ASREN

NREN BGP Workshop

Amman 5-8

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ASREN

Enabling Innovation for Arab Academe Through Advanced e-Infrastructures

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What are Research & Education Networks?

- Research and education networks are **dedicated** networks connecting the Universities, Schools, Research Centers, Hospitals, Museums and any other institution that may have research and education activities.
- National Research and Education Networks **(NRENs)** are established to provide connectivity and communications services for the research and education communities at the national level
- Regional Research and Education Networks **(RRENs)** are connecting the NRENs to provide connectivity and services to researchers and educators across the boarders.

Main Drivers for Research Networks

- **Technological:** Satisfy high demand *eScience* initiatives, **Multimedia Collaboration**, Distributed High Performance Computing (**HPC, GRIDs**) for **Earth Sciences, High Energy Physics** (CERN, LHC…), **Bioinformatics**, **Computational Chemistry**, **Radio-astronomy**, **Engineering Planning** (computations, emulations & simulations), ***Cultural*** (archiving, collaborative digital access & processing) …
- **Social:** Common culture of R&E community, Virtual Organizations VOs, collaborative research, tele-education, Smoothing the Digital Divides, affordable high bandwidth linkage to the Global R&E community
- **Economic:** Demand aggregators: University & school staff, students, researchers. Consolidation & control of diverse public expenditures. Promotion of Information Society (e-Government, e-Business, e-Health). Stimulation of technological & telecom markets → Competitiveness

Major Objectives for R & E Networks

- Provide scientific research and education institutions with reliable means of communication in order to facilitate ease of cooperation and coordination
- Strengthen the notion of partnership and encourage joint scientific research among communities.
- Minimize cost of research by using diversified academic and technical resources to be made available for use on the network with no need for duplicating investment.
- The fact that students, teaching staff, and researchers use such dedicated networks would eventually uplift efficiency and productivity and would boost the concept of creativity and innovation.

NRENs: Major Services

- Unified connectivity to all research and education institutions to provide country-wide standard communication facilities and capabilities to faculty, researchers, students, and staff, leading to better sharing of resources, information, data, knowledge and expertise.

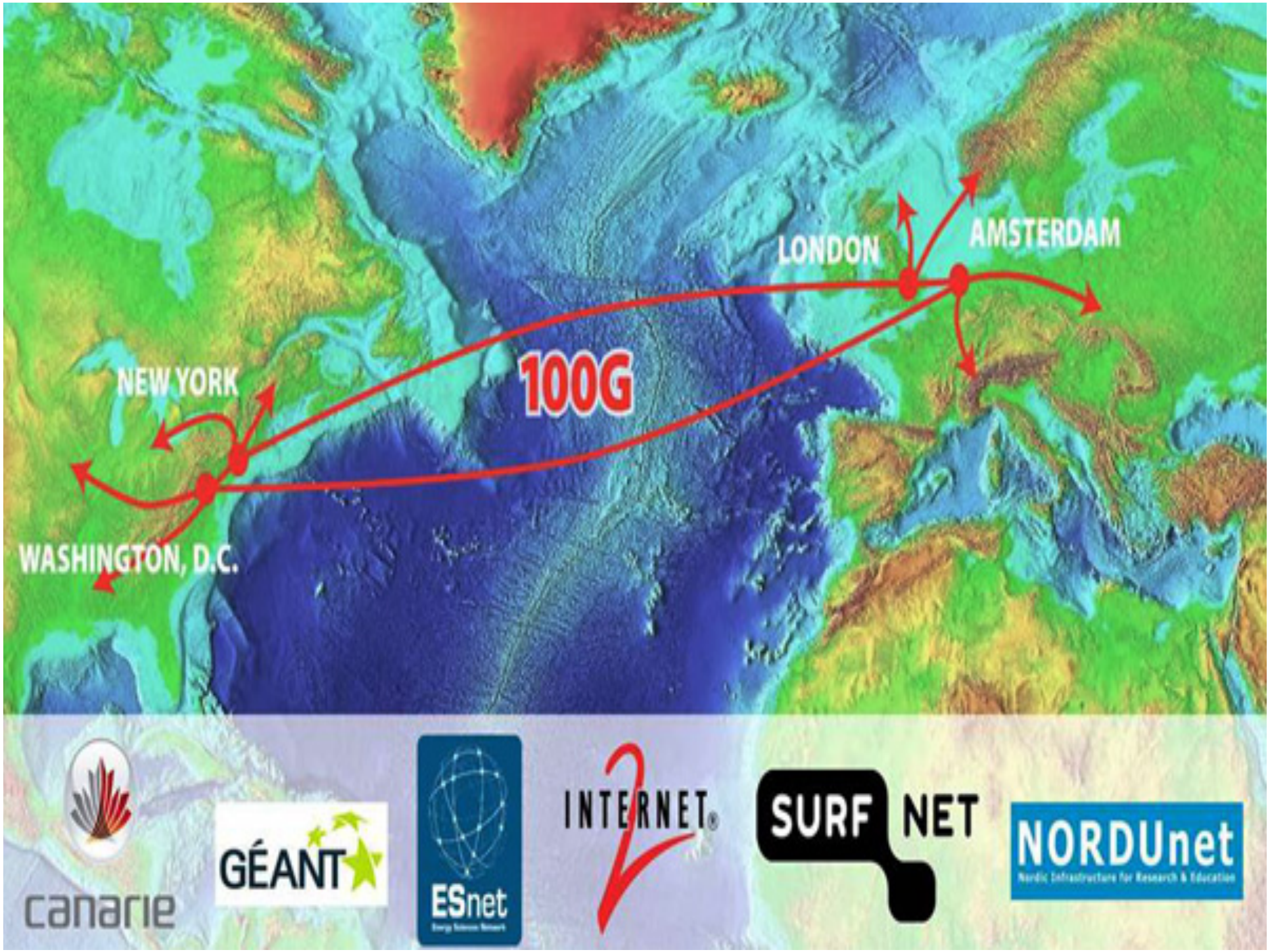
- Consolidated Internet services, with the NREN acting as an ISP to universities and research institutions. Available statistics in some countries have shown that savings can go up to 40% on access costs, while enabling common access policies and configurations at the national level.

- Connectivity to regional research networks, providing opportunities for joint research collaboration and online education initiatives.

- Access to content, common repositories, and library resources of all universities with a unified subscription to all journals and periodicals for all Universities and research centers.

NRENs: Major Services *(continued)*

- Video conferencing services, media streaming, IP telephony, access federations, and wireless roaming for the purpose of facilitating communications, exchanges of lectures, and coordination of meetings, training and conferences between all users in universities and institutes.
- Consolidated agreements with software vendors on behalf of all Universities for licensing, with savings reaching up to 50% in some cases.
- Common caching, filtering and anti-spam and anti-virus protection services provided by NRENs to all connected institutions.
- Furthermore, an NREN can be eligible to create and manage a national Internet Exchange depending on the regulations of the Country, and provide domain name registry services and networking consultancy.


