 10 Gbps backbone, and we used to extend 1Gbps per institution. It is planned to reach Westren region using satellites, and we will be able to extend 10 Gbps links to the campuses of our member institutions.

In terms of membership for Ankabut, we are connecting public and private universities, research centers and K12 schools. There are 35 member organisations in Ankabut. We were able to connect 88 campuses to Ankabut. In terms of the international connectivity we have 155 Mbps link from Fujaira to New York. It is planned to extend a 2.5 Gbps link from Singapore to Fujaira, Ankabut's part was to extend the 10 Gbps link from the landing point to the open free zone in Smart Hub in Fujairah, and to extend it to the core of Ankabut. We managed to buy the router and to extend the cross connect link, but we struggled with the domestic link between the Fujairah Smart Hub and Ankabut.

6.2 Keynote (2):



Steve Cotter, "Opportunities and Challenges of Research and Education Networks", CEO, GEANT, Netherlands

Steve Cotter outlined the main challenges and opportunities for research and education networks to respond to changing demands by users and the need to adopt innovative business models. He urged NRENs to focus on delivering greater value added for users and learn from the business world to deliver services more responsively and nimbly.

6.3 Session (3): “Roundtable on Global R&E Networking”



Boubakar Barry, “West and Central African Research and Education Network”, CEO, WACREN, Senegal (Chair)

The session has focused on a roundtable on global research and education networking (REN) with insights from WACREN, CANARIE, Ubuntunet Alliance, Internet 2, GEANT, and ASREN.

Boubakar commenced the session by introducing himself and the other speakers, then he gave a short brief about WACREN; which is the West and Central African Research and Education Network, its objective is the promotion and establishment of interconnections between national research and education networks in West and Central Africa to form a regional research and education network, the interconnection of this network with other regional and continental networks, and the provision of services aiming at fostering collaboration between research and education institutions in the region as well as between them and peer institutions at continental and international levels.

Boubakar asked the other speakers to give a brief description of their organisation, its current focus and strategies for the future.



Jim Ghadbane, Canadian Research and Education Network, CANARIE, Canada

Established in 1993, CANARIE is a non-profit corporation, with the majority of its funding provided by the Government of Canada, the CANARIE network operates at speeds up to 100 Gigabits per second, It also stretches more than 23,000 km of fiber across Canada, and that does not include the fiber network that exist in the free territories. We recently partnered with other international NRENs including nternet2, NORDUnet, CANARIE, and SURFnet, to start to consolidate some of the international connectivity, and rather than every NREN in the North Atlantic doing their own thing, we found a mechanism by sharing the cost, so CANARIE has the benefit now of having moved from 20 Gigabits per second circuit across the North Atlantic to 30 Gigabits per second, but now in a configuration that is totally reliable and that is done through collaboration.

CANARIE has been investing in the development of software to support scientific research since 2007. In its last mandate (2012-15), CANARIE funded the development of nearly 70 research software tools. These tools enable Canadian scientists to analyze, visualize and share immense volumes of research data, transforming data into knowledge and insights that contribute to Canada's economic and social development. More recently, CANARIE announced funding for five new research platforms, currently in development. CANARIE also provides services to the private sector, in 2010 it started offering cloud services and virtual computers to small business in Canada, and recently started giving portion of the network to ICT companies in the country. Lastly in terms of the future we will continue to approach to the cloud, and to leverage that to the benefit of our members.

Pascal Hoba, Sub Saharan Research and Education Network, Ubuntunet Alliance, Malawi

UbuntuNet Alliance is a regional association of National Research and Education Networks (NRENs) in Africa. It was established in the latter half of 2005 by five established and emerging NRENs in Eastern and Southern Africa, he driving vision was that of securing high speed and affordable Internet connectivity for the African research and education community in Gb/s rather than in Kb/s.

A major achievement of the network so far is that connectivity costs have dropped significantly, this shows that the progress of rolling out the UbuntuNet network has unfolded at an impressively good pace.

What we are now trying to reach out is to provide new innovative way to support the members, provide them with additional services, and to provide the technical support that are more relevant to their needs.

Johnathon Chapman, The USA Internet2 for Universities, USA

Internet2 is the National NREN of the United States, it was formed in 1996, it exist to facilitate collaborative efforts between U.S. higher and research institutions, it was first focused on bandwidth and network, however it now certainly goes beyond that, and it works across the higher education industry, the regional networks, the international networks, government agencies and research institutions.

Internet2, operator of the nation's largest and fastest, coast-to-coast R&E infrastructure, announced that it carried 100 petabytes of data across its backbone in April 2016, up almost 50 percent since last year. The record high traffic is due to an uptick in traffic from rapidly expanding collaborations among researchers and educators around the globe who use Internet2 to accelerate their work. Growth in genomics, physics and other big-data applications, as well as the increase use of video on campuses and the continued adoption of 100G and cloud services across campuses have all contributed. Since February, 2008, traffic carried on the Internet2 backbone has increased 2,500%.

Since its development, the Internet2 organization has supported the evolution of other valuable R&E technologies, such as the InCommon Federation, which provides a common framework for trusted shared management of access to on-line resources, as well as Internet2 NET+, which accelerates and safeguards institutions transitioning to the cloud.

The infrastructure has expanded to support R&E's evolving global ecosystem, as campuses require advanced and seamless networking capabilities to collaborate internationally. The network supports 42 Internet2 Research and Education Network Members, regional and state networks that, play a critical role in the future of the national advanced research and education network infrastructure by providing local leadership on advanced broadband and by connecting local research, education and government entities to the global R&E network.

Over 100 countries were connected to our partnership around the world, they have a capacity of around 17 terabits per second, the motivation is to support our members in their roles, and we want to do that by providing them with the best possible network and then back it up with services to help facilitate that.

David West, The European GEANT Network, UK

GEANT is the Pan European Research and Education Network, owned by all the European NRENs, and we are here to meet their international needs, we are in our third year of the fourth phase of EC funding of GEANT, and we have a program that will keep running to 2020 - 2021 in this current phase.

We are still working very hard to expand and improve our network, now we have a root between two European cities, which is 1 terabit per second capacity, the network is expanding very fast, and there is more emphasis now in providing services including security and infrastructure, particularly cloud services and professional services to support users and their needs.

European Commission does remain a very important stakeholder, and they continue to pay roughly half the cost of the GEANT program in Europe as well as additional contracts for the overseas activities we do.

Finally, as the UK voted early in the year to leave the European Union, we are now looking very carefully at what the implications of that are, and we will be taking some internal actions to ensure that all of our relationships are undamaged, everything that GEANT has been doing in the past will continue internally and we don't expect that we will have any significant effect on either what we do in Europe or other world regions.

Salem Alagdash, The Regional Arab States Research and Education Network, ASREN, Jordan

ASREN is the Arab States Research and Education Network, which is a non profit organisation that was established in 2010, it covers the Northern parts of Africa, the Eastern Mediterranean countries and the Gulf Region. The Arab region consist of 22 countries which is a huge area with different developments in each country, this is considered one of the main challenges that we face in ASREN.

In the context of global REN, ASREN plans to establish a pan-Arab connet that starts with a 10 Gbps cable in the Arabian Gulf with landing points on Basrah - Iraq, Kuwait, Damam – Suadi Arabia, Bahrain, Qatar, Fujairah – United Arab Emirates. The cable would then pass to the Arab Sea with landing points in Oman, Yemen, Djobuoti, then passing to the Red Sea serving Sudan, Saudi Arabia and Egypt. Then the cable would pass to the Mediterranean Sea serving Jordan, Palestine, Lebanon, Syria, Libya, Tunis, Algeria, and Morocco. ASREN plans to setup open exchange points in Fujaira, Jeddah, and Alexandria to interlink with regional RENs across the globe.

We hope together with our partners and strong supporters to bring this forward and become competitive to the point of where our colleagues have started long time ago.

6.4 Session (4): “Global Science Communities, the Biodiversity Case”

Pascal Hoba, CEO, Ubuntunet Alliance, Malawi (Chair)



Yousef Torman, “MAGIC Project”, Co-Managing Director, ASREN, Jordan

Yousef made a very short introduction about the MAGIC Project which is considered one of the unique projects that cover the “globe”. He also summarized the acheivements of ASREN under this project which include implementation of edurom, idp, NRENum.net, Colaboratorio in addition to users engagement in the Global Science Communities.



Tiwonge Banda, “Global Science Communities”, Head of Administration and Finance, UbuntuNet Alliance, Malawi

MAGIC (Middleware for collaborative Applications and Global vrtial Communities) project is co-funded by the European Commission with the purpose of establishing a set of agreements for participating World Regions, that consolidates and completes the building blocks of middleware necessary for the establishment of a marketplace of services and real-time applications for international and inter-continental research groups which facilitates mobility and the work of global science communities. While the rest of the work packages of the project are developing the tools for research and education including training and dissemination, work package 5 has developed

and is working with 4 communities of global nature in the domains of e-Health, Biodiversity, Environment and Remote Instrumentation. This presentation will give an overview of the activities of the 4 global science communities, including, but not limited to the methodology used in identifying the 4 priority areas, the development of the 4 global communities and the activities that the communities have been carrying out so far.



Tania Altamirano, “Colaboratorio” Coordinadora General de Comunidades”, Academic Communities Coordinator, ReDClara, Chile

Colaboratorio is a platform developed specifically to support the work of research and education communities with a variety of tools that allow academics to share and promote knowledge, organise joint activities and communicate in real time in a secure and private environment, optimising time and effort.

Initially intended for users in Latin America, it has been developed tailored versions for the NREN of Ecuador (CEDIA), Colombia (Renata) and Costa Rica (CONARE) in Latin America and in the East and Central Africa (WACREN). Additionally, it is in the process of being adopted by the networks of the Middle East (ASREN) and South Africa (SANReN).

To date it hosts around 400 communities and has more than 9,000 registered users from around the world who have the possibility to access and be part of the discussions of current events and communities, create and participate in web conferencing, transfer large files, apply for funding opportunities for project development, meeting partners and collaborators for research projects and to get information about events of interest at global level.



Rhea Kahale, “The flora of Lebanon at your fingerprints”, Project Manager, Saint Joseph University, Lebanon

Lebanon is considered a small country with a surface area of 10,452 km², positioned on the eastern end of the Mediterranean Sea. It has five singular geomorphological regions: The coastal zone, The Mount Lebanon range, The Bekaa Valley, The Anti-Lebanon chain, and South Lebanon. These five distinctive geomorphological regions lead to considering Lebanon a hotspot since it features one of the highest densities of floral diversity in the Mediterranean basin. Thus, the need of keeping geo-referenced and

time-stamped records of the Lebanese floral diversity in a database has emerged. In order to visualize biodiversity digitization, various multidisciplinary specialists were targeted. It intended to document native Lebanese plant species in a user friendly, image rich and searchable web resource.

