ASREN

Arab States Research and Education Network

The Arab States Research and Education Network (ASREN)

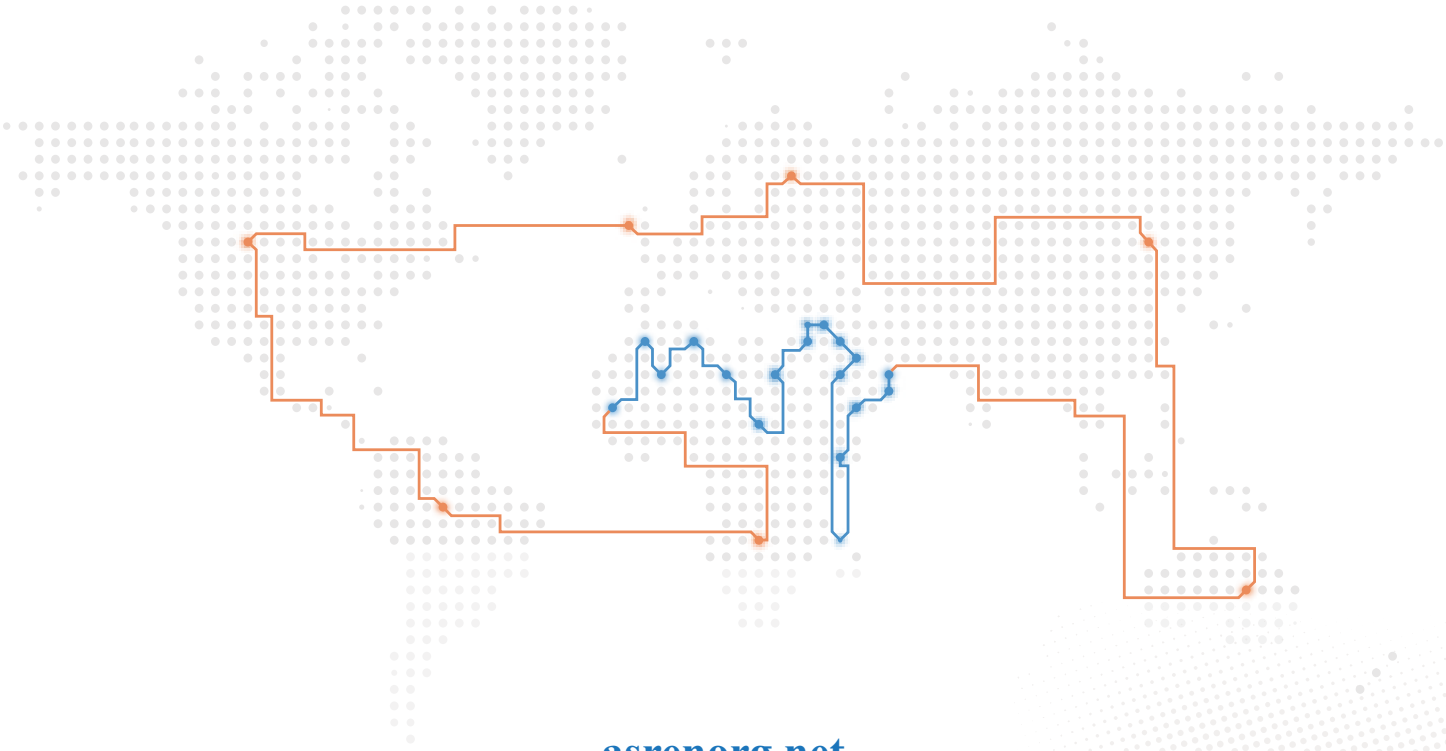
Honorary Chair

HE Mr. Ahmad Aboul Gheit

Secretary General of the League of Arab States

Chair

HE Dr. Talal Abu-Ghazaleh



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Chairman's message

"ASREN is the pan-Arab research and education network contributing to boosting scientific research, innovation and education across the Arab world.

The practice of scientific research is changing dramatically. Long gone are the days in which researchers working in isolation contributed to technological innovation and social development. Only through multidisciplinary collaborations among research centres, industry and public entities knowledge, innovation, and exchange of know-how can be facilitated. e-Infrastructures play a major role in making such collaboration possible and enabling institutions to "boot up" and join the globalizing developed world.

ASREN has been founded in 2010 with an objective to establish an Arab Regional Network to interconnect existing Arab National R&E networks (NRENs) with each other and to their counterparts across the globe, and to act as a catalyst for e-Infrastructures in Arab countries where they are not yet available".