LONDON
AMSTERDAM
NEW YORK
100G
WASHINGTON, D.C.
canarie
GÉANT
ESnet
INTERNET2
SURFNET
NORDUnet
Nordic Infrastructure for Research & Education

ANA-200G : GNA pathfinder – production ready Q4 2014

What an NREN (v2) is not—*what it must become*

specialized regional ISP—*essential global platform*

afraid to take risks and experiment—*innovation incubator*

supply-side market player—*demand-side market maker*

contract broker—*market aggregator*

knowledge carrier—*knowledge multiplier*

provider of shrink-wrapped solutions—*economic development engine*

business-as-usual partner—*transformation vehicle*

neutral collaboration connection—*collaboration enabler*

disinterested community service—*community developer*

political tool—*political stabilizer*

National R&E Networks: Not just networks anymore

INTERNET2

Dave Lambert, President and CEO of Internet2 @TNC2013, Maastricht

INTERNET 2
STEPHEN WOLFF
Internet2
JUNE 2013
NREN 3.0
@TNC 2013

Implications/consequences

- **Globalization** ⇒ No NREN is an island
- **Team science** ⇒ (possibly virtual) team networks for virtual communities
- **Big Data** ⇒ More than just bigger pipes

Further implications

- **Globalization** ⇒ It's time to *engineer* global R&E connectivity: from *NRENs* to a *GREN*
- **Team science** ⇒ A one-size-fits-all IP network is not enough. SDN (e.g., OpenFlow, OSCARS) will help *users and applications* configure the network
- **Big Data** ⇒ Re-architecting (Science DMZ), tuning (Web10G), measuring (perfSONAR)

INTERNET 2

SITEMAP | COOKIE POLICY | GÉANT GATEWAY

Search this site

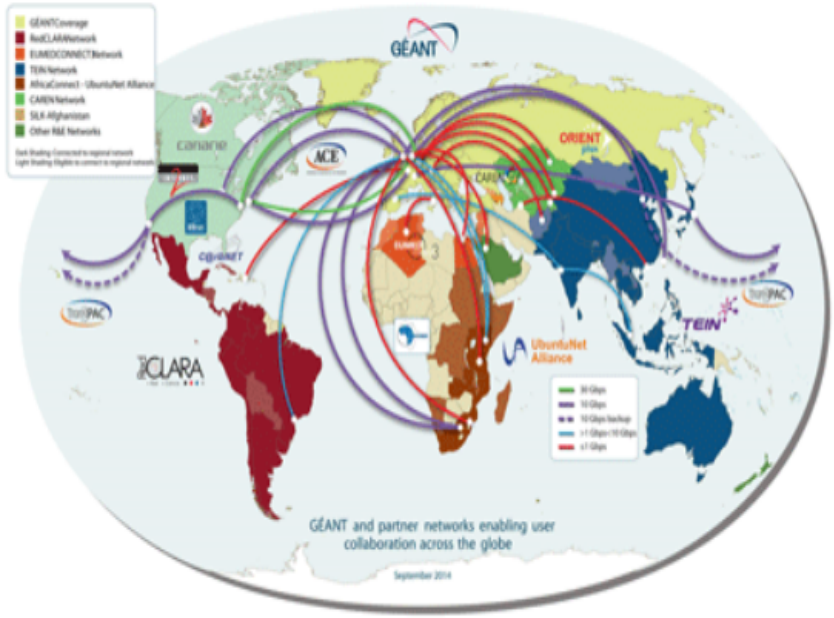
The Case for NRENs

A repository of resources to support funding, advocacy and the advancement of national and regional R&E networks

MAKING THE CASE | CASE EXAMPLES | RESOURCES & TOOLS | CONTACT US

Welcome

Monday 17 Aug 2015 | Time - 13 56



Welcome to the Case for NRENs portal

This portal offers tools and materials to assist national and regional R&E networks (NRENs and RRENs) "make a case" to their users, funders, government agencies, vendors and partners.

It also provides a toolkit of information and guidance materials to support in particular new and emerging NRENs.

The 'Case for NRENs' portal was developed in response to demand from a number of regional networks where NRENs are starting up in order to share global experiences and best practice.

How to use and contribute to this portal ›

http://services.geant.net/case-for-nrens/Pages/Home.aspx

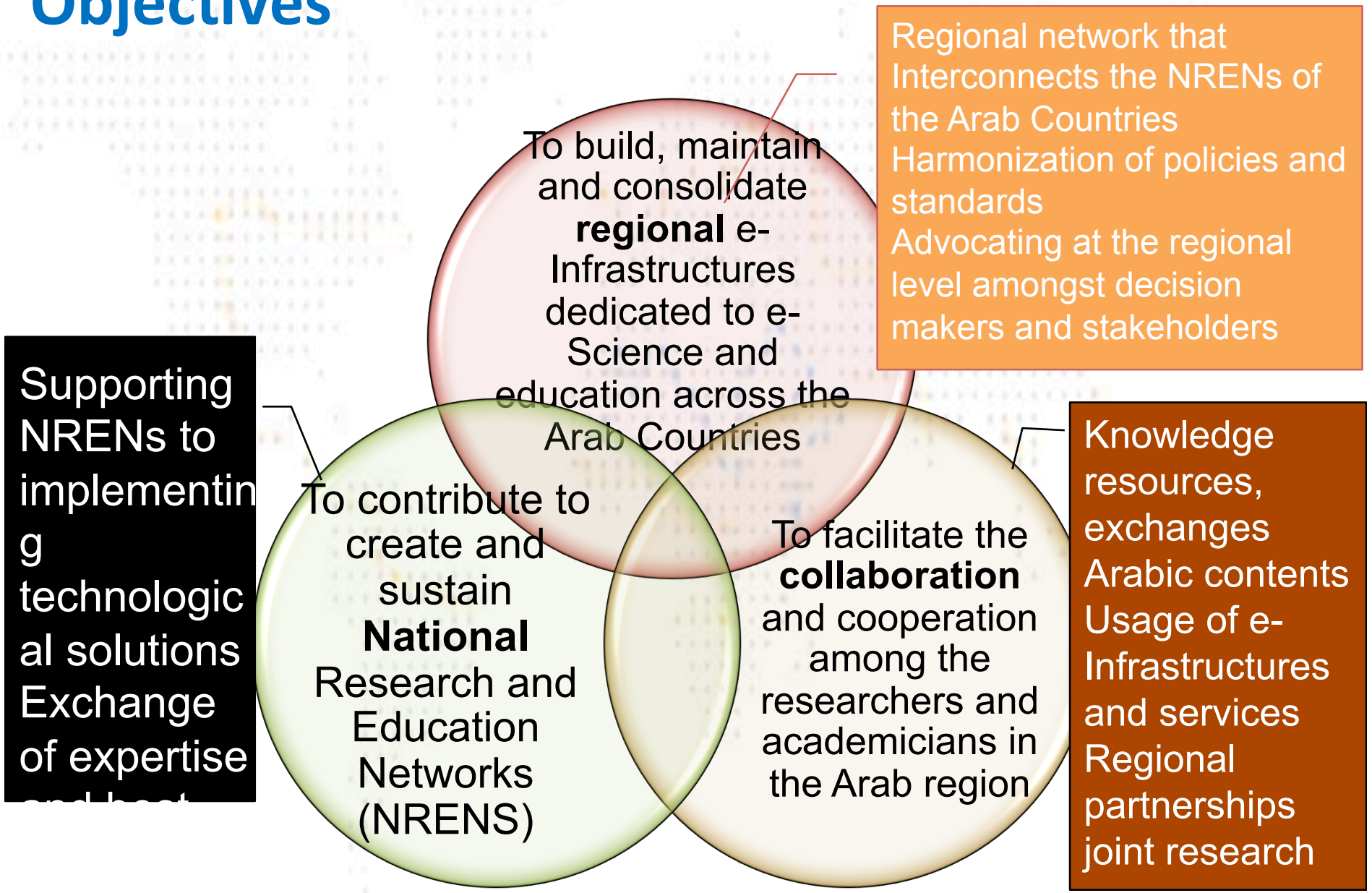
Arab States Research and Education Network ASREN المنظمة العربية لشبكات البحث العلمي والتعليم

