



MARWAN : Moroccan REN

Redouane Merrouch
CNRST - Morocco
merrouch@cnrst.ma

National Research and Education Network in Morocco

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

MARWAN 1 (1997 – 2004)

Infrastructure

Marwan started with limited bandwidth but that met the institutions' needs

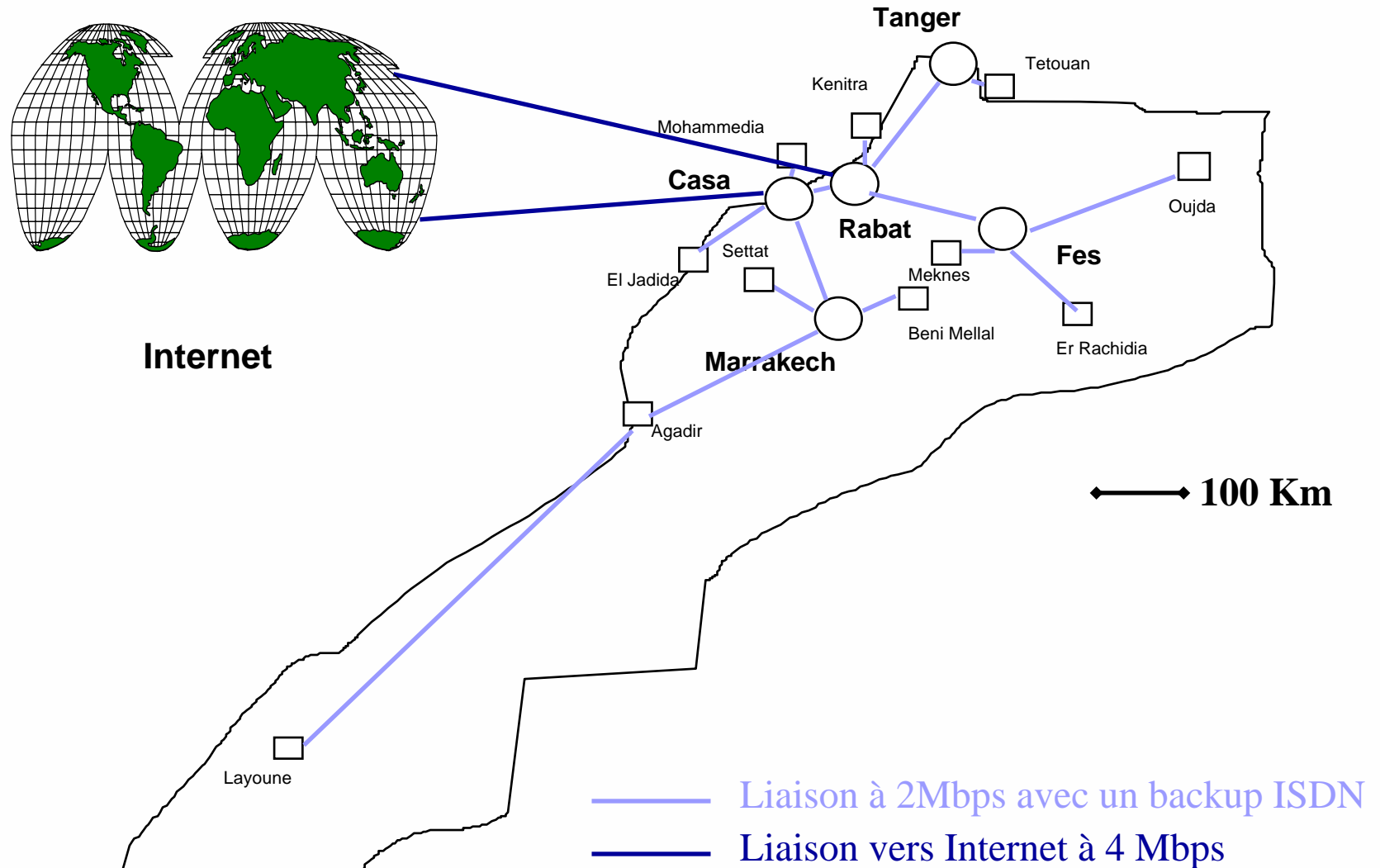
- ❑ Dedicated backbone (2 Mbps) connecting 16 cities
- ❑ Links connecting the institutions to the backbone (64 - 512 kbps)

Constraints

Marwan faced 2 problems

- ❑ Monopoly of the unique operator and high cost of links
- ❑ Limited working budget

MARWAN 1 (1997 – 2004)



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

MARWAN 2

- ❑ 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.