Thus, Lebanon-flora data base was born. It is compiled from contributions by experts and non experts dealing with Lebanese flora. The initiative’s Executive Committee includes scientists from different Lebanese Universities and institutions. The project is designed to bring together scientists, teachers, students, amateur and policy makers who need access to an authoritative source of

taxonomic, geographic, genetic, morphological and cultural information about Lebanese plant species. The first step was the grounding installation of the website. Field works were launched as to have recent records and floral assessment of different localities in addition to the bibliographical known data. This step was followed by scientific research on genome size, chromosome number of endemic species. The continuous field works helped out initiating the cartography procedure. After a while, once the data gathered from the field trips as well as the ones from the genetic studies were considered heavy enough, strengthening the infrastructure of the database was the intention. Easy access remained our motto. Therefore, it was made sure to easily search the targeted specie by its taxonomic name, color, altitude range or location. Furthermore, a seed bank webpage was created covering various information about the type of dispersal, fruit type, behavior storage of the species. This platform includes also germination protocols of endemic plant species and species important for reforestation.



Ibrahim Fathy Moawad, “Biodiversity Informatics: Scientific Data Management”, Associate Professor, Faculty of Computer and Information Sciences, Ain Shams University, Egypt

Biodiversity Informatics is a topic of particular scientific and societal importance. Globally, there has been a proliferation of data generated during the last decades. More and more, science and economy rely on data for decision making and progress. One area, where the importance of data is particularly obvious is Biodiversity research. This discipline studies the totality and variability of organisms, their morphology and genetics, life history and habitats, and geographical ranges. It is thus crucial to raise awareness for the importance of biodiversity and to develop methods to better understand and preserve it. Biodiversity Informatics is the application of informatics techniques to biodiversity data for improved management, presentation, discovery, exploration and analysis. Biodiversity informatics is a relatively new discipline extending computer science in the context of biodiversity data.

To transfer the Biodiversity Informatics expertise to our Arabian area, three Arabian universities (the Ain Shams and the Assuit universities in Egypt and the Sfax university in Tunisia) have started a new project with Jena university in Germany. This project is called BioDialog, and it is funded by DAAD. The BioDialog project aims to build a scientific platform that supports communication between scientists and students from three different integrative domains: data management, biodiversity, and intercultural communication. During their applied research in the field of Biodiversity Informatics, the German side developed a scientific data management system called Bexis. This talk has three objectives. First, introducing the BioDialog project objectives and activities. Second, describing the new applied model of scientific data management life cycle. Third, introducing the Bexis system to be exploited by the scientists of Arabian universities.



Manal R. Nader, Director, “Mapping Potential Responsible Hunting Areas in Lebanon”, Institute of the Environment, University of Balamand, Lebanon

The new hunting law in Lebanon (#580/2004) intends to control and limit hunting within the boundaries of Responsible Hunting Areas (RHAs) distributed across the Lebanese territory. In addition, the new Hunting Law defined a list of 16 game species and other requirements that hunters must abide to.

For these reasons, the Society for the Protection of Nature in Lebanon (SPNL) intended to identify 10 RHAs on municipal land that would cover most of the listed game species according to the Hunting Law #580/2004. Better understanding of the environment and physical and ecological characteristics of Lebanon requires the use of Geographic Information System (GIS) tools and analysis. This allowed the production of maps that will help decision makers and stakeholders understand the importance, locations and spatial characteristics of the recommended RHAs.

Therefore, the Marine and Coastal Resources Program (MRCZM) at the Institute of the Environment (IOE), University of Balamand (UOB) was subcontracted to produce:

1. Potential habitat maps: 16 maps identifying the potential habitats of the 16 game species.
2. Strategic maps: two maps, the first for the identification of potential RHA sites based on the results obtained from the 16 potential habitat maps and the second for locating 10 RHAs on national level (according to land ownership, interest of owners, and field surveys).
3. Detailed maps: 10 maps for each identified PHA including its boundaries on cadastral level.

The 28 maps produced will help ensure the adoption of the identified RHAs based on internationally validated and adopted scientific methodology. In addition, these RHAs are expected to promote the conservation and sustainable management of game as well as other species and their ecosystems while at the same time ensuring economic and recreational benefits to both local communities and hunters. It is therefore imperative that these RHAs be declared by law leading the way to the full implementation of the Hunting Law of Lebanon.

During the whole process, technology was essential for efficiently reaching objectives. It allowed:

- Grouping several parameters for identifying habitats.
- Locating potential habitats of game species at national level.
- Locating RHAs on municipal level including habitat types.
- Extensively reducing the time and effort of field work and subsequent analysis.
- Integrating information from several sources with different methodologies into one product.
- Allowing visualization of the products in a summarized, highly informative and presentable fashion.
- Creating a database that can be easily updated and/or used for future products.



Ghassan Soleiman Abu-Sittah, “Where Surgery meets Augmented Reality”, Chief of Plastic & Reconstructive Surgeon, AUB, Lebanon

Proximie is a revolutionary application transforming the way surgeons work and teach. Through an interactive augmented reality platform, Proximie enables surgical support to be seamlessly provided from anywhere in the world. Specialist skills are virtually transported to your side – resulting in better patient care, reduced costs and a highly engaging training experience.

Proximie is a way of bridging the gaps in healthcare and ensuring everyone benefits from the best expertise, and the latest technology, in an exciting and innovative way. It allows surgeons can virtually transport themselves into any operating room in the world to guide, train and support other surgeons and medical experts.

6.5 Keynote (3):



Ayman El-Sherbiny, “Key Issues on the Information Society, Digital Economy and Smart Development”, Chief, Information and Communication Technology Policies, UN-ESCWA, Lebanon

Data and infrastructure coordination team of the Afrigeoss initiative is carrying a study about the available space based and in situ data sources for African continent, data dissemination mechanisms and required infrastructure; the aim of this study is to support decision making process by providing suitable in-time information. The usage of non-dedicated earth observation infrastructure is one of the solution that can be implemented in fast and efficient way; in that context, the team is trying to investigate the availability of regional data networks and its accessibility, and to disseminate earth observation data among regions.

ASREN as the regional network for the southern and eastern Mediterranean region is one of the main candidates that can be used in for earth observation data dissimilation.

6.6 Session (5): “Research, Education and Collaboration (1)”

Habib Youssef, General Director, Computing Center el Khawarizmi, Tunisia (Chair)



Chafic Chaya, “The RIPE Academic Cooperation Initiative (RACI)”, Regional Communications Manager, Middle East Region, RIPE NCC - Dubai, United Arab Emirates

RACI Started in 2013 as a way to connect the RIPE and the research communities, it connects members of the academic community with the RIPE community by inviting students and researchers to present their Internet-related research at RIPE Meetings, ENOG, MENOG and SEE meetings.

It offers academics the chance to present to industry, make connections and get feedback. The successful applicants receive complimentary tickets, travel and accommodation to meetings, and all applicants can publish their work through RIPE Labs (labs.ripe.net).

The selected applicants will also have the chance to Represent their departments and institutions within an international, open forum, attended by some of the largest and most prominent technological organisations in the world, present their research at the upcoming RIPE Meeting, ENOG, MENOG or SEE meeting, receive valuable input and critique regarding their work from industry experts and attendees, experience the professional networking environment with parties from a variety of nations and backgrounds, and get their perspectives on current topics of interest, and publish their work to the technical and Internet community at large via RIPE Labs, a public platform frequented by network operators, developers and industry experts

The RIPE community, in turn, benefits from this opportunity to engage in informed discussion with academics and prospective community members, as well as see new innovations and research from a vibrant community. This proves invaluable when shaping the future of RIPE's activities.



Tarek Sadek, “Regional Initiative on Climate Change in the Arab Region: Regional Knowledge Hub”, Economic Affairs Officer on Climate, ESCWA, Lebanon

The Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR) is an outcome of a collaborative effort between the United Nations and the league of Arab States (LAS) and respective specialized organizations to respond to the request of the Arab Ministerial Water Council and the Council of Arab Ministers Responsible for the Environment to deepen the understanding of the impact of climate change on water resources and its associated implications for socio-economic vulnerability in the Arab region.

The Regional Initiative aims at assessing the impact of climate change on freshwater resources in the Arab Region through a consultative and integrated assessment that seeks to identify the socio-economic and environmental vulnerability caused by climate change impacts on water resources in the Arab region.

The Regional Initiative aims to assess the impact of climate change on freshwater resources in the Arab Region through a consultative and integrated regional initiative that seeks to identify the socio-economic and environmental vulnerability caused by climate change impacts on water resources based on regional specificities.

The outcomes of the assessment aims to provide a common platform for addressing and responding to climate change impacts on freshwater resources in the Arab region by serving as the basis for dialogue, priority setting and policy formulation on climate change adaptation at the regional level.

The Regional Initiative will establish an Arab knowledge hub on climate and water, delineate an Arab Domain for regional climate modeling in accordance with CORDEX protocols, complete an ensemble of regional climate projections for the Arab region based on representative concentration pathways, conduct detailed analysis of climate change impacts on water resources based on hydrological modeling tools, and incorporate extreme weather events analysis in the climate change impact assessment and vulnerability assessment.



Sara Najem, “Beirut Solar Map”, Researcher, CNRS-L, Lebanon

Solar irradiation data in Lebanon are currently available in the form of town or city averages, which do not reflect the spatial variability across buildings even within the same area due to factors like topography and building overshadowing. For this purpose, we produced a fine-grained map for Beirut with which the user can interface and inquire about the Average Daily Global Horizontal and Direct Normal Irradiations together with the expected number of subscribers benefiting from solar power, by simply clicking on the desired building in the map. The latter’s objective is to raise environmental awareness and promote the use of solar energy by providing residents as well as policymakers with a decision making tool for PVP installation. The expected result is to lower peak loads and in the end reduce greenhouse gas emissions.

6.7 Session (6): “ Infrastructures and Services (1) ”

Ahmed Dabbagh, Chief Education & Technology services Officer, Emirates College of Technology, UAE (Chair)



Salem Alagtrash, “Pan Arab Services for Research and Education”, ASREN, Jordan

ASREN has been active in providing services to its communities, including eduroam, eduGAIN, science gateway, and computing facilities. One of ASREN’s main plans is to establish a complete service portfolio that includes connectivity, eduroam, indentity federation, and science gateway. The details of these sevices are given on: <http://asrenorg.net/?q=content/connectivity>



Patrick Fassnacht, “Updating the ASREN Community on the MENA-CERN collaborations”, Physicist, CERN, Switzerland

Ptrick’s talk was a continuation of the talks given in e-AG in 2014 and 2015. He began by giving a brief about CERN which is a research facility founded in 1954 and sits astride the Franco-Swiss border near Geneva.

He pointed out the mission of CERN, which is “to push back the frontiers of knowledge eg. the secrets of the Big Bang, to develop new technologies for accelerators and detectors, to train scientists and engineers of tomorrow, and to unite people from different countries and cultures.”

He highlighted the scientific activities at CERN in which countries from the MENA are involved, and mentioned the progresses made over the last 12 months in the relations between some of the MENA countries and CERN, like signing agreements and setting up training programmes.

He also Adressed the networking issues and in particular the needs of high bandwidth connections to CERN.

He concluded his speech by expressing his enthusiasm to expanded more collaboration with MENA.



Yves Poppe, “Convergence of Computing, Storage and Networking: Supercomputing without Borders”, A*Star, Singapore

Cloud Computing, IoT, data mining, data analytics, deep learning, artificial intelligence are increasingly occupying the minds of the R&E community as well as governments as supercomputing is now perceived essential to the wealth and even survivability of nations.