A legal non for profit organization with Arab NRENs as shareholders for promoting world-class Pan-Arab e-Infrastructures and E-services for the R&E communities to boost Scientific Research and regional Cooperation

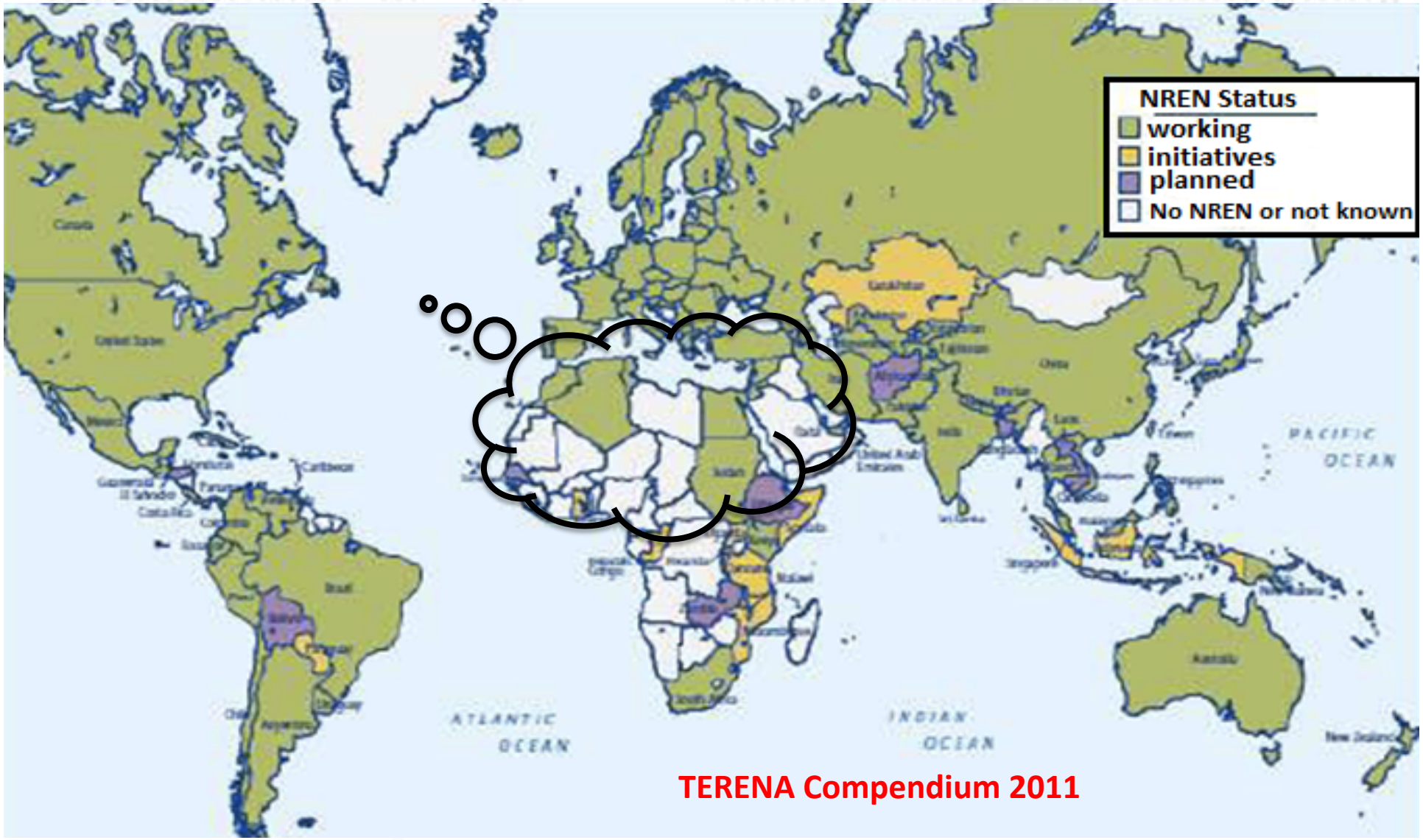
- **Vision Statement**: Pan-Arab collaborative research and education projects and activities, contribute to boost the scientific research, innovation and education levels in the Arab countries by uplifting efficiency and productivity of research and education communities.

- **Mission statement**: 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.

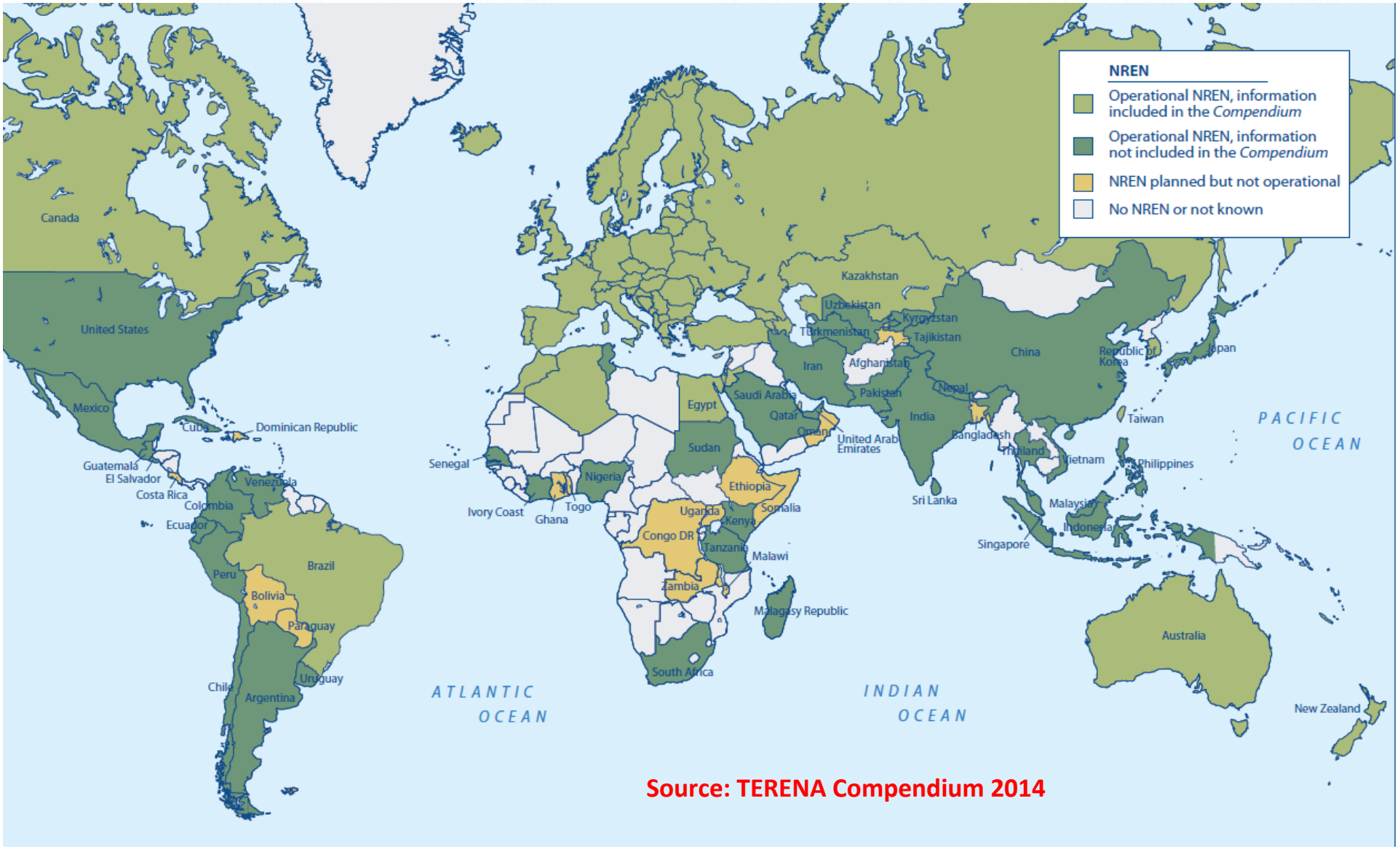
Objectives


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
Regional network that Interconnects the NRENs of the Arab Countries
Harmonization of policies and standards
Advocating at the regional level amongst decision makers and stakeholders
Supporting NRENs to implementin g technologic al solutions
Exchange of expertise
Knowledge resources, exchanges
Arabic contents
Usage of e-Infrastructures and services
Regional partnerships joint research