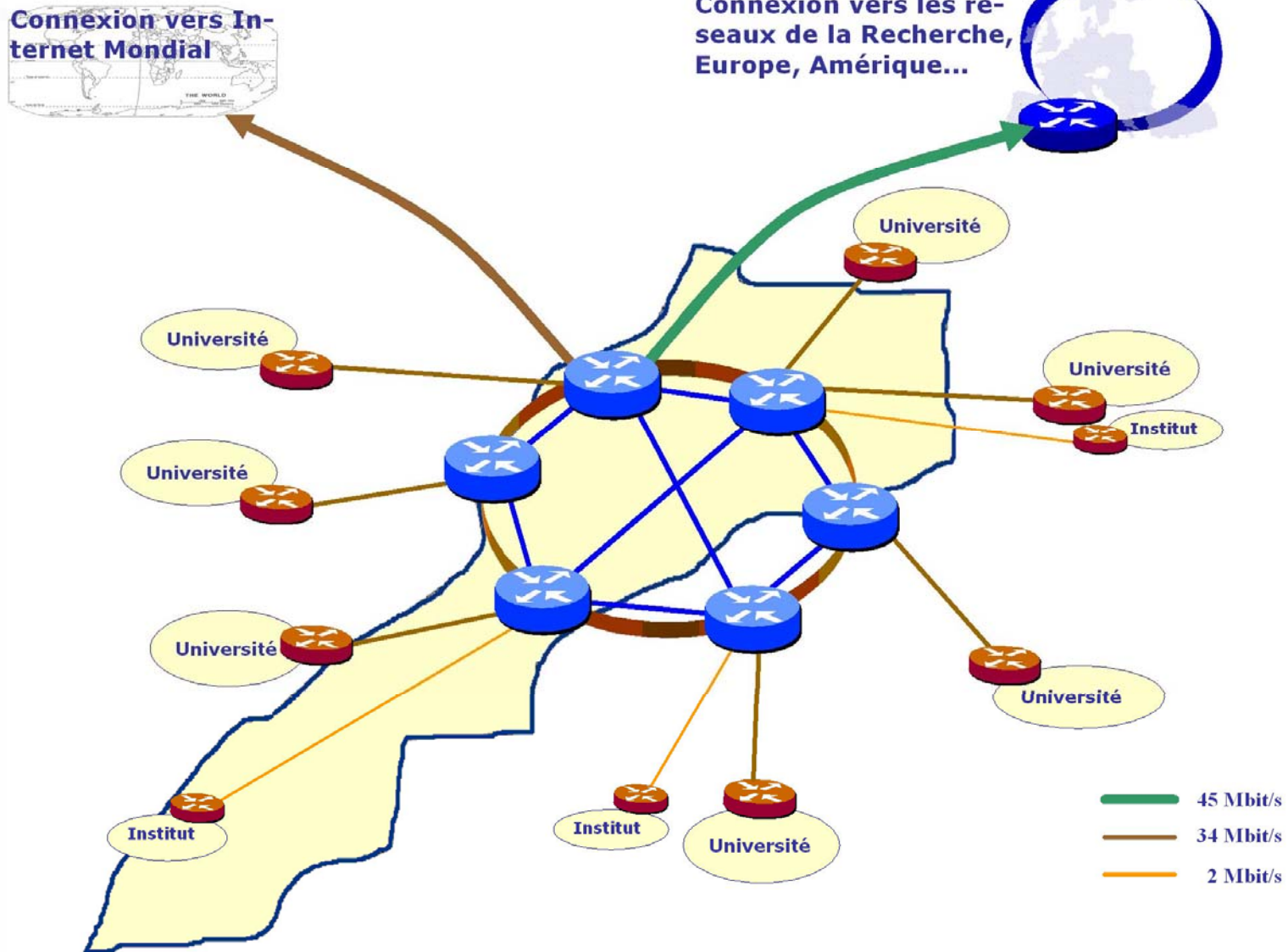
- ❑ The new network has the following characteristics:
 - ❑ Shared backbone (VPN/MPLS)
 - ❑ Institutions links (2 – 34 Mbps)
 - ❑ Connected to EUMEDCONNECT
 - ❑ The price of the links between the Institution and the backbone is less than that of the internet

MARWAN 2

Réseau GEANT

Connexion vers Internet Mondial

Connexion vers les réseaux de la Recherche, Europe, Amérique...



MARWAN 2 (in numbers)

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

EumedConnect

- ❑ 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 80% 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

MARWAN 3 (2008)

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

MARWAN 3 (2008)

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.