Super Computing based simulations have become a major source of discovery and extraordinary amounts of data are now collected worldwide. We are at the cusp of convergence between Computing, Storage and Networking

In this context, Singapore has successfully implemented the petaflop level National Super Computing Centre (NSCC) combined with an upgrade of SingAREN and very high speed international connectivity both to North America and to Europe. A new Singapore Open Exchange (SOE) for R&E facilitates collaboration, exchange of megabytes and the sharing of scientific instruments.

Our hope is to see connectivity between the APAN networks and the ASREN networks help grow Research and Education Collaboration between Asia, the Middle-East and beyond.



Antonio Saravia González, “RedIRIS: Consolidation and Development and Deployment of New Services”, Deputy Director, RedIRIS, red.es, Spain

Antonio began his speech by giving a brief introduction about RedIRIS, which is the Spanish NREN that provides advanced communication services to the scientific community and national universities. It is funded by the Ministry of Economy and Competitiveness and is included in the Ministry's map of Special Scientific and Technological Facilities (ICTS). It is managed by the Public Corporate Entity Red.es, which reports to the Ministry of Industry, Energy and Tourism. RedIRIS offers its services to around 500 institutions,

including Spanish universities, public research centres and ICTSs, 150,000 researchers, and around 2,000,000 potential users.

RedIRIS Network has a top-level technological infrastructure in its field, which is set to provide advanced services for decades. A key tool for enabling remote collaboration among researchers and teachers, regardless of their geographic location. RedIRIS collaborates with other European national academic networks (NRENs) to together deploy and manage a pan-European academic and research network (GÉANT) which connects national academic networks to each other and to other parts of the world.

Antonio gave a quick review of RedIRIS's current services portfolio related to optical circuits and virtual circuits, reputation list management, Digital Identity, eduroam, email distribution lists,

Security, Technical support for institutions, Working Groups or Technical Conferences, (Facebook and Twitter). He also talked about the improvement of existing services and the development of new services.

He said:“RedIRIS is now facing a new stage in which to consolidate all the infrastructures and services put in place the previous years and where specially to develop and deploy new services to satisfy the new needs of the Research and Education community in a European and global scenario.”

6.8 Session (7):“IoT and NRENs”

Walid P. Karam, University of Balamand, Lebanon (CHAIR)



Fred Baker, “IoT and Security”, Consultant, USA

Fred believed that the recent spate of IOT-based attacks were entirely predictable (and in fact predicted them) based on the security and manufacturing processes used in making common IOT products. He pointed out that we have learned about security in the Internet the hard way, and still have trouble getting people to follow Best Practices in the area.

Fred asserted that we need to follow Best Practices in IOT manufacturing and security as well as in managing the devices with which they communicate with, encrypting sessions in flight and data at rest, and in securely updating firmware from time to time.



Chafic Chaya, “IoT evolutions and impact”, Regional Communications Manager, Middle East Region, RIPE NCC – Dubai, United Arab Emirates

Originally, the Internet was conceived to interconnect computers and transmit messages with limited data exchange capability. With the advent of web technologies, a first revolution took place enabling the linking of documents and the creation of a world wide web (web 1.0). In the early years of this century, the Internet evolved towards a universal communication technology making it possible to carry all voice, video, or information content, with social media enabling user-generated content (web 2.0). Based on existing communication technologies like the Internet, the IoT represents the next step towards digitisation where all objects and people can be interconnected through communication networks and report about their status and/or about the status of the surrounding environment.

IoT permits all objects and people to be interconnected through Internet, and report about their status and/or about the status of the surrounding environment. The Internet of Things (IoT) can have many definitions and is used to describe a very broad spectrum of technological innovations, concepts and applications. The important here is that apart from the functional description, the term IoT denotes a specific and high marketing value, representing the future. It is this marketing

value that seems to be of high importance to industry actors, as well as in high-level governance debates, where definition gets more diluted from a strictly technical perspective.

Cisco predicts 50 billion interconnected devices by 2020. Intel, more brightly, predicts 200 billion by that same year. Surely, we should be concerned about the addresses needs of this large Internet of Things. Let's start from the beginning. We ran out of IPv4 addresses managed by the Internet Assigned Numbers Authority (IANA) on Feb. 1, 2011. IPv4 32-bit address space of four billion is not even enough to give each person on earth a unique identifier. IPv6 has come just in time, providing 340 trillion trillion trillion possible 128-bit addresses. This makes the address needs of the Internet of Things with plenty left over.

Yet, we admit that IPv6 adoption is still weak where worldwide IPv6 traffic reaching Google totalled about 15% by end of 2016. The good news is that adoption is increasing where Global IPv6 traffic accessing Google was less than 3% in January 2014.

The potential for the IoT is enormous, Business Insider Intelligence estimates that there will be 24 billion IoT devices installed globally by 2020, with \$6 trillion to be invested in IoT over the next five years. This is due to several factors, including expanded Internet connectivity around the world, increasing mobile adoption, low-cost sensors, and larger IoT investments.

Service providers keep saying that there is no demand for IPv6 from their customers. But it is nonsense to wait for them. The majority of consumers do not know which version of IP is running on their electronic devices, and they don't care.

What really matters is whether a company's leadership has the vision to ensure that it retains a competitive edge for its products and services. Companies that say there is no immediate money to be made by transitioning to IPv6 need to ask themselves whether they intend to make money from the IoT.

Businesses will be the top adopter of IoT solutions because they will use IoT to lower operating costs, increase productivity, and expand to new markets or develop new product offerings.



Salam Yamout, “Internet Society Trends in IoT”, Regional Bureau Director for Middle East, Internet Society, Lebanon

Salam focused on IOT from the perspective of the Internet Society, a global organization that works at the intersection of policy, technology, and development for issues impacting the Internet and its users. The IOT is not a new concept. Since its inception, the Internet is an open platform used to connect all kinds of devices and sensors together. What is new is the number and scope of such sensors and devices estimated to reach 20 Billion by 2025. Salam also focused on the key issues facing the implementation of IOT which are security, privacy, interoperability, and standards.

6.9 Keynote (4):



Lars Fischer, “Integrated and Ubiquitous e-Infrastructures with Open Exchanges”, Strategy and Policy Officer, NORDUNet, Denmark

Lars emphasized on the importance of establishing open exchanges toward the development of integrated and ubiquitous e-Infrastructures. Open exchanges are important building blocks for peering data traffic and for fast access to research and education resources and computing facilities.

The idea of exchanges is nearly as old as the Internet itself. Initially facilitating the peering of IP networks, the concept evolved into open exchanges as hubs for global R&E connectivity. Networks such as NORDUnet have used exchanges as a key building block in global networks, and they have been used as nexus for collaborative efforts to connect world regions.

In recent years, open exchanges have evolved beyond networks and have become vehicles for integrating a wide set of e-Infrastructures. Lars outlined the history of open exchanges (OXPs), showing how the concept has played a crucial role in the expansion of the NORDUnet network, and through the examples of global peering strategy, the Global Network Architecture (GNA), and the ANA-300G collaboration, shown how it is becoming essential to both regional and global R&E networking and network collaboration.

OXPs are furthermore an essential building block in forming a globally connected, integrated, and ubiquitous e-infrastructure for research and education. OXPs play a central role in connecting and integrating a diverse set of resources from public and private actors, and delivering such infrastructure to researchers, educators, and students everywhere.

Lars concluded by saying: “we believe that there would be great benefit – both for the region and for global R&E networking as a whole – in establishing one or more open exchange points in the Middle East.”

6.10 Session (8): “Infrastructures and Services (2)”

Aouaouche El-Maouhab, Director, ARN, Algeria (CHAIR)



Michal Prochazka, “CESNET Services and Best Practices”, Researcher, CESNET, Czech Republic

Michal began his speech by giving short brief about CESNET, which is the Czech National Research and Education Network (NREN), CESNET is an association of universities of the Czech Republic and the Academy of Sciences. It is a single NREN in Czech Republic and it is supported by Government.

CESNET provides services to all connected users and institutions, which are mainly from the academic area, like universities, research institutions and schools, but also includes hospitals, museums and libraries. CESNET has a lot

of dedicated communication lines and 55 locations in Czech Republic. It also has connections with the outside world to the NRENs in the neighbouring countries like; the ACONET in Austria, SANET in Slovakia, PIONIER in Poland, GÉANT, and AMS-IX in Netherlands.

At the end, Michal gave a brief description of services which are provided by CESNET. Services are provided on three levels, the core network services, advanced services like high performance computing, and distributed storage and security services to protect all services at CESNET.



Mohamad Nawar Alawa, “e-Infrastructure: Enabler for Sustainable Development in the Arab Region”, Regional Advisor on Technology for Development, ESCWA, Lebanon

Mohamad commenced his speech by giving a short brief about ESCWA, which is one of the five regional commissions related to the United Nations that were established in 1975. Its objective is to enhance social economic cooperation between the Arab countries. ESCWA has a lot of initiatives and programs that are launched at the national, sub regional and regional levels. It has 18 Arab countries as members.

Internally, ESCWA encloses on several sections, and each section is dedicated to a special topic, such as: sustainable development, social economy and technology for development in addition to its regular activities in providing studies and reports to the Arab countries. It is also implementing a technical cooperation program that provides free of charge advisory services and conducts capacity building workshops to members in the Arab countries.

Mohamad Alawa also talked about the 2030 Development agenda that was adopted by the leaders of the world in September 2015. The Sustainable development goals (SDGs) of the new agenda were designed on a new paradigm that says “Developments meets the needs of the current generation without compromising the ability of future generations”. It has 3 dimensions; social, economic and environmental, and it aims to achieve better future for all people and to save the planet.

At the end, he indicated some suggestions and recommendations to improve leveraging e-infrastructure in achieving sustainable development in the Arab region.



Alexander Van Den Hil, “The benefits of the Advanced North-Atlantic 300G for the global R&E community”, Product Manager, SURFnet, Netherlands

Back in 2013 a group of national research and education networks (NRENs) i.e. Internet2, NORDUnet, CANARIE, GÉANT, SURFnet and ESnet demonstrated the first trans-Atlantic 100 Gb/s connection. The parties continued to work together and decided to evolve the connection into a resilient and robust operational 100 Gb/s system for NRENs across the North Atlantic Ocean, the ANA-300G.

Nowadays the ANA-300G is a fully resilient 100 gigabits per second network that traverses the North Atlantic Ocean and supports today's most advanced, data-intensive research and education applications. This network is funded by the participating NRENs. At the heart of the Advanced North Atlantic (ANA) system are Open Exchange Points that enable policy-free interconnects between autonomous networks.

The partners in the ANA-300G consortium are collaborating closely. This collaboration is critical for supporting data flows from European and North American research instruments, institutions and individual researchers. While fiber cuts in subsea cable systems are rare, if one occurs, the downtime on the cable system typically lasts for weeks, due to complex engineering processes and weather uncertainties. With this collaboration the links provided by the partners function as one system. This creates unprecedented stability at a capacity never before seen between two continents.