NRENs Status Around the world, 2011



NRENs Status Around the World - 2014



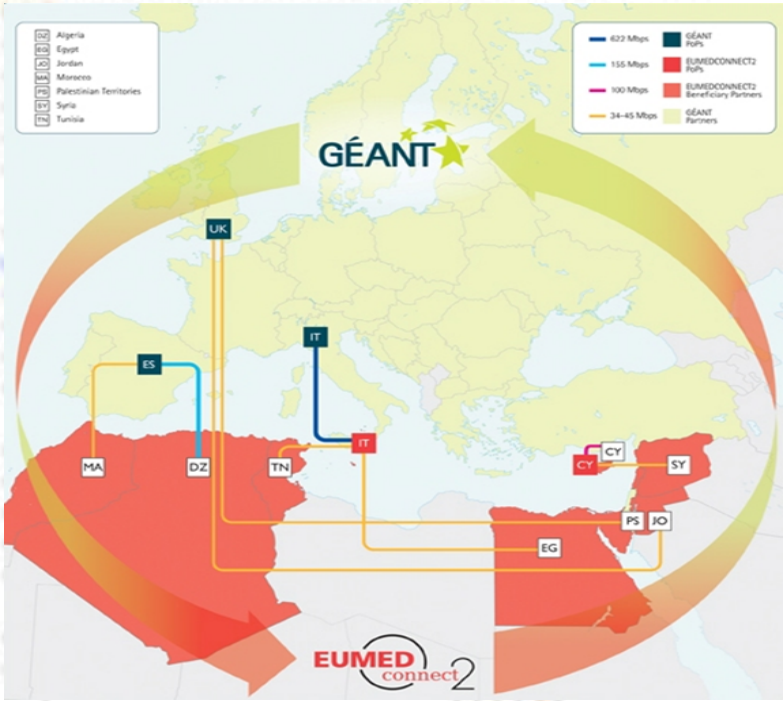
Source: TERENA Compendium 2014

EUMEDCONNECT Programme

EUMEDCONNECT Research and Education network project 2004 -2016 (3 phases), 14M Euro of EC funding

The only regional Research and Educational Network in the Arab Region

National Research and Education Networks in Algeria (ARN), Egypt (EUN), Tunisia (CCK), Jordan (JUNET), Morocco (MARWAN), Palestine (PALNET) and Syria (HIAST) were connected to its European counterpart GÉANT



More 2 million users in around 700 institutions

Other Supporting Projects

The EUMEDGRID Support Project

Coordination and Harmonization of Advanced e-INfrastructures

Exchange Programme to advance e-Infrastructure Know-How

Linking Scientific Computing in Europe and the Eastern Mediterranean

NREN Status – Arab World - 2011

Existing Arab NRENs	
Morocco	CNRST-MARWAN
Algeria	CERIST - ARN
Tunisia	CCK (RNU)
Egypt	EUN
Sudan	SudREN
Somalia	SomaliREN
Jordan	JUNet
Palestine	PalREN
UAE	Ankabut

Starting (Planned) NRENs	
Lebanon	CNRS??
Oman	TRC
Qatar	Qatar Foundation
Syria	SHERN, HIAST

No NREN, No Information	
KSA	KACST – KAUST?
Bahrain	
Iraq	
Libya	
Kuwait	
Mauritania	
Djibouti	
Yemen	
Comoros	

NREN Status – Arab World - 2015

Existing Arab NRENs	
Morocco	CNRST-MARWAN
Algeria	CERIST - ARN
Tunisia	CCK - RNU
Egypt	EUN
Sudan	SudREN
Somalia	SomaliREN
Jordan	JUNet
Palestine	PalREN
UAE	Ankabut
Oman	OMREN
Qatar	QREN

Starting (Planned) NRENs	
Lebanon	CNRS & MOICT & AUB
Bahrain	University of Bahrain
Syria	SHERN, HIAST ??
Iraq	MOHE
KSA	KACST - ISU
Libya	MOHE
Yemen	YCIT-HE
Mauritania	MOHE & USTM