Chairman

Dr. Talal Abu-Ghazaleh

I. INTRODUCTION

ASREN is a non-profit company with limited liability (GmbH), and was officially registered in Germany in 2011. ASREN is the association of the Arab region National Research and Education Networks (NRENs). It aims to implement and operate a Pan-Arab dedicated research and education network that connects national and regional research and education networks, worldwide. The purpose is to boost scientific research and cooperation in member countries through the provision of world-class e-Infrastructures and e-services. The e-Infrastructures enable sharing of resources and access to variety of services and applications as to highly sophisticated and technologically advanced computing resources available elsewhere.

Education and scientific research have become key elements and significant resources for economic development, technological innovation, and knowledge creation in the Arab region. Researchers working in isolation no longer contribute to technological innovations or social development. Only through multidisciplinary collaborations among research centres, industry and public entities that knowledge, innovation, and know-how can be facilitated. ICT technologies have played a major role in making such collaboration possible. The creation of an educational and research connectivity infrastructure has a great potential, most importantly in its impact on enabling institution to "boot up" and join the globalizing developed world in their highly advanced interconnected research and education networks.

Vision and Mission

ASREN's vision is 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. Its mission is 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

The objectives of ASREN are defined as:

- To build, maintain and consolidate regional e-Infrastructures dedicated to e-Science and education across the Arab Countries
- To contribute to create and sustain National Research and Education Networks (NRENS)
- To facilitate the collaboration and cooperation among the researchers and academicians in the Arab region

II. HISTORICAL PERSPECTIVE

The intention of forming the Consortium of Arab Mediterranean Research and Education Networks (CAMREN) was first declared in 2006 by the 7 Arab partners of the EUMEDCONNECT project that connect over 2 million academic users and researchers in 400 research centers and educational establishments. The partner countries, Algeria, Egypt, Jordan, Morocco, Palestine, Syria, and Tunisia, are represented by their national research and education network organizations (NRENs) and co-finance the network infrastructure and management costs, a substantial investment of around 1.5 million Euros each year.

In December 2009 the idea is refined and the proposed new regional association is now the Arab States Research and Education Network (ASREN), under the patronage of the League of Arab States and the United Nations Global Alliance for ICT and Development. The lead for this has been taken by the Jordanian NREN, JUNET, and it this replaces the CAMREN proposal and enables a wider participation throughout the Arab region (U.A.E. and Oman have joined the discussion process).

Since then, with the support of EUMEDCONNECT2 funded by the European Commission and managed by DANTE (UK), four strategic planning workshop have been held in Cairo (January 2010), Brussels (March 2010), Algiers (July 2010) and Rome (November 2010) to finalize all the agreements on the organization's mission, objectives, structure and strategic plan.

A first formal announcement of the creation of ASREN was made at the Third EU-Med Conference on e-Infrastructures across the Mediterranean (EUMED Event 3) on March 31, 2010 in Brussels, by HE Dr. Talal Abu-Ghazaleh, Chairman of the Global Alliance for ICT and Development of the United Nations Department of Economic and Social Affairs (UN-GAID) at that time. Since then, Talal Abu-Ghazaleh Organization (TAG-Org) has been providing key technical and financial support in addition to political lobbying for the creation of ASREN. TAG-Org has lead the registration process of ASREN as a non-profit organization in Germany and had made all its resources available to meet the legal and financial requirements for a legally registered ASREN in Europe and operational in the Arab region.

In July 2010, His Excellency Mr. Amre Moussa, Secretary General of the League of Arab States at that time, endorsed the creation of ASREN, and announced the formal ASREN Launching at the premises of the League of Arab States in December 2010 in Cairo, Egypt. Several regional bodies including the League of Arab States Secretariat Department in charge of Science and Research, the Arab Education, Science, Culture Organization (ALESCO) and the Arab Union of Scientific Research Councils as well as representatives of UNESCO, the World Bank, European Commission, and heads of Arab delegations joined ASREN launch. In October 2011, ASREN was officially registered as a non-profit GmbH organization in Germany.