In less than two years, the research and education community on both sides of the North Atlantic Ocean has collaborated to re-architect the many individually-procured 10 Gbit/s links to 300 Gbit/s (not counting a number of remaining 10G links), capable of supporting individual data flows up to 100 Gbit/s. This would not have been possible without the advanced research and education networks - despite their different governance and funding models - working closely to achieve this goal.

The achievement is broader than just the technological achievement. The new form of cooperation is an innovation of itself. The NREN collaboration involved new transmissions technologies, higher speeds, new business models, new funding models, new operational agreements, new service levels and last but not least, new political models. This requires a high level of trust between partners and a set of lightweight agreements on accounting, operations, service levels, third party access etc. These agreements are still continuously evolving as the parties learn from practical experience what works and what does not work. In essence this collaboration is a proof of concept of the Global Network Architecture that is advocated by many NRENs that operate globally.



Radwan Mousalli, “Pushing the Limits on Research & Education with the Cloud”, Senior Vice President, TATA Communications, United Arab Emirates

Radwan commenced his speech by stressing that collaboration and education has always been about communication. He added; “In today's world, we have new consumer applications and services shaping our expectations for how we communicate and telling us that we need to always be connected and in touch. Users are driving change in how we communicate. My expectations of technology and communications have changed dramatically over the past few year. This is why I believe the Cloud is critical to the future of research and educational networks. Agility, flexibility and efficiency are not only for businesses. These things can benefit all of the Research and Education Communities around the globe.

When educational resources are hosted in the Cloud, they accelerate collaboration and enable this collaboration locally, regionally and around the world. The Cloud has gone mainstream amongst businesses and now the research and educational community can use the public internet to connect to the Cloud and access data and insights anywhere in a very secured, protected and managed manner.

The Cloud offers new flexibility and agility, and when delivered with a hybrid model, it can drive cost-efficiency for the public internet, drives down costs of accessing the Cloud and enables more researchers and students to benefit. With the right structure and support, the Cloud can be accessed with secured and predictable performance that removes the limits on who can use it and increases the scope for the Cloud to be leveraged in the Research and Education environment. It makes it simple and cost efficient to use the Cloud and maximise its potential within the Research and Education community. It removes the limits on collaboration and, accelerates performance.

e-AGE is part of this vision and will play an instrumental role to lift the quality of higher education to the highest standards and foster future prosperity in this region. With this in mind, investing in our youth and providing them with opportunities and a high quality education has to be one of our collective highest priorities and mandate.”

Radwan concluded his speech by saying: “Tata Communications has been proudly supporting the research and education community for over 20 years. We have been delivering innovative solutions that support education and collaboration, both here in the Middle East and around the world.

6.11 Session (9): “Research, Education and Collaboration (2)”

Ibrahim Fathy Moawad, Associate Professor, Ain Shams University, Egypt (CHAIR)



Mohamed Abdel-Rahman, “Incidence of Entomopathogenic Fungi of the Oat Bird-Cherry Aphid, *Rhopalosiphum padi* L. (Homoptera: Aphididae) Infesting Wheat Plants at Assiut”, Agricultural Research Center, Egypt

Four genera of entomophthorales and two hyphomycetes were identified. Entomophthorales was represented by four species belonging to four families: Ancylistaceae was represented by one genus, Conidiobolus. Entomophthoraceae by two genera, Entomophthora and Pandora including two species, namely *E. planchoniana* and *Pandora neoaphids* and Neozygiteaceae by *Neozygites fresenii*. The hyphomycetes fungi were represented by two species, *Beauveria bassiana* and *Verticillium lecanii* which belong to the family Moniliaceae, order Moniliales. Data show that the aphid began to infest wheat plants early during the middle of January when wheat plants were in the stem-elongation stage. Thereafter numbers of aphids increased gradually to reach a peak when the plants were at the flowering stage during the third week of February. During next three weeks the number of the oat aphid declined sharply. Mortality rate with the fungal pathogens was observed from the end of January up to the end of March. The numb



Mohammad Daoud, “Medical applications in the scientific domain”, Assistant Professor of Computer Engineering, GJU, Jordan

Substantial progress has been made toward using ultrasound imaging to track cancer growth, but the relationships between ultrasound image characteristics and tissue microanatomy are incompletely understood. A parallel three-dimensional (3D) ultrasound simulator and a 3D tissue microanatomical model are developed to investigate these relationships. The ultrasound simulator uses a 3D formulation of a k-space numerical method to compute wavefront propagation and runs on distributed-memory parallel computer clusters to enable imaging simulations with short running time.

The accuracy of the simulator is demonstrated by computing scattering from fluid spheres and comparing the results with matching analytical solutions. The tissue microanatomical model treats tissue as a population of stochastically positioned cells, where each cell is represented as a spherical nucleus surrounded by cytoplasm. The tissue model, which runs on shared-memory parallel computers, is employed to represent the microstructure of healthy mouse liver and an experimental liver metastasis. For each simulated tissue, the spatial organization of cells is controlled by a Gibbs-Markov point process. The ultrasound simulator is used to synthesize ultrasound images of the simulated healthy and tumor tissues. The first-order speckle statistics of the images of each simulated tissue are compared with corresponding experimental ultrasound images. The simulations show good matching between the ultrasound images of the simulated healthy tissue and images of healthy liver.

Moreover, good matching is achieved between the images of the simulated tumor and matching experimental images when acoustic properties are used that are different from the values assumed for healthy tissue. These simulations suggest that changes in the first-order ultrasound speckle statistics that accompany cancer progression are related to variations in tissue acoustic and microstructural properties. Parallel computing enhanced the simulator efficiency by enabling imaging simulations with short execution times. For instance, the parallel execution time of a simulated ultrasound image using 20 cluster nodes was 18.61 hours compared to a serial execution time of 357.50 hours.



Nagib Ghaleb Nasher Mohammed, “Quality of Rainwater From Rainwater Harvesting Systems in Sanaa”, University of Bahrain, Bahrain

Rainwater harvesting is a technique used to collect water as runoff from building roofs and paved areas and store it in metal or concrete tanks. The paper deals with the quality assessment of rainwater from water harvesting systems, encouraging water harvesting in Sanaa and sustainable management of water resources and optimum utilization of rainwater by building and construction of water harvesting systems to meet the requirements of the Sanaa city from domestic water supply and for agriculture.

Two samples of rainwater were collected from the roof and paved way from one site located in north of Sanaa. The analyzed parameters are pH, turbidity, colour, total and fecal coliforms, total

organic carbon and total nitrogen. The obtained results of the quality assessment were largely consistent with those reported by many other researchers. The obtained results indicate that, the rainwater from a rainwater harvesting system can be of consistently high quality through the selection of appropriate catchment and storage materials and the application of proper treatment by filtration and disinfection.

7. Session (10): “Joint Closing with AROQA and OSSCOM”



Ramin Sedehi, the COO of AUB gave the closing remarks with honors and appreciation to the organizers of e-AGE, AROQA, and OSSCOM conferences and relevant workshops and meetings. He said that these activities are at the core of AUB mission, essentially empowering their best and brightest to achieve their full potential, be they researchers with burning question or students with the desire to shape the world around them.

The organizers have acknowledged the role of each institution and member who has contributed to the success of the conferences, workshops and meetings. It was a hope that they successfully served as effective medium in attaining a convincing environment towards achieving their goals in developing stronger technology, research, and education communities in the Arab region and beyond.



8. ASREN Workshops

“Workshop on Computer Security Incident Response Team (CSIRT) “

Serge Droz and Jaap van Ginkel of SurfNET have delivered this two-day workshop, the workshop targeted new and potential CSIRT personnel who wish to gain a solid understanding of the main aspects of working in an incident handling and response team. It offered experience and expertise in Operational, Organizational, Legal and Technical areas, which form knowledge basis for CSIRT personnel.

The workshop offered the participants a unique opportunity to mix with their peers and discuss security issues in a secured and trusted environment, whilst being tutored by seasoned experts of the European CSIRT community. The course was opened to individuals working for a CSIRT or network security related organization, and those with bona-fide interest in establishing a CSIRT. Applications were also welcomed from commercial, governmental, law enforcement and military organizations, as well as national research and education networks (NRENs) and research and education institutes.

“Workshop on Identity Federation Infrastructure”

Michal Prochazka and Jan Oppolzer of CESNET from Czech Republic have delivered this two-day workshop, the workshop concentrated on technologies, which allow federated access to the services. It focused on identity federations, which are used for federated access to web based services but it has also tackled eduroam infrastructure.

Participants had an overview of eduroam, identity federations and eduGAIN, and they were able to prepare policies and agreements, which they signed with GEANT representatives in order to connect to the global community.

Participants learnt how to build national federation, and how to install and configure Shibboleth v3 for the home organization and connect it to the national federation, this sets the stage for them to be able to connect national identity federation to the eduGAIN.

One of the objectives for holding the workshop was to ensure the provision of research resources and applications and help researchers and academics have access to classified databases, which mainly rely on Identity Federation such as ASREN Science Gateway, in addition to other scientific research portals as well as their applications.

The workshop was held in cooperation with EUMEDCONENCT Project, and the Middleware for Collaborative Applications and Global virtual Communities -MAGIC Project; both funded by the European Commission.

9. AROQA 8th Conference

The importance of AROQA annual conferences arise from the sense of responsibility towards the future of education in the Arab world. Such a future requires raising the level of awareness among

Arab educational institutions on the importance of accreditation and quality assurance, and working together towards building and enhancing the Pan-Arab educational systems and structures.

AROQA has developed quite well to ensure quality in education among its priorities as well as the development of accreditation in coordination with the national quality and accreditation agencies in the Arab countries. It is important that for the cooperation to be enhanced with international quality assurance and accreditation organizations.

AROQA's Seventh Annual Conference entitled "Enabling Regional Quality in Education" served as a platform for the promotion of quality in education. It has brought together academics, policy leaders, representatives of quality assurance and accreditation agencies and quality experts.

The Conference held three sessions and three keynote speeches, in addition to the opening and closing sessions, two workshops, and annual general assembly meeting. The technical sessions of AROQA 2016 have been designed with twenty-one research paper contributions from universities in Lebanon, Jordan, Sudan, Oman, Iraq, Germany, and Switzerland on topics related to:

- Quality standards and systems
- Accreditation, governance, practices, Case studies, and research methodologies of quality
- Quality tools and methods in education

In their keynote speeches:

- Hana El-Ghali of the American University of Beirut and the World Bank presented how good governance of tertiary education can lead to competitiveness and employability in a wider scale.
- Ziad Al-Saad of Yarmouk University outlined the importance of quality assurance in teaching and learning with emphasis on the experiences at Yarmouk University.
- Karim Nasir from the University of Balamand presented the perspectives on the notion of quality, its management, and its assurance and the wider implementation at the institutional level.