No NREN, No Information	
Kuwait	KITS and Kuwait University
Djibouti	
Comoros	

Shareholders Progress

Current Shareholders

JUNet

CNRST

Talal Abu-Ghazaleh Organization

SudREN

Centre de Calcul KHAWARIZMI

EUN

In the Process

SREN
SOMALI RESEARCH AND EDUCATION NETWORK

ankabut عنكبوت

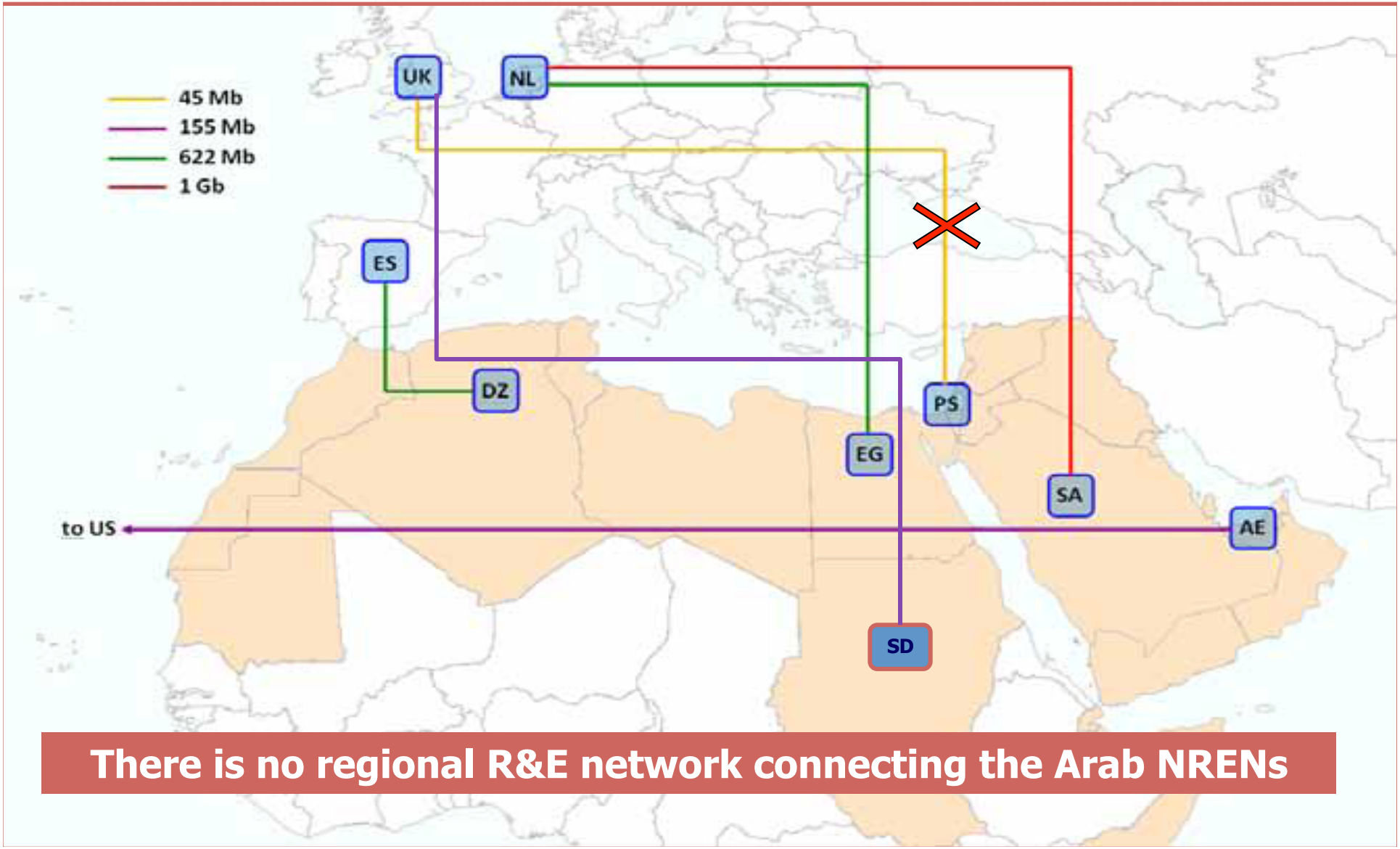
PALNREN

Expression of Interest

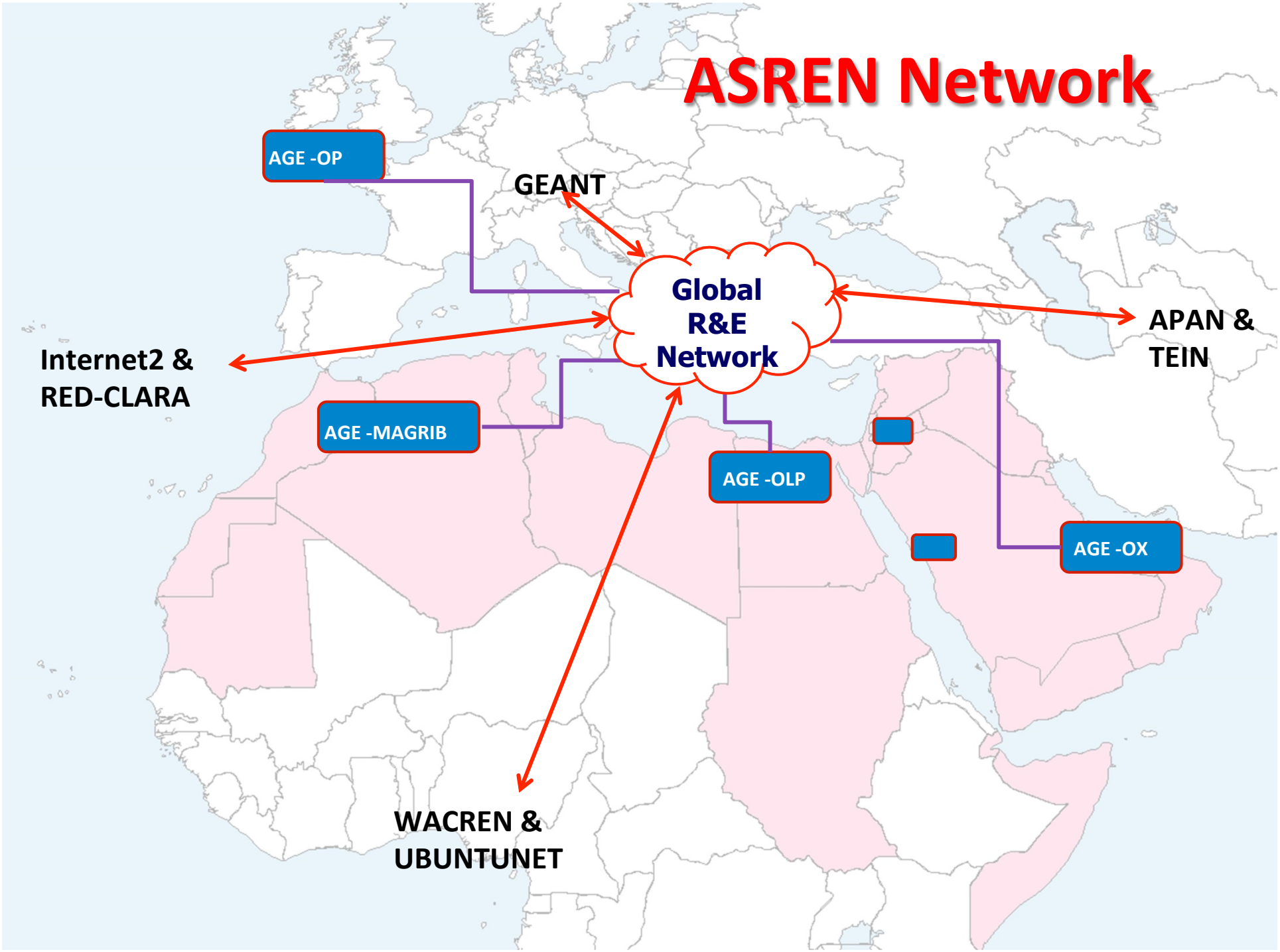
Qatar
Lebanon
Oman
Bahrain
Yemen
Libya

Shareholders Update
http://www.asrenorg.net/about/shareholders.html

NRENs Connectivity Status 2012

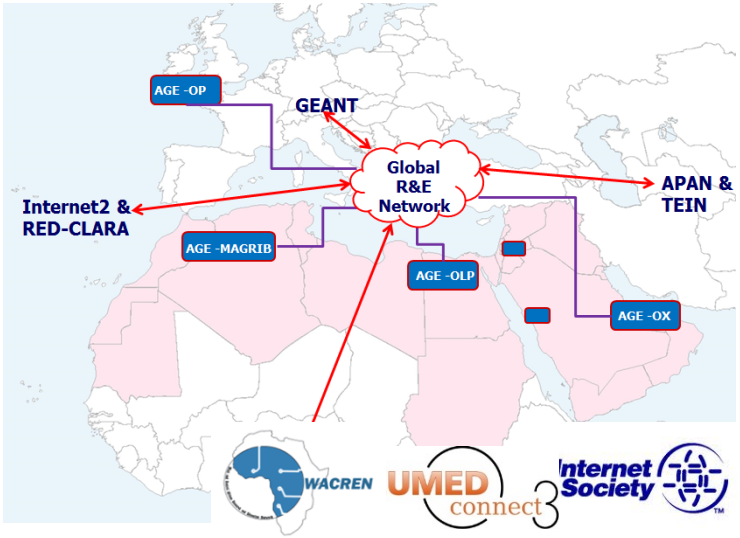


There is no regional R&E network connecting the Arab NRENs


ASREN Network
AGE -OP
GEANT
Global
R&E
Network
APAN &
TEIN
Internet2 &
RED-CLARA
AGE -MAGRIB
AGE -OLP
AGE -OX
WACREN &
UBUNTUNET

AGE - OP

- Arabian Global Educational Open PoP
- Installed and operational at London Telicity in cooperation with GEANT and WACREN
- Operational & ready to interconnect



- Operations by ASREN and GEANT
- ASREN team visited DANTE (GEANT Association in Cambridge to get training and to agree operations, monitoring, support…
- STM1 Connection to Jordan has been operated.

