Governments are the main stakeholders of NRENs: Moroccan experience

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In 1997, the Higher Education Department took the decision to create the Moroccan National Research and Education Network (MARWAN)

The network’s goals were:

- Interconnect all higher education and research institutions and provide them with internet access
- Encourage the development of TICs in Morocco
- Share Resources
- Control Costs
National Research and Education Network in Morocco

Direction
- Ministry of Higher Education, Managerial Training, and Scientific Research
- National Center for Scientific and Technical Research (CNRST)

Management
- CNRST

Financing
- The backbone is financed by the Ministry of Higher Education
- The institutions finance their own connections to the network

Infrastructure
Marwan started with limited bandwidth but that met the institutions’ needs

- Dedicated backbone (2 Mbps) connecting 16 cities
- Links connecting the institutions to the backbone (64 - 512 kbps)

Constraints
Marwan faced 2 problems

- Monopoly of the unique operator and high cost of links
- Limited working budget
MARWAN 2 (2005)

In 2004, it was necessary to improve Marwan in order to meet the institutions’ growing needs.

In addition to the existing goals, the network was designed to:

- Offer more bandwidth
- Be connected to international higher education and research institutions
- Offer network services
- Provide transport support for the national TIC projects
The problems remained the same (limited budget and monopoly)

A pragmatic approach was adopted for Marwan 2 which consisted in choosing a solution that wasn’t the best one technically but that took the constraints into consideration and that met a maximum number of stated objectives.

In order to ensure MARWAN’s success, the CNRST financed Campus networks in all universities.

The new network has the following characteristics:

- Shared backbone (VPN/MPLS)
- Institutions links (2 – 34 Mbps)
- Connected to EUMEDCONNECT
- The price of the links between the Institution and the backbone is less than that of the internet
Marwan 2 connects all the higher education and research institutions in Morocco:

- 110 institutions connected
- 15,000 professors and researchers
- 300,000 students

Most research and cooperation projects between Morocco and Europe use Marwan and EUMEDCONNECT:

- 63 FP6 projects out of 96 (Moroccan participation)
- 09 EUMEDIS projects out of 17 (Moroccan participation)
MARWAN 2 (Applications & Services)

Applications
Marwan supports important national projects:
- Moroccan Institute for scientific and technical information
- National grid for Intensive Calculations
- Virtual Moroccan University
- Deployment of IPv6 in Morocco

Services
- The institutions have IPv4 and IPv6 connections
- The institutions connected to Marwan have access to over 3000 online full text scientific revues
Since 2005 Marwan is connected to Eumedconnect by a 34 Mbps link.

At the end of 2006 it was necessary to increase the link to 155 Mbps due to extensive use. This link is currently used at 60% of its capacity.

Despite European funding, the cost of the link represents a large percentage of Marwan’s budget: 35%.
EumedConnect

Eumedconnect has had a very positive impact on:

- **The evolution of Marwan:**
  
  In 2005, within the framework of the GEANT2 NA4 program Marwan benefited from a study on the state of the network and its evolution. This study was conducted by a group of experts from GEANT and TERENA.

- **The formation of Marwan technical teams:**
  
  2 months x person

- **Quick integration of advanced IP services and the deployments of new applications**

- **The amelioration of cooperation between Moroccan researchers and their European and Mediterranean counterparts**

  Given the close relations between Moroccan researchers and their European counterparts and the number of joint projects, EumedConnect is extremely important for Morocco.
In 2008 Marwan will evolve into a new network that will better meet its users’ needs. The network will have to:

- Provide more bandwidth to universities
- Introduce new services and applications
- Be connected to international networks
- Be more independent in its technical management
For this new network

- The budgetary restraint remains the same
- However the telecom sector in Morocco has evolved
  - Opening of the telecom market (3 operators)
  - New submarines cables (Atlas-Shore, …)
- A consultation of the 3 operators will be launched in November 2007 for the setup of Marwan 3
CONCLUSION

- Marwan supported the development of TICs in the higher education and research sectors in Morocco

- Its participation in the Eumedconnect project was a major factor in the acceleration of its development, the integration of new technologies in the country, and the participation of Moroccan researchers in major European projects (Eumedgrid, Atlas…)

- The financing of higher education and research projects is a major problem in southern countries. The low budgets allocated to research have a direct impact on the network’s budget

- It’s quite clear that the government is the only possible funder for such structures

- The justification of such expenses is difficult especially in southern countries, where the bandwidth offered by these networks -which are relatively low- place them in direct competition with commercial internet providers.

- Such expenses can only be justified if these networks provide more advanced services than commercial providers.