AROQA's Annual Assembly meeting was attended by members from across the Arab region and was concluded with the following recommendations:

- To continue to support the development of AROQA as an independent and non-profit organization for quality and accreditation
- There is an urgent need to promote a culture of quality and accreditation to improve the quality of education in the Arab educational institutions.
- A plan of action is needed to spread the culture of quality and awareness of scientific research, quality and work introductory document to raise awareness on the issue of quality in education.
- Organize training courses for administrators in the Arab educational institutions to raise awareness of the culture of quality and to continue dialogue and cooperation between education institutions and accreditation bodies and organizations in the quality of education in order to consolidate the concepts of quality at the Arab regional level
- There is a need for ongoing dialogue and continuous dissemination of best practices related to quality in education
- Restructure the editorial board of the Arab Journal of Quality in Education

10. AROQA Workshops

“Processes and Procedures for ABET Accreditation: Hands-on Steps for the Implementation of Continuous Improvement Processes”

This workshop dealt with a systematic step by step approach to preparing Engineering, Computer and Information Sciences and Technology Programs for ABET accreditation. Specifically, it defined the accreditation processes by introducing and discussing in details the nine specific ABET criteria needed for accreditation. These relate to Students, Program Educational Objectives, Student Outcomes (Program Outcomes and Assessment), Continuous Improvement, Curriculum (Professional Component), Faculty, Facilities, Institutional Support and finally Program Criteria. It also discussed other important aspects concerning participation from key constituents: professionals, institutions, and industry and government representatives.

ABET is the body empowered to accredit computer science, applied science, engineering, and technology programs in the United States of America, and now the rest of the world.

“Benchmarking of accreditation processes in HEI - Challenges, Criteria & Approach”

Participants of this workshop learnt about the different possibilities on how to implement and develop quality management as well as quality assurance systems in higher education institutions. They discussed and developed criteria on which as a basis higher education institutions can be distinguished. Furthermore, the participants acquired skills and knowledge about different forms of accreditation. They identified the most relevant criteria regarding the classification allocation of higher education institutions to the systematics of program and/or system accreditation. Additionally, overall benchmarking criteria for higher education institutions was discussed within the whole group. Based on these criteria the participants elaborated criteria for the decision for or against specific quality assurance measurements in a higher education institution. In individual work, the participants developed the profile of their own higher education institution. This profile was discussed within smaller groups and included in the developed benchmarking scheme for higher education institutions. The various results were discussed within the whole group. At the end, all participants will received the developed and aggregated results.

11. e-AGE 2017

It was decided to have the seventh International Platform on Integrating Arab e-Infrastructure in a Global Environment, e-AGE 2017, jointly with AROQA's Eighth Annual Conference in Egypt under the patronage of His Excellency Ahmed Aboul-Gheit, Secretary General of the League of Arab States.

12. Submitted Papers

Quality of Rainwater From Rainwater Harvesting Systems in Sanaa

Nagib G. Nasher Mohammed, email: nnasher@uob.edu.bh

Department of Civil Engineering, University of Bahrain

Abstract: Rainwater harvesting is a technique used to collect water as runoff from building roofs and paved areas and store it in metal or concrete tanks. The paper deals with the quality assessment of rainwater from water harvesting systems, encouraging water harvesting in Sanaa and sustainable management of water resources and optimum utilization of rainwater by building and construction of water harvesting systems to meet the requirements of the Sanaa city from domestic water supply and for agriculture. Two samples of rainwater were collected from the roof and paved way from one site located in north of Sanaa. The analyzed parameters are pH, turbidity, colour, total and fecal coliforms, total organic carbon and total nitrogen. The obtained results of the quality assessment were largely consistent with those reported by many other researchers. The obtained results indicate that, the rainwater from a rainwater harvesting system can be of consistently high quality through the selection of appropriate catchment and storage materials and the application of proper treatment by filtration and disinfection.

Key words: Water Quality, Rainwater, Water harvesting systems

Introduction

The term water harvesting was probably used first by Geddes of the University of Sydney. He defined as the collection and storage of any form of water either runoff or creek flow for irrigation use. Meyer's of USDA, USA has defined it as the practice of collecting water from an area treated to increase runoff from rainfall. Recently Currier, USA has defined it as the process of collecting natural precipitation from prepared watershed for beneficial use. Now a day water harvesting has become a general term for collecting and storing runoff water or creek flow, resulting from rain in soil profile and reservoirs both over surface/ under surface. Previously this was used for arid and semiarid areas, but recently their use has been extended to sub humid and humid regions too. Every raindrop that fall from the cloud is very soft and the cleanest water sources in this world [1].

Rainwater is a part of hydrologic cycle; the never-ending exchange of water from the atmosphere to the ocean and back again as rainwater. The precipitation like hail, rain, sleet, snow and all the consequently movement of water in nature forms are from part of this cycle. Rainwater quality always exceeds the surface water and comparable to ground water because of it does not come in contact with soil and rocks where it can dissolve salts and mineral which is harmful for potable and non-portable uses. In the other hands, rainwater is valued for its purity and softness. The quality of water collected in a rain water harvesting system is affected by many factors, including:

1. Environmental conditions such as proximity to heavy industry or major roads, the presence of birds or rodents [2].
2. Meteorological conditions such as temperature, antecedent dry periods, and rainfall patterns [3].

3. Contact with a catchment material and the dirt and debris that are deposited upon it between rainfall events [4].
4. Treatment by pre-cistern treatment devices such as filtration or first-flush diversion [5].
5. Natural treatment processes taking place within the rainwater cistern [6].
6. Treatment by post-cistern treatment devices such as particle filtration, ultraviolet disinfection, chlorination, slow sand filtration or hot water systems [7].

Water resources in Yemen

With renewable water resources of only 125 cubic meters per capita/year Yemen is one of the most water-scarce countries in the world. This level is less than one tenth of the threshold for water stress, which is defined at 1,700 cubic meters per capita/year [8]. Total water demand of 3,400 million cubic meters per year exceeds renewable resources of 2,500 million cubic meters per year, thus leading to a steady decline in groundwater levels, varying between 1 m per year in the Tuban-Abyan area and 6–8 m per year in the Sana'a basin [9]. Today, there are between 45,000 and 70,000 wells in Yemen, the majority of which are under private control. No one can be certain of the exact number, as almost all were drilled without license [10]. Agriculture takes the lion's share of Yemen's water resources, sucking up almost 90 percent, and it is estimated that qat production accounts for 37 percent of all water used in irrigation [10].

Renewable Water Resources in Yemen

The annual precipitation averages 500-800mm at western high lands, and less than 50mm at coasts of red and Gulf of Aden. Surface water is considered to be important source for irrigation in Yemen. Surface water consists of seasonal spate water and springs, with differing quantity and quality depending on the area. This source of water is less affected by drought and other natural and geographical factors. High runoff speed and heavy rainfall cause deep valleys and from several basins. Topographic patterns control the flow of rainwater and lead it two directions, the outer water basins (draining to the west Red sea and to the south in Golf Aden and Arabian sea) and the internal water basin (draining east or west towards the Rub Al-Khali desert, the Ramlat al-Sabatain and Wadi Hadramawt). Surface water in Yemen is estimated to be about 1,500 mm³/year. Around 50 diversion weirs and mail distribution canals have been built by the government and dikes are built on many main valleys fir the purpose of directing spate waters into branches of the valleys to earth canal spate irrigation systems, which irrigate around 120,000-150,000 hectares in the low lands of the country. There also around of 800 medium and small dams for rainfall water harvesting in the highlands [11].

Treatment

The advantage of water from rainwater harvesting systems is that depending on type of application, it could be used in some cases without further treatment such as public garden irrigation and deferent exterior applications. In case of application for interior uses a filtration and prober disinfection are recommended.

To improve the quality of rainwater, a variety of treatment technologies have been developed to mitigate the contamination which takes place following contact with a catchment surface. One treatment technique popularized in Australia is the first-flush device, which is used to divert the first 0.8–3.5 mm of rainfall from storage in the rainwater cistern [12]. The rationale for these devices is the first-flush phenomenon reported in the literature, whereby the concentration of contaminants decreases exponentially during the first few millimetres of rainfall. This trend has been observed for a range of contaminants including suspended solids, PAHs, organic compounds and trace metals [13]. Following storage in a rainwater cistern, particle filtration and UV disinfection are other means by which rainwater can be treated. A study by Kim et al. (2005) examined the performance of 5 mm and 1 mm metal membrane filters (comparable to polymeric membrane filters) and UV disinfection on roof-harvested rainwater. The Korean study observed a 50% reduction in the number of total coliforms for rainwater samples treated using a UV lamp, even at the low intensity of $I_{UVA} \frac{1}{4} 5.4 \text{ W m}^2$ [14]. Filtration was also found to reduce the number of total coliforms by rejecting them at the membrane surface. A removal efficiency of 78% and .98% was achieved with 5 mm and 1mm metal membrane filters, respectively. In addition to the rejection of biological organisms, 80% and 95% of the particles present in the rainwater were removed by the 5 mm and 1mm metal membrane filters, respectively (Kim et al. 2005). Slow sand filtration is another method shown to be effective at improving the quality of rainwater. Ahammed & Meera (2006) compared two slow sand filters, one with iron hydroxide-coated sand and one with an uncoated sand medium.

The uncoated sand filter was shown to achieve a bacterial removal of ,21%, whereas the iron hydroxide-coated sand reduced total and fecal coliforms by 97–99%. Both turbidity and the concentration of the heavy metals zinc and lead showed improvement following slow sand filtration. The turbidity of rainwater collected from a concrete catchment surface was reduced from 8.2 to 0.5–2.4 NTU following slow sand filtration. Zinc levels dropped from 3.6 to 0.1 mg l⁻¹ and lead was reduced by 90% to 0.01 mg l⁻¹ on samples collected from a galvanized iron roofing material [12]. Storing rainwater at temperatures typical inside a residential hot water tank (50–70°C) has also been shown to reduce biological contamination. A study of 27 rainwater systems at Figtree Place in Australia found that all coliform bacteria were removed after storage in the hot water tank in the 23 samples collected. This removal efficiency was achieved with rainwater of fairly poor quality. The average number of total coliforms throughout the study was 166 CFU/100 ml, with 20 CFU/100 ml fecal coliforms [7]. Another study showed a similar inactivation for *Escherichia coli* at sub-boiling temperatures. Spinks et al. [14] observed an almost 5 log reduction in *E. coli* concentrations when the water was maintained at 60°C for a period of 5 minutes in a laboratory setting [15].

Description of study area and rainfall patterns

Two samples were collected from the roof and paved areas of specialist child hospital located north of Sanaa in month of August, which witness the highest precipitation rainfall in the year. The average annual precipitation for the city of Sanaa is 265 mm. The average daily temperature shown in Fig. 1 is of 24°C and average night temperature is of 11°C in the winter [16]. Rainfall data shown in Fig.1 for the City of Sanaa was recorded in the period 2000-2012. As shown in that figure, the

average temperature throughout the year is almost same; however, rainfall differed in all months. For example, the rainfall accumulations for the City of Sanaa in months February, May, July and August is higher than the average of the year and there is no rainfall accumulation in months January, June, September and December as shown in Fig. 2.