AGE - OP

- Organizational
  - Partnership to support regional development of high-speed connectivity and open exchange points
    - ISOC, Cisco – Equipment donation
    - GEANT – network operation in the initial phase, first line of support
- Operational
  - Regional network operation center – GEANT / ASREN
- Technical
  - Telecity data center (SLA)
  - Cross connect to GEANT and world REN
  - Cross connect to ISP (~40 times cheaper)

ASREN NOC

- ASREN Rack co-located with WACREN
- Telecity Data center
- Operate, maintain, and manage communication and information flow with the connected RENs and upstream networks
- To be integrated in GEANT's NOC in the initial phase

Cisco ASR 1002x's

- Hardware redundancy
  - Control panel redundancy
  - Power supply redundancy
  - Multiple connection cards
  - Redundant supervisor (one software)
- 3 – years vendor warranty
- Cisco SLA

Telecity SLA

- Data center serviceability
- 2nd line support

TelecityGroup

Description	Notes
Colocation & Bandwidth	
Full standard rack 40U (8A / 1.76kW limit) - single power bar	Where available / Excludes power usage
Additional power bar from redundant feed	Where available
Power consumption is excluded from the price - 18.5p per kWh	Applicable to all data centres
Cabling - Fibre - SM or MM / Presentation: SC/PC, FC/PC, E2000 (per cable)	Monthly price only applicable after first year

DANTE/ EUMEDCONNECT3 SLA

GÉANT IP Service Level Agreement (SLA)		
The following are the implicit Service Level Agreements (SLAs) for the GÉANT IP service and corresponding equipment:		
Affected NREN or service	**Measurement**	**SLA**
All NRENs	Time to respond to a fault	15 minutes
Multi-homed on-net NRENs	Service availability	99.999%
Multi-homed NRENs connected to GÉANT with third party managed circuits	Service availability	99.9%
Single-homed NRENs	Service availability determined on a case by case basis	Typically at least 99.4%
GÉANT PoPs in Europe	Time to fix a fault	5 hours

AGE-OX

- **Arabian Global Educational Open Exchange (AGE-OX) to open in Fujairah, United Arab Emirates** led by national network Ankabut in Fujairah
- 10G connectivity to Internet2 in Singapore and future links to Internet2 in Europe/Americas to support US Campus & Research collaborations across the Middle East

Capacity Building Workshops

- Joint training with MENOG in Amman attended by NRENs of 3 countries
- Workshop on building Federation of Identities Infrastructure in Amman with representation from 9 Arab NRENs
- Workshop on NREN NOCs by NSRC, Tunisia, 9-11 December 2013
- Clouds for Research and Education, Rome, 24-26 June 2014

Supporting NREN creation & developments

Progress with:

- » Lebanon
- » Iraq
- » Bahrain

Discussions with:

- » Libya
- » Qatar
- » Yemen
- » KSA
- » Kuwait
- » Mauritania

Forward

- » Djibouti
- » Comoros

eduroam

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What is eduroam?

eduroam (**edu**cation **roam**ing) is the secure, world-wide roaming access service developed for the international research and education community.

Having started in Europe, eduroam has gained momentum throughout the research and education community and is now available in 71 territories.

