

# **The Strategic importance and impact of e-infrastructures for Science, Society and Economy in Europe and neighbouring Southern Countries**



*Fondation "Partager le Savoir"*  
*Sharing Knowledge Foundation*

EUMED 2008, Amman, Jordan

Robert Klapisch

# Three regions at very different stages of development

- **Europe** has the most developed system in the world and will be our reference.
- **Africa (SSA)**, is lagging by 10-15 years. A dramatic Digital Divide at our doorstep!
  - We cannot neglect a continent with 1 billion people (2 billion in 2050).
  - EU is committed to help develop e-infrastructure in Africa (Lisbon Summit (5-7 December 2007), reinforced by EU-Africa agreement (1<sup>st</sup> October 2008), on “Africa Connect” and “AXIS”, key recommendations of our Montpellier meeting 10-12 Dec 2007.
  - Considerable dynamism in Africa, may lead to shortcuts in developments.
- **MENA** is in between
  - In some countries, conditions close to Europe.
  - But still lagging in Broadband connections.
  - Some problems are similar to those of Africa.



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Lack of connectivity for the continent is untenable!



In addition to ethical reasons, many fields of science demand universal coverage: Human and Animal Health, Earth Sciences, Environment, Prevention of disasters.



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# Let us look at the numbers

	Internet users	Penetration	%BroadBd	Growth 2000-2008
EUROPE		60%		211%
<b>FRANCE</b>	<b>36153127</b>	<b>58.10%</b>	<b>46%</b>	<b>325.30%</b>
ALGERIA	3,500,000	10.40%	6.00%	6900%
EGYPT	8,260,000	10.50%	5%	1815%
LIBYA	260,000	4.20%		2500%
<b>MOROCCO</b>	<b>7,300,000</b>	<b>21.30%</b>	<b>5%</b>	<b>7200%</b>
TUNISIA	1,765,430	17.00%	2%	1665%
ISRAEL	3,700,000	57%	38.40%	191%
JORDAN	1,126,000	18.20%	4.30%	526%
LEBANON	950,000	23.90%	18%	216%
PALEST. AUTHORITY	355,500	13.60%	7.20%	660%
SYRIA	2,132,000	10.80%	0.20%	4900%
<b>TURKEY</b>	<b>26,500,000</b>	<b>36.90%</b>	<b>12.30%</b>	<b>700%</b>
BENIN	150,000	1.80%	1.50%	900%
BURKINA FASO	80,000	0.50%	2%	700%
CAMEROON	370,000	2%	0.10%	1750%
CONGO (Dem. R)	230,400	1.60%	1%	45980%
COTE d'IVOIRE	300,000	1.60%	3%	650%
GHANA	650,000	2.80%	2%	2006%
MAURITANIA	30,000	0.90%	2%	500%
<b>SENEGAL</b>	<b>820,000</b>	<b>6.40%</b>	<b>3.50%</b>	<b>1950%</b>
SOUTH AFRICA	5,100,000	11.60%	3.20%	112.50%



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# NREN or Commercial Providers, which are the driving force?

- In Europe, NREN (and GEANT) have a strong bargaining power when they buy bandwidth from competitive providers.
  - Because European science has uniquely advanced needs (e.g.LHC, etc..), and also solid financing, NREN's can innovate and set standards (such as 10Gb/s point-to-point fiber), later adopted by ISP's.
- In the South, the opposite is true. NREN still face monopolies and the market price of bandwidth is very high. Since Universities do not have adequate financial support, they are not customers which carry any weight...
- And yet, ...



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# NREN are a vital necessity for Southern Countries

- Researchers in Universities of MENA and SSA have much less resources than their peers in Europe. Carrying on their research by travelling to Europe or the US is costly and ineffective.
- Networks of Universities (on a national or regional basis) are a way of pooling resources and becoming valuable partners for European projects.
- EUMEDConnect integrates NRENs of Med countries with GEANT2
- AFRICA CONNECT (decided on 1<sup>st</sup> October 2008) will extend GEANT2 to Subsahara Africa. A major step forward!
- The Grid is coming... (Morocco, Senegal, South Africa).