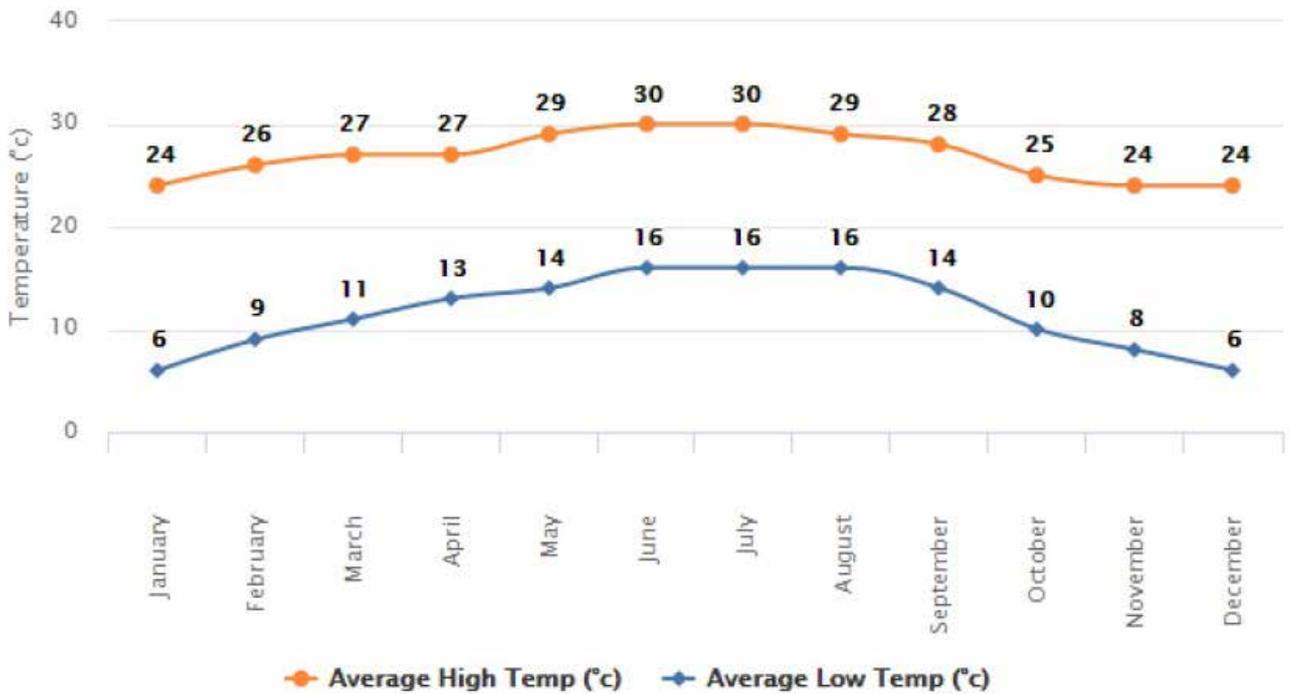


Fig.1 Average temperature (°C) graph for Sanaa

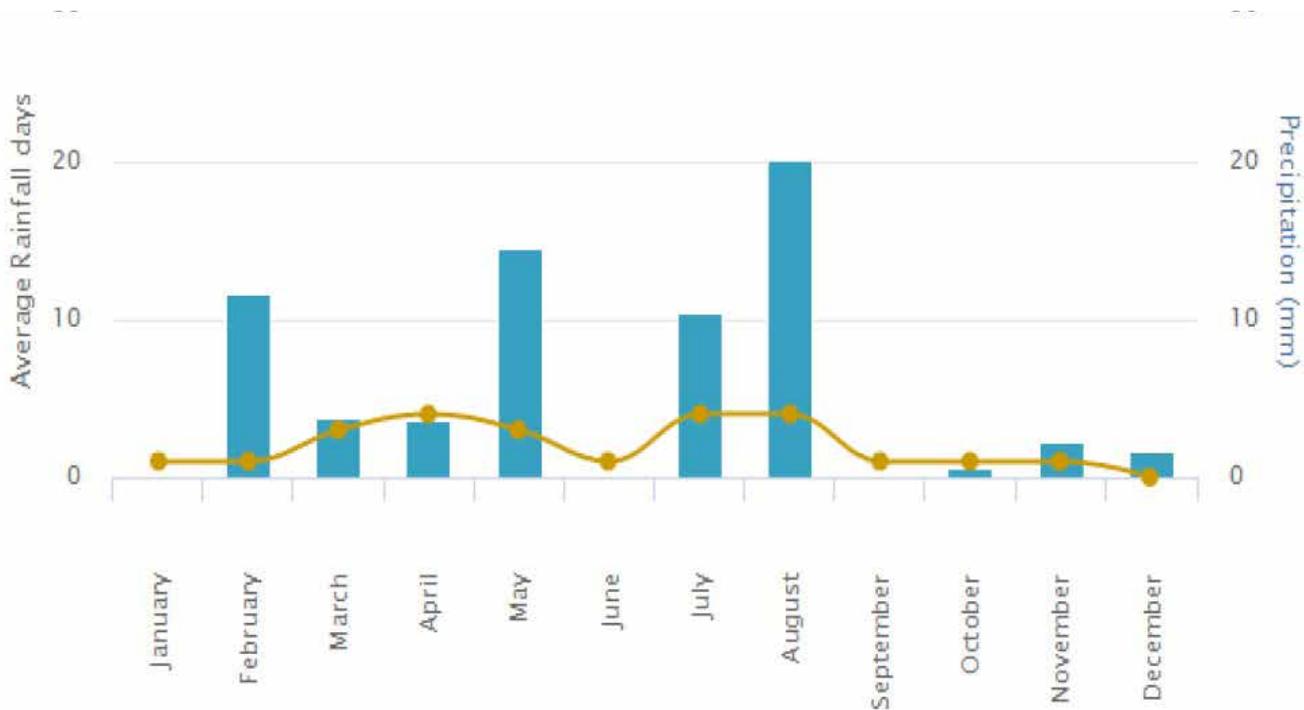


Fig.2 Average rainfall (mm) graph for Sanaa

Benefits of Water Harvesting

Rainwater harvesting systems have many advantages for users, community, government and environment as follows:

- a. Rainwater harvesting systems are low cost and easy to install, operate, handle and maintain.
- b. Rainwater is almost clean.
- c. Rainwater can be used in potable and non-potable applications such as toilet flushing, laundries, mechanical systems, washing car, landscaping and for bathing water.
- d. Rainwater harvesting has few negative environmental impacts.
- e. Reducing water bills and demand on your community's drinking water supply by using rainwater for flushing toilets, washing clothes, watering the garden and washing cars.
- f. Rainwater is free from pollutants, salts, minerals, and other natural and man-made contaminants.
- g. Rainwater can reduce the burden for new investment to replace the ageing systems and adding the water supply infrastructures.

Sample collection and laboratory analysis

A 300-ml glass bottle was used to collect the rainwater samples. The bottles were sterilized for 30 minutes. The following parameters were analyzed: pH, turbidity, total organic carbon (TOC), total nitrogen (TN), colour, total coliforms, fecal coliforms,

Results and Discussions

Chemical and physical properties:

The chemical and physical rainwater quality data for both roof's sample and paved area's sample are presented in table1 as follows:

Parameter	Unit	Roof's sample	Paved area's sample
pH	--	6.8	8.1
Turbidity	NTU	0.5	2.8
Total organic carbon (TOC)	mg/l	4.5	6.5
Total nitrogen (TN)	mg/l	1.5	1.9
Colour	CU	27	45

Table (1) Chemical and physical properties analysis of rainwater

The results presented in Tables 1, show that a number of trends are evident. The pH in the roof's samples is within the standards of potable water while, the paved area's sample is with high concentration. The turbidity of rainwater samples collected from the roof is within the standards, but the one collected from the paved way has high value. The concentration of TOC in roof's sample is within the standards; however the roof's sample has high concentration, which exceeds

the standards of raw water. Total nitrogen was detected in low concentrations in the roof's sample and little bit more concentration in the paved area's sample. The colour is little bit normal in roof's sample, whereas is high in paved areas's sample.

Microbiological analysis:

The microbiological properties analysis of rainwater samples shown in table. 2, as follows:

Parameter	Unit	Roof's sample	Paved area's sample
Total Coliforms	CFU/100ml	0.9	2.5
Fecal Coliforms	CFU/100ml	0.8	2.3

Table (2) Microbiological properties analysis of rainwater

The results of microbiological properties analysis show that the water sample contains little bacteria indicating beginning of the pollution of rainwater. It means that the microbiological has to be improved. In such case, disinfection may be applied. Chlorination is the most common and easily applicable practice. Chlorine is applied for the deactivation of most micro-organisms and is also reasonably cheap. Chlorination is generally applied after the harvested rainwater has been removed from the storage tank, as chlorine may react with organic matter to form undesirable by-products which can settle to the bottom of the storage tank. Chlorination should meet the level of 0.4–0.5 mg/l free chlorine [17], which is considered to be effective. This can be done by applying chlorine tablets or chlorine solution. The other solution that can be used is slow sand filtration which is a cheap method to improve the bacteriological quality of harvested water. Slow sand filtration is a biological treatment process rather than a physical filtration process [17]. The filter is constructed carefully by using graded sand layers that have the coarsest fraction on top and finest at the base. A constant flow of water through the filter is essential for it to be effective. Effective slow sand filtration can produce water with a very low nutrient level. The main restriction of this method is that the micro-organisms can be only reduced rather than completely cleared in the treated rainwater.

Conclusion

Harvested rainwater can play an important role in substituting and supplementing water supply from the water supply facilities. The potential of potable water savings can be substantial by using rainwater harvesting systems. Rainwater harvesting and its treatment is affordable by individuals and will be highly useful in drought prone areas.

The results obtained showed that, chemical and physical properties of rainwater are affected by the catchment materials. The rainwater cached by surfaces made of concrete roofs is of higher quality than that made from asphalt in paved areas. The properties of asphalt caused deterioration of rainwater quality, due its ability to absorb atmospheric particles that sediment on the catchment surface between rainfall events. The pH of rainwater cached in concrete surfaces tended to be slightly acidic, whereas rainwater pH cached in asphalt surfaces was slightly basic. Although the

quality of rainwater could be influenced by the environmental conditions, the rainwater cached by the rainwater harvesting systems is of high quality using appropriate materials for catchment surfaces and treatment. The obtained results also indicate that the rainwater could be treated effectively by the combination of filtration and chlorine disinfection.

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Incidence of Mycopathogens Fungi of The Oat Bird-Cherry Aphid, *Rhopalosiphum padi* L. (Homoptera: Aphididae) Infesting Wheat Plants at Assiut

Mohamed A. A. Abdel-Rahman¹, Asmaa H. M. Mohamed¹, Saad Sh. M. A. El-Maraghy³, Azza M. A. Awad³ and Youssef M. Omar⁴

¹ Plant Protection Research Institute, A.R.C, Egypt;

² Botany and Microbiology Department, Faculty of Science, Assiut University, Egypt;

³ Zoology Department, Faculty of Science, Assiut University, Egypt;

⁴ Plant Protection Department, Faculty of Agriculture, Assiut University, Egypt

Abstract: Six species of mycopathogens, including four entomophthorales and two hyphomycetes were identified infecting the oat bird-cherry aphid, *R. padi* infesting wheat plants. Entomophthorales was represented by four species belonging to three families: Ancylistaceae was represented by one genus, *Conidiobolus*, Entomophthoraceae by two genera, *Entomophthora* and *Pandora* represented by *E. planchoniana* and *Pandora* (=Erina) neoaphids, and Neozygitaceae by *Neozygites fresenii*. The hyphomycetes fungi were represented by two species (*Beauveria bassiana* and *Verticillium lecanii*) of order Moniliales. Data show also that the aphid began to infest wheat plants early during the middle of January when wheat plants were in the stem-elongation stage. Thereafter numbers of aphids increased gradually to reach a peak when the plants were at the flowering stage during the third week of February. During next three weeks the number of the aphid declined sharply. Mortality rate with the fungal pathogens was observed from the end of January up to the end of March. The number of cadavers increased gradually to reach the maximum level during the end of March.