III. FUNCTIONS AND SERVICES

The core functions of ASREN are related to:

- Interconnection: Interconnect the NRENs and managing technical and financial resources to manage the regional network infrastructure
- Network management of regional network: that includes design topology, tendering and managing NRENs interconnection, monitoring traffic and providing technical support and training to member (NRENs), etc
- Commercial and financial management of regional network, as managing contracts with network suppliers managing agreements for collecting funds from NRENs, managing contracts with funding organizations or agencies and conducting advocacy activities
- Developing Regional guidelines as for security policy or interoperability of services and protocols for supporting applications

ASREN has been providing variety of services to support Arab NRENs and its communities at large. These include:

- Interconnect NRENs across the Arab region through a high-speed network via the Arabia Global Exchange (AGE) Points, now established in London and will soon be set up in Fujairah
- Provide peering through physical fibre cross connects, circuit switching, or packet based VPN services, with equal and open access to all R/NRENs, carriers, and content providers
- Provide unified access to all research and education communities with standard communication facilities and capabilities, leading to better sharing of resources, information, data, knowledge and expertise
- Provide interconnected Arab universities and research centres with seamless and federated access to tremendous globally available research and education resources and databases, digital repositories, and computing infrastructures
- Setup Science Gateway with community-development tools, applications, and data, integrated via a customized portal
- Setup eduroam (education roaming) service as a world-wide roaming access service developed for the international research and education community
- Creating awareness, capacity building and technical support

IV. EVENTS

e-AGE Conference

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 one of the Arab countries. 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.

e-AGE is a 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.

Past e-AGEs

- e-AGE 2018 entitled "Education, Science and Innovation" – Amman, Jordan
- e-AGE 2017 entitled "Education, Science and Innovation" – Cairo, Egypt
- e-AGE 2016 entitled "Ubiquity and Cohesiveness of e-Infrastructures" – Beirut, Lebanon
- e-AGE 2015 entitled "Revealing and Harvesting Knowledge" – Casablanca, Morocco
- e-AGE 2014 entitled "Intercontinental Connectivity of the Pan Arab Network" – Muscat, Oman
- e-AGE 2013 entitled "Connect ---> Access ----> Innovate" – Tunis, Tunisia
- e-AGE 2012 entitled "Collaborate towards developing the regional e-Infrastructures" – Abu Dhabi, United Arab Emirates
- e-AGE 2011 entitled "Together We Shape the Future of Research and Education Networks" – Amman, Jordan

Workshops
ASREN conducted several workshops for capacity building in variety of topics. These include:
- NREN BGP Workshop 2018 – Amman, Jordan
- eduroam Training Workshop 2018 – Amman, Jordan
- Workshop on Computer Security Incident Response Team (CSIRT) 2017 – Cairo, Egypt
- Workshop on Identity Federation Infrastructure 2016 – Beirut, Lebanon
- Workshop on Computer Security Incident Response Team (CSIRT) 2016 – Beirut, Lebanon
- NREN BGP Workshop 2016 – Amman, Jordan
- Workshop on Joining eduroam and Identity Federation 2015 – Amman, Jordan
- Cloud Computing 2014 – Italy, Rome
- Identity Federation Workshop 2013 – Amman, Jordan

V. THE EU COOPERATION PROJECTS

The EU cooperation project to support the Arab Mediterranean countries in Grid Computing and e-Infrastructure services started twelve years ago. The objective has been to foster information society and develop high-speed connectivity in higher education institutions. The EUMEDCONNECT, and Africa Connect series of projects have been recognized as important cooperation projects that are co-funded by the European Commission under their Framework Programs.

AfricaConnect2 Project
AfricaConnect2 is co-funded by the EC with an objective to develop high-capacity Internet networks across the entire African continent and connect them to the European GÉANT network, allowing students, researchers and academics to collaborate with their peers from around the world. The connectivity boost not only advances research and education in Africa with opportunities like e-learning and cloud computing, but also benefits global scientific studies in areas such as climate change, biodiversity, food security, malaria and other infectious diseases.

A central part of the recently announced Africa – EU partnership, AfricaConnect2 fulfils both continents wish to connect research and education communities across borders and accelerates scientific breakthroughs. It builds on existing networks in Eastern, Southern, and North Africa and will extend connectivity into West and Central Africa. By collaborating with AfricaConnect2, the pan-European GÉANT network strengthens Europe's links with the African continent and provides African research and education communities with a gateway for global collaborations.

EUMEDCONNECT Project
EUMEDCONNECT established a regional research network in 2004, and then extended as EUMEDCONNECT2 in 2008 and EUMEDCONNECT3 in 2011. The network maintains high bandwidth connectivity to the Mediterranean research and education communities serving over 2 million researchers, academics and students in seven southern Mediterranean countries - Algeria, Egypt, Jordan, Morocco, Palestine, Syria and Tunisia. With its direct links to its pan-European counterpart GÉANT, the network facilitates the participation of the Mediterranean community in world-class research and education initiatives. The network has points of presence (PoPs) in Sicily, at Catania and Nicosia, Cyprus, while some countries connect via links to the GÉANT network. Access capacities range from 34 to 622 Mbps and circuits are connected in each case to the EUMEDCONNECT partners' national research and education network. The EUMEDCONNECT network has served as a backbone for many research initiatives. EUMEDGRID was initiated in 2006 as an e-Science development project targeting communities in different domains, including physics, hydrology, bioinformatics, engineering, and archaeology.

