

## Development of WWW services in Mexico, toward a National Information Infrastructure

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### Abstract

*This paper present the role of the Internet and specifically the World Wide Web in Education and Business in Mexico. There are several projects for regional networks all around the country, one of them that covers part of the central and western region with the name "Red de Computo Centro-Occidente" (REDCCO) has received financial support to develop an information system that links libraries and general information from six universities, each one located in different states.*

*The paper also presents a prospective view of the development of services through WWW and the possibilities of new projects to improve education and business practices. In 1996, TelMex's monopoly on long distance in México will end, bringing competition, yielding a significant reduction in costs, and creating new opportunities.*

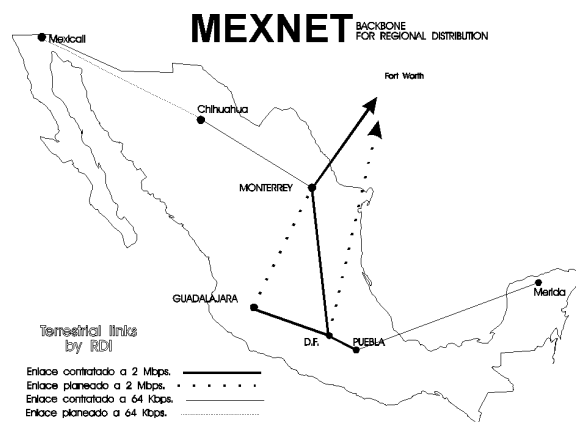
### 1 Introduction

There is a "Web" revolution in Mexico. 1994 was a year of fast growth in the number of nodes of the Mexican Internet. Its popularity and demand have increased dramatically since the appearance of the World Wide Web (W3) browser "Mosaic".

Web browsers have changed the overall perspective of the use and potential of Internet services. A National Information Infrastructure in Mexico becomes closer as government, education and business institutions seek to provide information about themselves and their services on the Web.

For years, access to the global Internet has been the main reason to establish a national backbone in Mexico. This was accomplished in 1994, when the National Council for Science and Technology (CONACYT) financed a national backbone with the cooperation of universities located in the main cities of Mexico who are part of MEXNET, the first nationwide Mexican network. With the participation of CONACYT and the upgrade of the backbone from 64 kilobits to 2 megabits, a new organization was established with the name "National Technological Network" (RTN), who acts as the main Internet access provider for business institutions.

The backbone uses fiber optic lines that integrate 4 main cities across the country, from which other 64 kilobit lines allow access to several regional networks. As a result, we have more than 20 cities with full Internet access. The shift from satellite links to the faster and more efficient RDI or Integrated Digital Network of TelMex, the Mexican telephone carrier, has been a major positive shift, improving the quality and stability of the Mexican Internet.



As in some other countries, universities and research centers have been the first important nodes of the network. This situation is likely to continue for at least a couple of years ahead. These universities were the "pioneers" of the "Net", most of their interest in the development of a Mexican national network, was only in order to have a reliable connection to access services from the U.S. and some European countries.

### 2 The Web fast growing

Since the recent introduction of the Web graphical browsers, information services and business related activities have gained strength.

Web servers have been growing at a rate of 7 to 8 new servers every month making a total of 80 (May 1995). At this moment, there are more than 15 Internet access providers, most of them located in Mexico City.

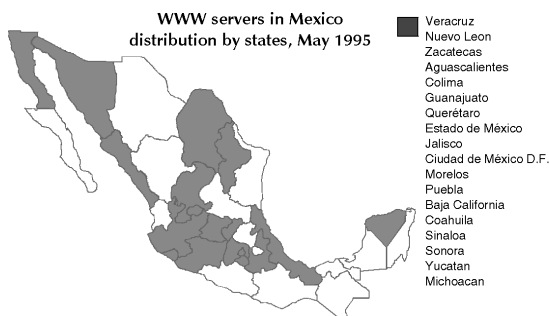
The first developments with NCSA Mosaic in Mexico began toward the end of 1993. Three universities developed their own "home pages." These were the ITESM campus in Monterrey in the northern region, the University of Guadalajara

(UdeG) in the west and the UDLA in Puebla in the south. Of these three, the UDLA became the official information provider about WWW sites in Mexico, and the UdeG brought on-line a Web about Mexican art and culture.

Mexican business has become more interested in being part of this phenomena, several conferences, magazines and books have contributed to the hype, but the number of connections do not reflect this. They realized the importance of being part of the Web, but high costs are the main obstacle to being part of it.

Services through the national network have been increasing in recent months; several university Web servers offer information about the culture, art, tourism, economics, sports and other general aspects of Mexico, UNAM and other universities offer free access to research centers via its supercomputers and there are a number of FTP sites available as well.

Global connectivity will play an important role in Mexico's academic development. Most of the schools and universities lack good libraries, and electronic information sources can play an important role contributing to solve this problem.