Key words: Oat bird-cherry aphid, *Rhopalosiphum padi* L, Wheat, entomopathogens, Assiut

Introduction

The oat bird-cherry aphid, *R. padi* is considered one of the most serious cereal aphids attacking wheat plants in Assiut, Egypt (Abdel-Rahman 1997, El-Lathy 1999, and El-Fatih 2000 and 2006). Entomopathogenic fungi are now being considered as biological alternatives to chemical control (Roberts & Yendol 1971, Samson et al. 1988 and Moubasher et al. 2010). Entomopathogenic fungi are frequently reported as major factors suppressing populations of cereal aphids and can cause sudden decline of dense populations (Feng et al. 1991 and Roy et al. 2000). Drastic reduction in the populations of various cereal aphids due to infection with Entomopathorales fungi was observed by Dedryver (1983).

The aim of the present study was to seek further information on mycopathogens of the *R. padi* infesting wheat plants at Assiut, Egypt.

Materials and Methods

The present investigation was carried out in Assiut Governorate (Abnoub district) about 15 Km Northeast Assiut City during 2013 and 2014 wheat-growing seasons. An area of about 2100 m² (about half of feddan) was cultivated with wheat (cultivar Sids 1) normally at mid-November in both cultivated seasons. The normal conventional agricultural practices were normally performed and no chemical control (insecticides or fungicides) was used during the study period. Weeds were removed by hand.

During the two seasons, the oat bird-cherry aphid numbers (all forms) were counted and recorded on 200 randomly selected seedlings or main tillers, later in the season, when the aphid numbers increase on the plants, the numbers of examined tillers were reduced to 100 tillers. Four replicates each were taken weekly from the beginning of January, when the migration of aphids onto the wheat crop, at the stage of tillering or early stem-elongation stage from overwintering sites begin, and continued through the time when aphid population declined to low or undetectable levels. At the same time number of infected aphids was also counted and recorded.

Cadavers (dead aphids) were recorded, placed in 1x5 cm vials and stored at 5°C. Aphid cadavers were examined under a dissecting microscope as soon as possible after collected to observe external symptoms and fungal reproductive structures if produced in situ on the plant. Desiccated and fresh cadavers were placed in a moist chamber for about 20 hrs to allow hyphae and reproductive structures to develop. Individual aphids were mounted in cotton blue or aceto-orcein and observed under a compound microscope. Identification of fungi was based on external symptoms and the morphology of spores and sporulating structures (Waterhouse and Brady, 1982), and new revision of the classification of Entomophthorales (Humber 1989 and 1991) was followed. Fungi identified as known aphid pathogens were considered to be the cause of death of their host.

Statistical analysis

Data were statistically analyzed using analysis of variance (F test) and means were compared according to Duncan's multiple range test.

Percentage of infection (mortality %) caused by entomopathogenic fungi was calculated in each sampling date according to Feng et al. (1992) as follow:

Number of infected aphids

$$\text{Mortality (\%)} = \frac{\text{Number of infected aphids}}{(\text{Total number of alive aphids}) + \text{No. cadavers}} \times 100$$

Results and Discussion

1. Entomopathogens identified from the aphid:

From the survey studies through 2012-2013 and 2013-2014 wheat growing seasons, six species entomopathogens, including four entomophthorales and two hyphomycetes were identified infecting the oat bird-cherry aphid, *R. padi* infesting wheat plants. Entomophthorales was represented by four species belonging to three families: Ancylistaceae was represented by one genus, *Conidiobolus*, Entomophthoraceae by two genera, *Entomophthora* and *Pandora* represented by *E. planchoniana* and *Pandora* (=Erina) neoaphids, and Neozygitaceae by *Neozygites fresenii*.

The hyphomycetes fungi were represented by two species (*Beauveria bassiana* (Balsmo) Vuill. and *Verticillium lecanii*) of order Moniliales.

These fungi mentioned above are surveyed worldwide as they are well-know as biological control agents of cereal aphids (Feng et al. 1990, 1991 and 1992, Abdel-Rahman, 2001, Hammam, 2003 & 2009). Entomopathogens are considered to be the best candidates for the biological control of aphids (Latge and Papierok, 1988), and numerous accounts of cereal aphids killed by entomophthoralean fungi have been documented in Europe (Dean and Wilding 1971, 1973; Dedryver 1983; Papierok and Havukkala 1986) and South America (Lazzari 1985). Regional lists of aphid pathogenic fungi have been published in Australia (Milner et al., 1980) and Finland (Papierok 1989). Five entomopathogenic fungi were reported from 34 aphid hosts in eastern Canada and the United States (Remaudiere et al. 1978 and Humber and Soper 1986).

2. Incidence of entomopathogens recorded

Data in Table 1 show the relative incidence of the six entomopathogens which infect the oat aphid, namely: *Conidiobolus* sp., *E. planchoniana*, *P. neoaphids*, *N. fresenii*, *B. bassiana* and *V. lecanii* during 2013 and 2014 wheat growing seasons.

In 2013 season, 147 cadavers were collected from *R. padi* naturally-infected with entomopathogens. Six species belonging to six genera of entomopathogenic fungi have been identified infecting the oat aphid in the field at Assiut.

Statistical analyses showed that *E. planchoniana* followed by *P. neoaphidis* were the most dominant species encountered in 38.26%, and 33.20% of samples, respectively. Three species: *N. fresenii*, *B. bassiana* and *V. lecanii*. showed a moderate level of infection while *Conidiobolus* was scarce.

In 2014 season, 659 cadavers of the oat aphids were collected during the whole season. Six species belonging to six genera of fungi were found infecting the aphid, i.e; *B. bassiana*, *Conidiobolus*. *E. planchoniana*, *N. fresenii*, *P. neoaphidis*, and *V. lecanii*.

Statistical analysis showed that *E. planchoniana* followed by *P. neoaphidis* were the most dominant species encountered in 44.16%, 34.90% of the sample, respectively. *B. bassiana*, *N. fresenii*, and *V. lecanii* showed a moderate level of infection while *Conidiobolus* was scarce.

Generally, it could be concluded that, regardless of the season, the present results indicated that various entomopathogenic fungi caused the oat bird-cherry aphid mycoses. The incidence of these pathogens were estimated from 806 cadavers of the oat bird-cherry aphid examined microscopically during 2013 and 2014 wheat growing seasons. There are five species in addition to an unidentified species of *Conidiobolus* of entomopathogenic fungi identified infecting this aphid species. Of the growing seasons data, *E. planchoniana* followed by *P. neoaphidis* were the most dominant species encountered 43.05%, 34.62% respectively. *V. lecanii*, *N. fresenii*, and *B. bassiana* showed low levels of infection (8.19%, 7.94%, and 5.58% respectively) while *Conidiobolus* was scarce (0.62%).

3. Entomopathogens and their host (*R. padi*):

The seasonal occurrence of the oat aphid and their entomopathogens were studied during 2013 and 214 seasons. Data in Table 2 show the incidence of entomopathogens in relation to oat aphid populations during 2013 and 2014.

In 2013 season, the aphid began to appear on wheat plants (0.02 individual / tiller) during the first week of January. Its population reached a peak of 4.10 aphids / tiller during the first week of March. The population then declined sharply to reach 0.80 aphids / tiller during the end of March. The cadavers appeared on wheat plants during the period extended from the beginning of February up to the end of March. The percentage of infection was relatively low, generally <6% during the first of March. Then the level of infection dramatically increased as the aphid population increased. Maximum infection (26.52%) was recorded during the second week of March correlated with 0.31 aphid / tiller.

In 2014 season, the aphid first appeared on wheat plants during the first week of January up to the end of March with a peak of abundance (6.70 individuals / tiller) during the first half of March. The cadavers were detected after three weeks of aphids observed on the end of January (0.01 cadaver / tiller). Percentage of mycosis increased from 0.79% correlated with 1.25 aphids / tiller during the first week of February to 3.43% correlated with 1.04 aphids / tiller during the end of March. Maximum infection (41.51%) was recorded during the middle of March correlated with 3.10 aphids / tiller.

In general, regardless of the growing seasons, data showed that the first case of infection insects was observed at the beginning of February with a percent mortality of 0.43% up to the end of March with a percent mortality of 8.45%. Maximum mortality (38.52%) was detected on March 17th.

Several species of entomopathogenic fungi are known to cause fatal diseases in aphids, including *Conidiobolus* spp. *Verticillium lecanii*, various; species of *Beauveria*, *Paecilomyces*

farinosus (Holm ex S.F. Gery) Brown & Smith (Roberts & Yendol 1971, Samson et al. 1988). Entomopathogenic fungi are frequently reported as major factors suppressing populations of cereal aphids and can cause sudden decline of dense populations (Feng et al. 1991). Three entomopathorelean fungi species killed 65-80% of common cereal aphids (Dean & Wilding 1973). Drastic reduction in the populations of various cereal aphids due to infection with Entomopathorales fungi was observed by Dedryver (1983).

Members of order Entomophthorales are excellent candidates for biological control of aphids (Latge and Papierok 1988). Worldwide, *P. neoaphidis* is the most common and frequently the dominant-pathogen of aphids (Waterhouse and Brady 1982). This fungus can cause collapse of aphid population within few weeks of the onset of disease (Feng et al. 1990). Without management however, the fungus is not effective as control agent alone because it does not attack until the aphid population has peaked and has already caused considerable damage (Feng et al. 1991).

Conclusion

Entomopathogens are considered to be the best candidates for the biological control of aphids. *E. planchoniana* followed by *P. neoaphidis* were the most dominant species. The first case of infection insects was observed at the beginning of February. Maximum mortality (38.52%) was detected around the middle of March. Entomopathogenic fungi are frequently reported as major factors suppressing populations of cereal aphids and can cause sudden decline of dense populations.

Table (1): Numbers and percentage of mycopathogens recovered naturally infecting the oat bird-cherry aphid in the field during 2013 and 2014.

Fungi species	2013		2014		Total	
	No.	(%)	No.	(%)	No.	(%)
Conidiobolus	2c	1.54	3c	0.45	5c	0.62
Entomophthoraceae planchoniana Cornu	56a	38.26	291a	44.16	347a	43.05
Pandora (=Erina) neoaphidis (Remaudierel & Hennebert) Humber	49a	33.20	230a	34.90	279a	34.62
Neozygites fresenii (Nowakowski) Batko	14b	9.53	50b	7.59	64b	7.94
Beauveria bassiana (Balsmo) Vuill.	11b	7.35	34b	5.16	45b	5.58
Verticillium lecanii (Zimmermann) A.W. Viegas	15b	10.12	51b	7.74	66b	8.19
Total	147	100	659	100	806	100

Means vertically followed by the same letter are not significantly different < 0.05 level of probability.