GÉANT

Advisories

› 004
RADIUS Attribute Issues

› 003
Cipher suite selection for eduroam

› 002
Internationalised domain names for eduroam realms

› 001
Do not use web logins for eduroam

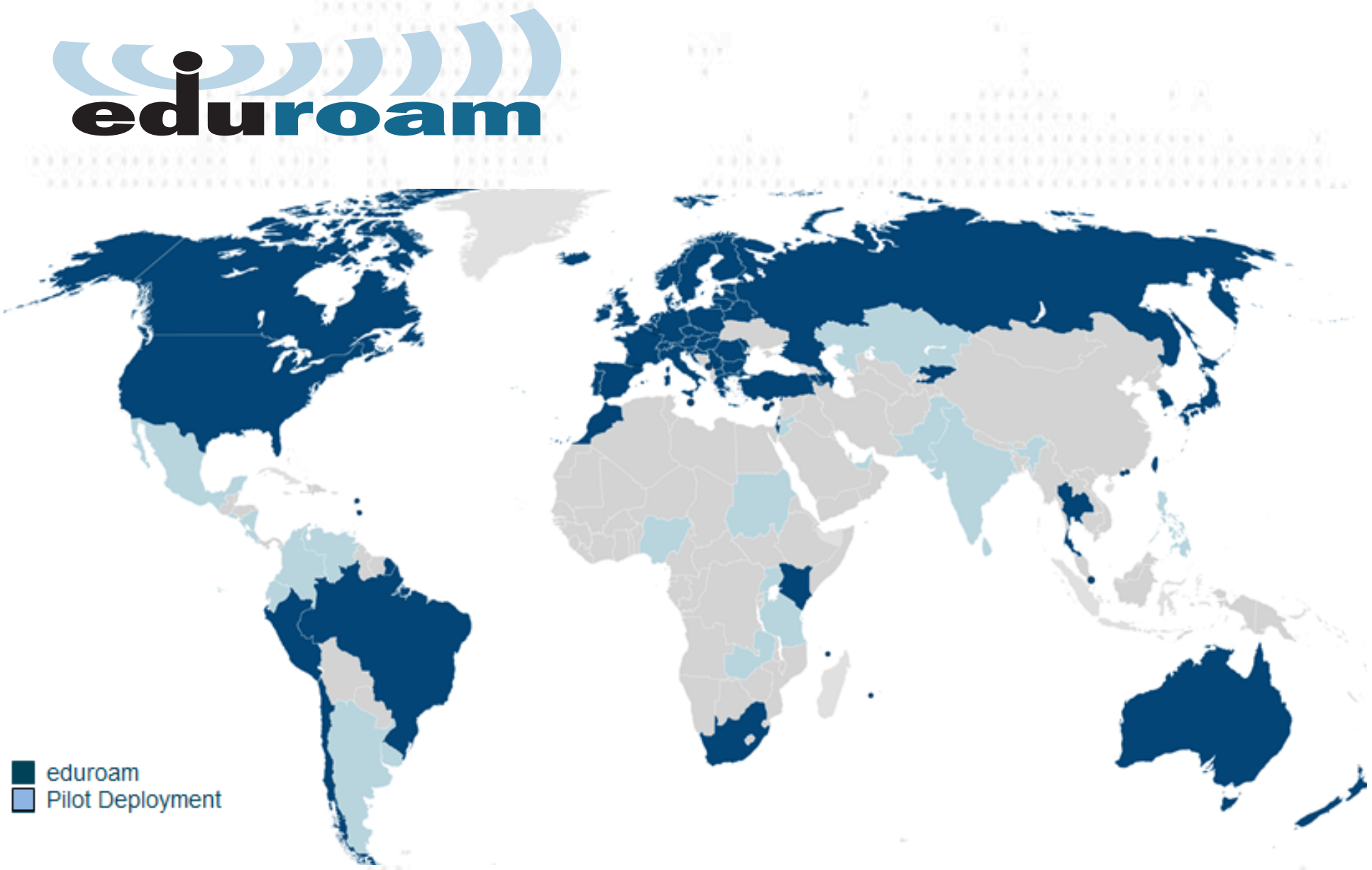
News

› 29 January 2013
New eduroam CAT eases user configuration and admin support

› 18 December 2012
GeGC first term ends in period of growth for eduroam

Implementation in Morocco, KSA, Qatar, UAE, Lebanon, Algeria

Pilots in Egypt, Tunisia, Jordan, Oman, Sudan



ASREN, together with some Arab NRENs started implementing eduroam

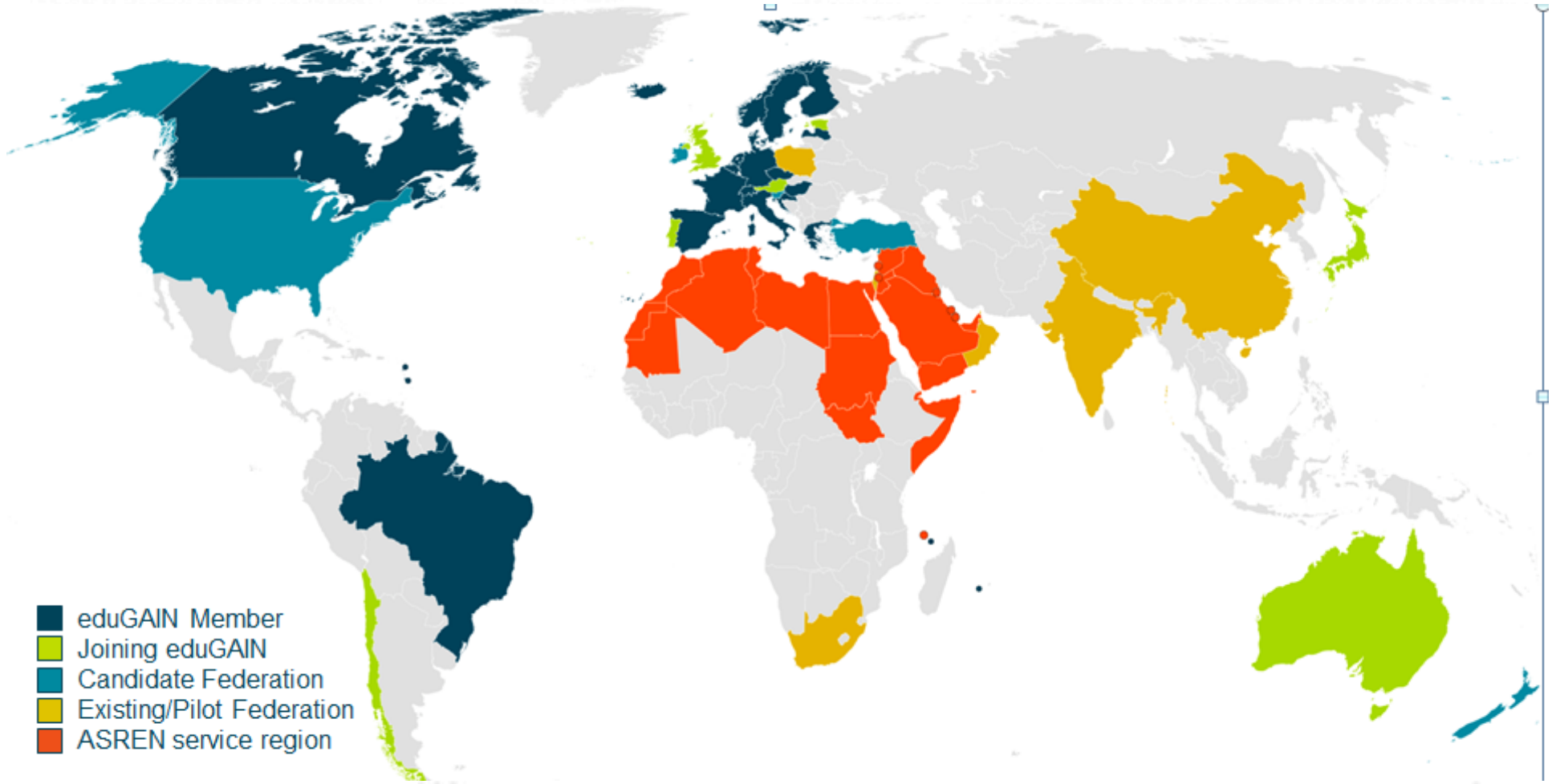
ASREN IdP

- ASREN IdP Identity Provider is a **SAML** standard-based service powered by **Shibboleth**
- Allows the use of a single identity to sign-in into secure websites, Science Gateways …
- A member of **Grid IDentity Pool (GrIDP)** federation and currently authenticates the users of several **Service Providers**

https://idp.asrenorg.net/

Thanks to the CHAIN-REDS Project

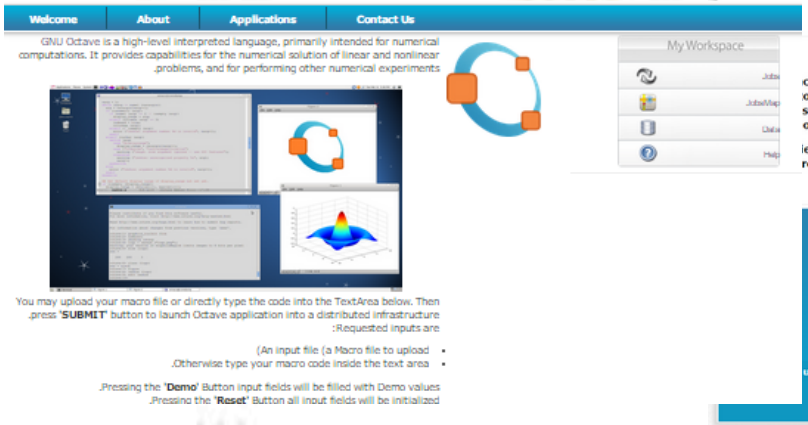
eduGAIN



ASREN, TERENA, DANTE in in cooperation of Arab NRENs started to work on Pan Arab Federation of Identities Infrastructure.