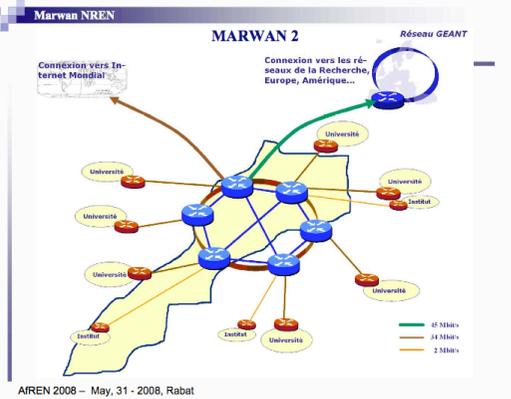


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# Marwan in Morocco: a case study



- Shared backbone at 45 Mb/s (VPN) and links with institutions 2-34 Mb/s. Link with Eumedconnect at 155Mb/s

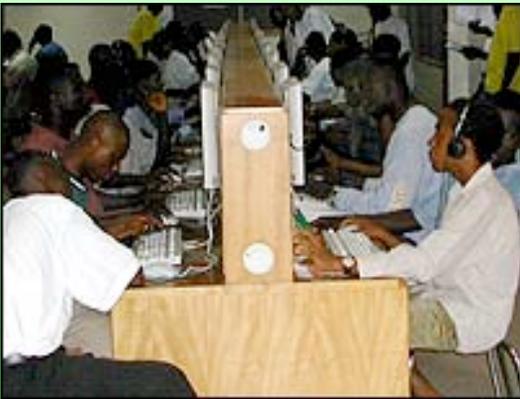
Connects 15 000 researchers and professors from 110 Institutions and 300 000 students.

Has been essential to integrate Morocco to European research. Used by 63 FP6 projects, 9 EUMEDIS projects, CERN, LHC- ATLAS (with LHC Grid).

Tight budget threatens development. MARWAN is in danger of being less attractive than private sector alternatives. Until 2007, monopoly operator but situation might improve with 3 operators in competition.

# Students should be able to study!

- Most universities SSA (with hundreds of Staff) have less bandwidth than a typical household in Europe or the US.
- As a result, students do not have access to the University network and resort to Internet Cafés.



This is not cheap: several \$/hr, but less expensive than a connection at home.

The least expensive, a 256 kbits connection (58 \$mth) in Benin should be slashed by 2 to become affordable.



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# Africa has a lack of cable infrastructure and management by monopolies results in high costs



SAT-3-WASC run by a consortium of state monopolies that has opted for elite rather than mass market.

Prices tend to align to satellite in the absence of competition!

“Black” Fibres installed along roads, pylons etc.. remain unused because of monopoly regulation!

# From Centers of Excellence to Internet for the masses

- MENA and SSA are lagging in Broadband penetration because of high costs
- In SSA, the cost of a connection can be higher than the average income of a family. The main reason is the lack of competition (dominance of state monopolies), coupled to insufficient infrastructures. Wholesale int'l SAT3 bandwidth costs 1300\$ to 15 000 \$/Mb/month
- Things are slowly changing where there is competition. In Benin, OTI is now offering 256k for 58\$/month (463\$ for 1 Meg). Still too expensive ...

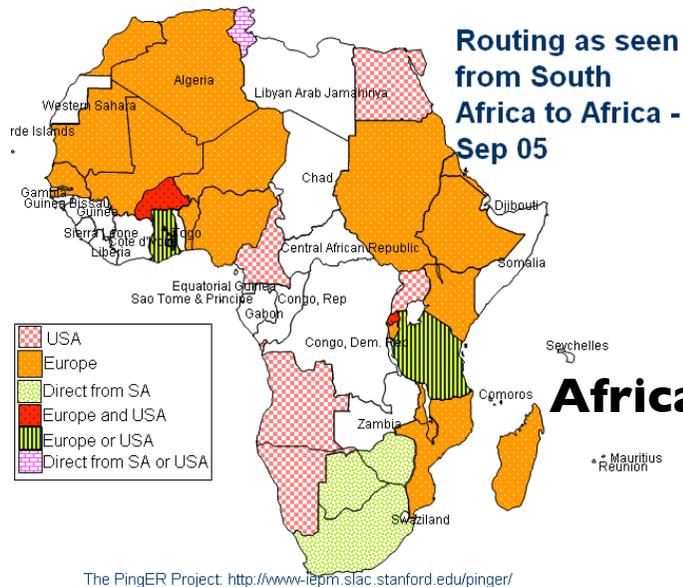


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# Additional costs: no direct connection from one country to the other.



Need to go through Europe or the US

Costly waste of International Bandwidth is one of the reasons for high costs.