### 3 Services on the Mexican Web

Services are the attraction on the Web in Mexico, the first advantage is that the systems are in Spanish. Secondly, through the 2 megabit network, there is fast access to the Web servers throughout the country, yielding a reduction in data traffic to international networks.

#### 3.1 Business

In Mexico, the high costs of telecommunications have been an obstacle to linking more educational and business institutions to the Internet. Since WWW Mosaic has become more popular, interest in the business community has grown, but very few can afford the costs of a permanent Internet link. The current situation with the peso devaluation makes it more difficult for business to be part of the Net.

However, business on the Web is a growing reality. Three WWW servers are dedicated as commercial services providers, presenting several companies that offer products and services. One of them is an Internet shopping mall. In September of 1994, "MexPlaza" came on-line, the first Latin-American virtual shopping center using the Web, located in a 2 megabits node. It has about 15 clients or "shops" and for them this has been an easy way to have a "home page" on the Internet at a low cost.

Things are changing in the Mexican business arena with the current economical crisis. More and more companies with foreign investment, or that are part of international corporations, need the advantages of the traditional Internet services and the new possibilities that appear with the Web graphical browsers. The solution in most cases has been a private digital connection to their counterparts in other countries. However, with the growing number of participants in the domestic network and competitors accessing global networks, Mexican businesses realize that the reach of their network is not sufficient for the purposes of a modern enterprise networking system. For Mexican companies, changing the traditional networking activities from local to worldwide scope presents new dimensions in business. They want to be part of the WWW, with its great potential.

One may expect Mexican companies, such as MexPlaza and other information and data processing providers, to offer their services internationally, taking advantage of reduced operations costs through low wages. Also, more efficient and faster communications means better business, and that is important to keep pace with business in other countries like the United States, Mexico's major trading partner.

We look forward to the near future in which there will be more money coming from commercial traffic, to help cover the cost of doing business. The Web is the determining factor in a new way of doing business, more companies will join the Internet taking from the academic institutions the leading role in Web services.

#### 3.2 Education

There is no doubt about the powerful combination of "hypermedia" of the Web graphical browsers and the capacity of remote access for educational purposes. The Web becomes the "dream application" for educators. New resources from all over the globe are now at educators' fingertips. Because language is still a very important barrier, more academics are sharing html tutorial documents on-line. These are written in Spanish allowing access

to many people who do not read English. Currently, these tutorials focus on computer-related issues, but we expect a growing number of documents in other academic areas.

The North American Free Trade Agreement (NAFTA) includes a chapter on cooperation and exchange in higher education. We expect the WWW to play an important role in reaching these goals.

Culture has been one of the most developed areas in the Mexican Web. There are at least three servers with a heavy load of cultural information about the country and its past, one of the newest and more interesting additions has been a new "Mosaic" with a virtual museum of archeology and anthropology.

### 3.3 A regionally distributed library

Regional networks are becoming the principal components of the Mexican network. Each of the five regions - in the northwest, northeast, western-central, south and Mexico City - has a 2 megabit node as the network backbone.

The western-central region, called "Red de Computo Centro-Occidente" has a project called "SIRIAI" which has received financial support to develop an information system that links libraries and general information from six public universities, each located in different states in the region. The system uses Mosaic or Netscape as a "front end" for queries and searches in the distributed databases that runs with the RDBMS "Oracle". Their own Web functions as a campus wide information system and as a "client" for the library catalog of the regional participants.

Also noteworthy is the fact that for many years, the Mexican Ministry of Education have been poured money into a project called the "national library network" which has never quite come to fruition. Now however, through the Web, the system is operating in some states.

### 3.4 Politics and Economy

Politics are also important on the Web. Significantly, while many opposition political groups have generated support using the Web, the government, generally speaking, has not paid much attention. For example, there is a "home page" for the EZLN or "Zapatistas" Mexican guerrilla movement. Similarly, a leftward leaning Mexico City newspaper - La Jornada - has reached Mexican co-nationals in the U.S. and students studying abroad

- an important sector - with a home-page developed by volunteers.

On economics you can find studies on the country in general or focused on specific states, the Instituto Nacional de Geografía y Estadística which conducts major research on the Mexican economy, is already on-line, will soon use the Web to publish its findings.

## 4 Conclusions

It is not enough to have a national network with sufficient bandwidth. Increasingly, it is necessary to develop services that make use of and give meaning to the existence of the electronic infrastructure.

Thanks to the appearance of graphical Web browsers, Internet has drawn attention from the business community, accelerating the number of network access points coming on line in recent months.

New projects aimed at facilitating knowledge exchange for educational and cultural purposes are helping the academic community achieve new goals, thus improving education.

The development of new and better technologies, such as the reduction of communications costs due to the opening of the long distance market in this country will allow further developments in the use of the Internet resources.

## References

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