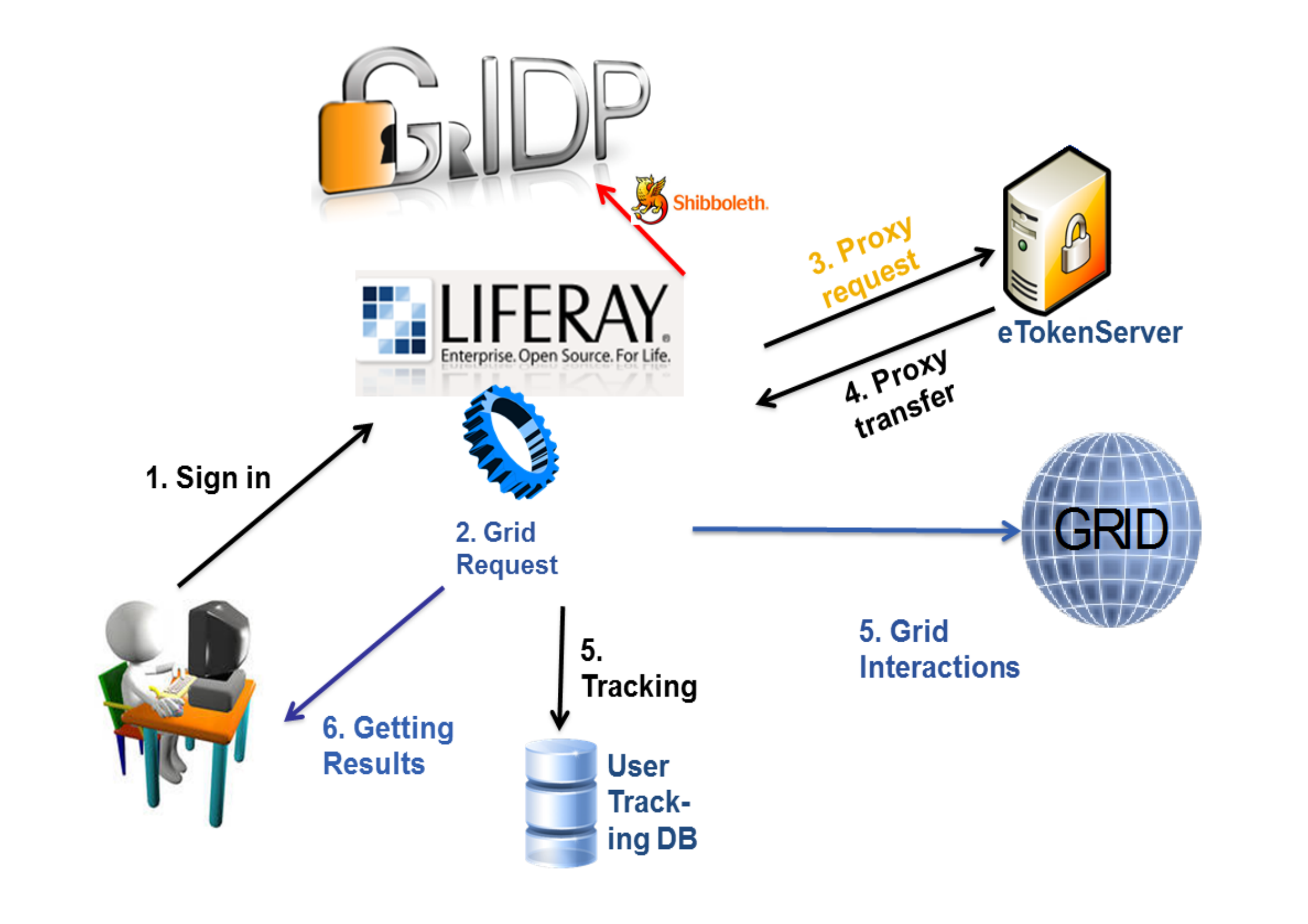
ASREN Science Gateway

ASREN SGW provides a set of tools, applications, and data that is integrated via a portal with graphical user interface, that is further customized to meet the needs of a specific community.



Thanks to the CHAIN-REDS Project

https://sgw.asrenorg.net/

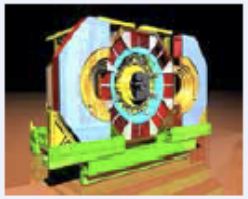

GRIDP
Shibboleth.
LIFERAY
Enterprise. Open Source. For Life.
3. Proxy request
4. Proxy transfer
eTokenServer
1. Sign in
2. Grid Request
GRID
5. Grid Interactions
5. Tracking
6. Getting Results
User Track-ing DB

SOME OF THE APPLICATIONS AVAILABLE

COMPUTER SCIENCE AND MATHEMATICS

Sonification		Sonification is the use of non-speech audio to convey information or perceptualise data. Auditory perception has advantages in temporal, amplitude, and frequency resolution that open possibilities as an alternative or complement to visualization techniques.
Octave2		Octave is a high-level interpreted language, primarily intended for numerical computations. It provides capabilities for the numerical solution of linear and nonlinear problems, and for performing other numerical experiments.
R		R is a language and environment for statistical computing and graphics.

HIGH-ENERGY PHYSICS

BESIII		The BESIII experiment is to study basic elements made of matter, interaction among elements and matter, basic rules of particles, etc.

LIFE SCIENCES

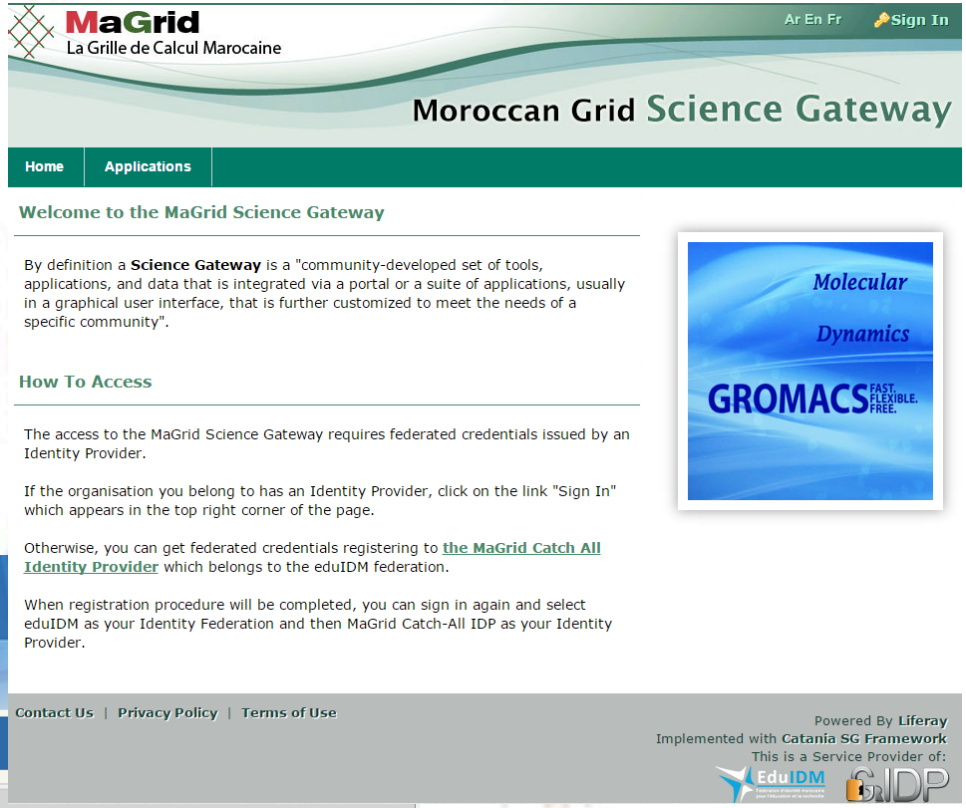
GROMACS	GROMACS FAST. FLEXIBLE. FREE.	GROMACS is a versatile package to perform molecular dynamics, i.e simulate the Newtonian equations of motion for systems with hundreds to millions of particles.

OTHERS

ASTRA	ASTRA Project UniversidaddeMálaga	The ASTRA project aims at reconstructing the sound or timbre of ancient instruments (not existing anymore) using archaeological data as fragments from excavations, written descriptions, pictures, etc. (www.astraproject.org)

Other SGW

Morocco and Algeria



Magic

Middleware for collaborative Applications and Global virtual Communities

General Objetive

The Middleware for collaborative Applications and Global virtual Communities (MAGIC) Project seeks to establish a set of agreements for Europe, and other participating World Regions, aiming at consolidating and completing 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.

H2020-INFRASUPP-2014-2

Magic

Middleware for collaborative Applications and Global virtual Communities

Specific Objectives

- To foster the deployment of the platforms that enable mobility of people and seamless access to services by promoting the establishment of identity federations connected to eduGAIN, creating awareness of privacy and security issues and spreading eduroam.
- To develop a Model for the provision of services between NRENs of participating World Regions based on Cloud Provisioning that takes advantage of applications developed and run by NRENs across different continents to create a model for a worldwide application market for collaboration tools and services.
- To seek consensus among participating World regions on the importance of interoperability of Real Time Applications and work towards the adoption of standards to promote the creation of a worldwide environment for these applications.
- To foster the collaborative work of Global Science Communities by actively promoting the participation of Latin American and other regions' researchers in European Commission Calls

ASREN

SIxth International Platform on Integrating
Arab e-infrastructure in a Global Environment, **e-AGE 2016**

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Thank You

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