**Africa needs International Exchange Points in every country**

**Since 1st October 2008, AXIS is a priority project of EC and AUC !**

# Direct link project Carmena

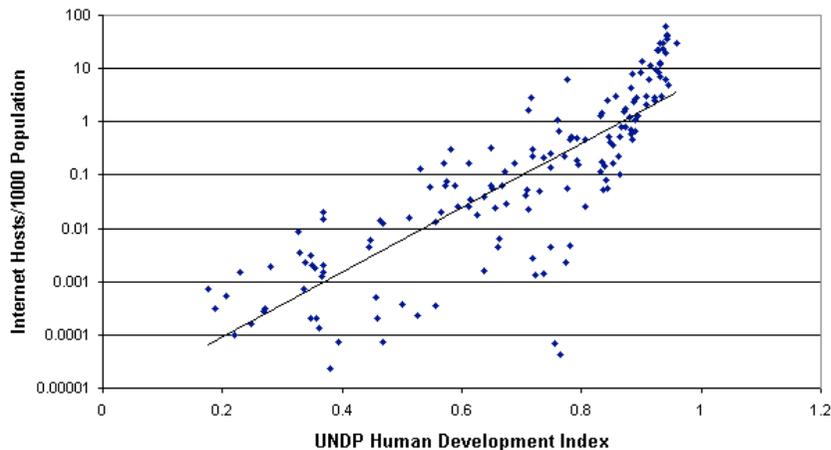


A direct fiber connexion,  
linking all MENA countries  
would be an enormous boost  
to develop the region

Will financing be available ?

# Internet and a Developed Society

HDI  
vs Hosts/Capita



The Human Development Index, computed by the UN, is meant as a more people-oriented metric than GNP per capita. It takes into account life expectancy, literacy, education achievements as well as GNP per capita. It is computed every year for all UN countries. There is a remarkable correlation with the development of Internet.

- There are many benefits for developing countries if access to Internet is widespread in the population.



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# Influence on daily life in Southern countries

- e-government to simplify and speed-up administrative procedures.
- The development of banking infrastructure is an essential step for the economic development of MENA and SSA and ICT is mandatory.
- e-banking can also benefit poor people.
  - emerging in MENA and Africa is the transfer of small sums by **mobile phones**, from towns to rural areas and from the diasporas to home.
  - Great future: 300 million mobile phones in Africa, 30 billion € transfers to Maghreb alone. Fees charged by Western Union are 15%...
- Commerce: ensuring health safety along the food chain (traceability..)
- Internet is mandatory to develop tourism at all levels.



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# Rural Life

- MENA and SSA have sizeable populations living in isolated villages.
- Countryside people need Internet even more than those in cities
  - Farmers need to know what is a fair market price for their crops.
  - Recommended agricultural practices
  - Health warnings about human or animal diseases.
  - e-learning, e-medecine...
- Connections are not likely to be by cable. Satellites may be supplemented by wireless (Wimax or Wifi) extending tens of km.
- Collective solutions such as Internet kiosks in villages.
- Broad success of cell phones indicates future for mobile Internet.



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## Capacity building

- To develop ICT in MENA-SSA, it is imperative to develop local expertise
- Following our Montpellier workshop (December 2007), organised with Guy Wormser, director of Institut des Grilles of CNRS, a pilot programme of computing grids has begun in Senegal and South Africa.
- HP and UNESCO supplied hardware and CNRS provided training by experts. Since July 2008, the Grid is now working at UCAD, Dakar and linked to EGEE.
- A school will be held in Durban in December 2008, open to potential pan-African users.
- ICTP Trieste, in collaboration with Nigeria and Malawi has submitted to the EU a proposal to train several hundred specialists in Wireless Internet for isolated locations.



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# CONCLUSION

- Improving e-infrastructures and in particular connection with NRENs in MENA and SSA is of vital importance for their scientific development.
- But ICT is a tool rather than an end in itself and the fact remains that more resources should be allocated in this part of the world to Science and Education.
- The Future belongs to the Knowledge Society, and authorized voices are demanding that more of the money in the Arab World be devoted to Research and Education.
- Participation to International Projects is vital, but a great hope should rest in Regional projects of which SESAME is the best example. Jordan should be commended for supporting SESAME, but one can only hope that more countries join in to make it a great success.



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can be found on our site.**

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**THANK YOU**



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