Table (2): Average number of the oat bird-cherry aphid on wheat plants and infection rate with entomopathogens naturally in the field during 2013 and 2014 wheat growing season.

Inspection date	Growth stage *	2013 season			2014 season		
		No / tiller		Infection (%)	No / tiller		Infection (%)
		Aphids	Cadavers		Aphids	Cadavers	
Jan. 6	28	0.02	0	0	0.02	0	0
13	30	0.07	0	0	0.18	0	0
20	32	0.21	0	0	0.34	0	0
27	33	1.05	0	0	1.25	0.01	0.79
Feb. 3	37	1.62	0.01	0.61	3.19	0.04	1.24
10	39	2.31	0.04	1.60	4.31	0.07	1.59
17	43	3.40	0.09	2.57	4.97	0.10	1.97
24	57	3.87	0.13	3.05	4.99	0.24	4.59
March 3	65	4.10	0.22	5.09	4.13	1.30	23.94
10	71	1.64	0.46	21.90	6.70	2.00	22.99
17	73	0.97	0.35	26.52	3.10	2.20	41.51
24	75	0.31	0.11	26.19	1.51	0.52	25.62
31	77	0.80	0.06	6.98	1.04	0.11	9.57
Total	----	20.37	1.47	6.73	35.73	6.59	15.57

* A decimal code for growth stage of wheat (Zadoks et al., 1974)

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13. ANNEX

Organizers and Partners

The Platform is organized by Arab States Research and Education Network GmbH, in cooperation with:

- EUMEDCONNECT3 and AfricaConenct2 Projects
- GEANT
- MAGIC Project
- US Internet2 Special Interest Group Middle East (Internet2)
- Talal Abu-Ghazaleh Organization (TAG-Org)
- German Jordanian University (GJU)
- National Council for Scientific Research (CNRS)

Program Committee

- Boubakar Barry, West and Central African Research and Education Network (WACREN), Senegal
- David West, Delivery of Advanced Network Technology to Europe (DANTE), UK
- Fahem Al Nuaimi, Ankabut, UAE
- Florencio I. Utreras, the Latin American Cooperation of Research Networks (RedCLARA), Latin America.
- Helga Spitaler, Delivery of Advanced Network Technology to Europe (DANTE), UK
- Hicham Hajj-Hassan, National Council for Scientific Research (CNRS-L), Lebanon
- Johnathon Chapman, Internet2 Middle East Regional Interest Group, Qatar
- Pascal Hoba, UbuntuNet Alliance, Malawi
- Salem Al-Agtash, German Jordanian University (GJU), Jordan
- Sara Al-Eisawi, Arab Organization for Quality Assurance in Education (AROQA), Jordan
- Walid Karam, University of Balamand, Lebanon
- Yousif Asfour, American University of Beirut, Lebanon
- Yousef Torman, Arab States Research and Education Network (ASREN), Germany

Organizing Committee

- Clara Mchantaf, American University of Beirut, Lebanon
- Lara Mneimneh, American University of Beirut, Lebanon
- Mohammad Abbass, American University of Beirut, Lebanon
- Mohamad Awad, National Council for Scientific Research, Lebanon
- Waref Kumayha, Talal Abu Ghazaleh Organization, Lebanon
- Yasmeen Al-Kouz, Arab States Research and Education Network (ASREN), Jordan
- Yousef Torman, Arab States Research and Education Network (ASREN), Jordan

Scientific Committee

- Ahmed Hassan, Egypt University Network, Egypt
- Boubakar Barry, West and Central African Research and Education Network, Senegal
- Edward Moynihan, Internet2, USA
- Federico Ruggieri, Director, GARR Consortium, Italy
- Florencio Utreras, RedClara, Argentina
- Habib Yousef, CCK, Tunisia
- Markus Baumann, Asia Pacific Advanced Network, Australia
- Ognjen Prnjat, GRNET, Greece
- Pascal Hoba, UbuntuNet Alliance, Malawi
- Roberto Barbera, University of Catania, Italy
- Salem Al-Agtash, German Jordanian University (GJU), Jordan
- Walid Karam, Balamand University, Lebanon
- Yousif Asfour, American University of Beirut, Lebanon

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At Naseej, our vision has always focused on being a true partner to our customers and an active contributor to the spread of knowledge in our societies, with the ultimate objective of empowering organizations and individuals in the Arab world with the tools, technologies, systems, and best practices to manage and share knowledge and information. Naseej provides Academic and Higher Education institutes in the region with comprehensive and integrated solutions and services designed to enable Academic institutions to actively contribute to the success of their students.

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CERN, the European Organization for Nuclear Research, is the largest particle physics laboratory in the world, where physicists and engineers are probing the fundamental structure of the universe. They use the world's most complex scientific instruments to study the basic constituents of matter – the fundamental particles. At the forefront of CERN, research is the largest scientific tool in the world, the Large Hadron Collider. A particle accelerator 27km in circumference, the LHC is buried 100 meters underground. Four huge detectors study the particle collisions generated by the LHC. Two of these – ATLAS and CMS - recently found the Higgs boson, one of the greatest discoveries in physics.

To conduct science at the frontiers of knowledge, CERN develops state-of-the-art technology, which has found applications in fields as diverse as vacuums and medicine. As well as knowledge transfer, CERN educates the scientists of tomorrow through its education and outreach programs. Founded in 1954 and based astride the Franco-Swiss border near Geneva, CERN has become a prime example of peaceful international collaboration. It has 22 Member States and involves today more than 10,000 scientists of almost 100 nationalities.

A large rectangular image with a blue background showing a dense pattern of white and light blue particle tracks or data points, resembling a particle detector's output.

CERN, Science for peace

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home.cern





The Internet Society was formed in 1992 by Vint Cerf and Bob Kahn, two of the “Fathers of the Internet”. Among its leadership and membership one can find many of the Internet’s technical pioneers, innovators, and global connectors. Its mission—to promote the open development, evolution, and use of the Internet for the benefit of all people throughout the world—mirrors the guiding principles that gave rise to and enabled the propagation of our era’s defining technology. Believing that “the Internet is for Everyone,” the Internet Society has worked since its founding to make that goal a reality.

For more than 20 years, the Internet Society has also played an important role in informing and creating the history of the Internet. The Internet Society’s foundational pillars—Outreach, Technology, and Policy—have found expression in initiatives that have helped to connect the world, supported the development of fundamental Internet technology, and promoted transparency and a multistakeholder, bottom-up approach in addressing global Internet governance issues.

A dark blue banner with a pattern of lighter blue diagonal bars. It features the Internet Society logo and text in white.

 **Internet Society**

The Internet is for everyone.

We are a global movement that champions an open Internet for all.

Join us today @internetsociety.org



Alfa is the brand name of the first Lebanese mobile network managed by Orascom Telecom Media and Technology (Orascom TMT). Alfa capitalizes on the vast know-how and international expertise of Orascom TMT in order to deliver quality and professional solutions for the mobile sector in Lebanon. Alfa has been focused since 2009 under Orascom TMT's management on technology innovation being the first operator to introduce latest global mobile technologies in Lebanon. On October 25, 2011, it was the first to launch 3G+ mobile broadband services.

On May 15, 2013, it became the first to commercially roll out 4G-LTE services in the country, and in another regional milestone, Alfa launched the first 4G+ live site in Lebanon in Q3, 2015. Alfa currently serves 2 million subscribers, among of which more than 75% are data users and its state of the art network (2G, 3G+, 4G LTE and 4G+ LTE-A) covers 99% of Lebanon.

4G+

*Now Three Times
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RIPE NCC is an independent, not-for-profit membership organisation that supports the infrastructure of the Internet through technical coordination in Europe, Middle East and parts of Central Asia. The most prominent activity of the RIPE NCC is to act as the Regional Internet Registry (RIR) providing global Internet resources and related services (IPv4, IPv6 and AS Number resources) to members in the RIPE NCC service region. The RIPE NCC also provides services for the benefit of the Internet community at large.

RIPE NCC members are mainly Internet Service Providers (ISPs), telecommunication organisations, large corporations and governments located in Europe, the Middle East and parts of Central Asia.

The RIPE NCC operates from its main office in Amsterdam, the Netherlands and from its new regional office in Dubai.

By expanding its presence in the Middle East, the RIPE NCC hopes to meet increased demand for region-specific support in an area experiencing continuous growth in the Internet and related fields. The Dubai office has a growing team that will help the organisation engage effectively with its members, as well as industry representatives and government bodies in the region. The RIPE NCC has also appointed two local industry experts who will also be able to provide support in Arabic regarding both policy-related and technical issues.



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

The RIPE NCC is in Dubai!



On 31 March 2014, the RIPE NCC opened its first regional office in Dubai to better connect with our members in the Middle East.

Our Mission:

We serve our members by delivering a high quality registry and supporting the core Internet infrastructure.

Connecting people within and beyond the technical community through our inclusive, multi-stakeholder approach, we contribute to an innovative and reliable Internet.

RIPE NCC | The Lofts, Building B1, Suite 206,
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Phone: +971 43 64 94 59
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Tata Communications is a leading global provider of A New World of Communications™ to multinational enterprises, partners and service providers. The Tata Communications global network includes one of the most advanced and largest submarine cable networks and a Tier-1 IP network with connectivity to more than 200 countries and territories across 400 PoPs, as well as nearly 1 million square feet of data centre and collocation space worldwide. With a strong presence in both developed and emerging markets, the company is a key enabler of information and communication technology globally with a broad range of services including network services; voice, data and mobility solutions; unified communications & collaboration tools; managed security and hosting; content management; media and entertainment services; and cloud and data centre solutions.

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Established in 1996, BMB soon became a trusted global business technology, advisor to more than 2,500 industry-leading customers. The company specialized in delivering high availability solutions and services that span the spectrum of Information & Communication Technology. In doing so, it played an integral role in reducing down time, maximizing investments and optimizing businesses through technology.

With a three dimensional characteristic, BMB - through its divisions: Direct, Move, Reach – is a pioneer in the industry for the Middle East, North Africa and Levant (MENAL region), with services ranging from project design, consultancy, management, implementation, to after sales support.

Founded with an expert workforce as the core of the company’s value chain, it offers worldwide professional services through a mobile and dynamic team. With over 300 employees, BMB community focuses on professionalism, drive and perseverance, thus acquiring an exclusive identity. Equipped with a strong entrepreneurial spirit, it aspires to continuously expand its geographical coverage and presence as a major asset to meet clients’ needs.

The image shows a banner for the BMB Group website with the URL www.bmbgroup.com and the BMB logo. Below the banner is a grid of three colored boxes representing the divisions: Direct (orange), Move (purple), and Reach (red). Each box lists the services offered by that division.

Division	Services
bmb DIRECT	Business Intelligence Enterprise Content Management E-forms and Workflow Solutions Business Process Management Archiving
bmb MOVE	Sales Force Automation Enterprise Mobility Solutions Warehouse Management Field service RFID Solutions
bmb REACH	Enterprise Networking Data Center Network Security Collaboration Professional services



Contacts

The Arab States Research and Education
Network-ASREN
info@asrenorg.net
Phone: +962 6 5100250 Ext.4306



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