VI. ARAB CONNECT

"Arab Connect" is a new initiative to consolidate efforts towards building a pan-Arab research and education network. The objective is to develop National Research and Education Networks in Arab countries, then linking them to research and education networks in Europe, North America, Latin America, Asia, Africa and Australia together with existing NRENs in the rest of the Arab countries through a comprehensive high-speed network.

The complete pan-Arab e-Infrastructure presents great promises for connecting Arab research and education institutions between themselves and to the globe through high-speed data-communication networks. The research mechanism all around the world has radically changed by the availability of advanced broadband infrastructures that make possible collaboration on a massive scale as well as sharing scientific instruments and computational and data resources.

The European Commission has always shown a particular interest to improve the level of collaboration among scientists on both shores of the Mediterranean, to boost scientific development and to address today's pressing problems at global level related to climate change, global economy, food, water scarcity, alternative energy, and environmental issues. The world-leading pan-European research network GÉANT played a key role in enabling this collaboration; sharing of resources and services at over 8000 research and education establishments across Europe; and accessing on-line repositories of scientific data, through establishing the EUMEDCONNECT project, which connected the research and education networks in Algeria, Egypt, Jordan, Morocco, Palestine, Syria and Tunisia since 2004.

The Arab National Research and Education Infrastructure

Efforts of National REN (NREN) development in the Arab region vary with different successes. Figure 1 shows the status of NREN development in the Arab countries. Eight countries have mature NRENs built and operated by a national organization but with different networking topologies and technologies, which are Morocco, Algeria, Tunisia, Egypt, Sudan, KSA, UAE and Oman. Five countries have initiated the development of NREN as in Jordan, Lebanon, Somalia, Qatar and Palestine, and the remaining eight countries; Syria, Mauritania, Libya, Yemen, Kuwait, Iraq, Djibouti and Comoros have started some attempts to establish such networks but it has not come into effect yet due to the current political situation.

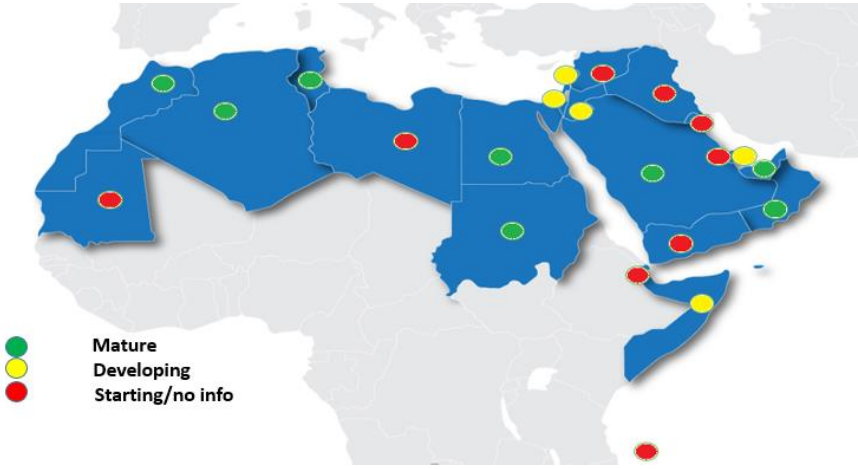

Fig. 1: Status of NREN development in the Arab region

The Pan–Arab Network for Research and Education

This component of "Arab Connect" aims at establishing a pan – Arab high-speed communication network for research and education to provide the Arab region with a gateway to global research collaboration, and to connect Arab educational institutions and research centres with their peers locally, regionally, and internationally. It builds on the EUMEDCONNECT network and the AfricaConnect network in North Africa and extends to cover the region. The envisaged network topology that is technically possible and cost effective is based on two main aggregation points:

- UAE Giga PoP: aggregating research and education traffic of the GCC countries, to be set up in cooperation with Ankabut and Etisalat.

- Egypt Open Lightpath Exchange: aggregating research and education traffic of the Eastern Mediterranean countries and southern African Arab countries, to set up in cooperation with TE Data and Egypt Telecom.

The two sites represent the main landing point for a large number of international submarine cables, and would be expected to carry traffic originating from more than 15 Arab countries and connecting to ASREN London PoP. The Magreb Arab countries are geographically scattered and are seen more feasible to connect through GEANT in Europe. Recently, terrestrial cross-boarder fiber connections have been established between many neighboring Arab countries. These connections represent a strong basis for kicking off a real start of a pan-Arab e-Infrastructure, with a prospective topology shown in Figure 2.

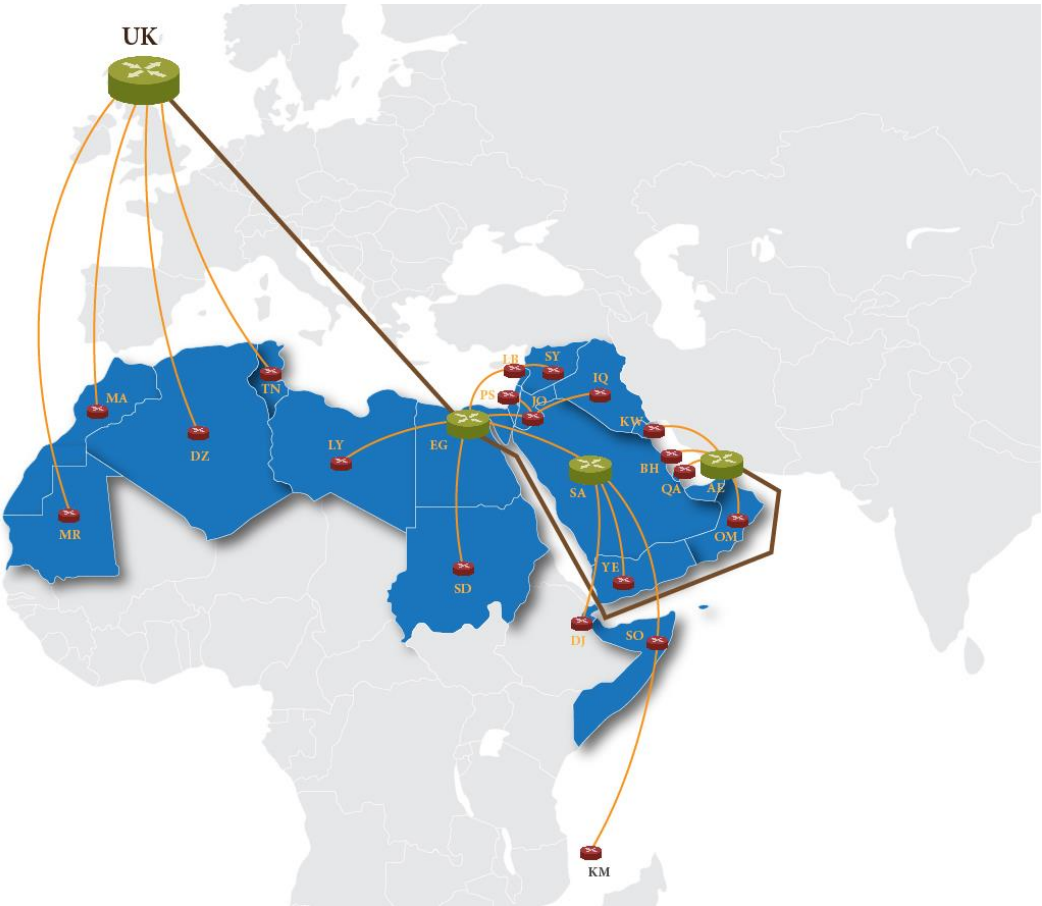

Fig. 2: Proposed Pan-Arab network topology

Benefits will include: reducing of costs of conventional interconnections; linking seamlessly scattered educational LANs, which exist across multiple networks and traditional boundaries; reducing latency and path complexity by direct traffic routing; deploying light path services; and facilitating common experimental activities among distributed virtual research communities.

The Research and Education Services

This component of "Arab Connect" aims at providing interconnection and network services as well as e-Science resources, and involves seamless access to worldwide available scientific resources, facilities, and applications.

Interconnection and network services to facilitate direct light path wave layer 2 links for major eScience programs and computationally intensive global applications. These links will be established and operated to maintain local and regional peering of relevant research and education traffic, while avoiding high costs and transit constraints imposed by carriers.

e-Science services accessible seamlessly through ASREN Science Gateway, including applications, resources, and facilities for research and educational communities; storage and hosting of content; grid and cloud computing; federations of identities; and virtual learning environments.

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