CONSTRUCTING A WEB-BASED GIS FOR EARTHQUAKE MONITORING IN TURKEY

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OUTLINE

- Internet GIS
- Method, tools, and data
- Programming a GIS application
- Work flow of the application
- Client side of the application

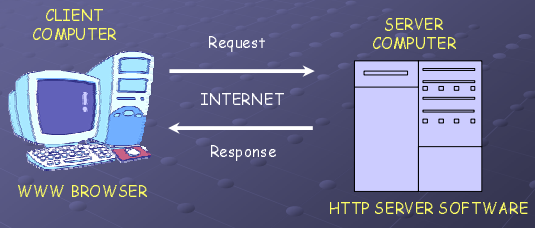
INTERNET-GIS

GEOGRAPHIC INFORMATION

INTERNET TECHNOLOGIES

USERS

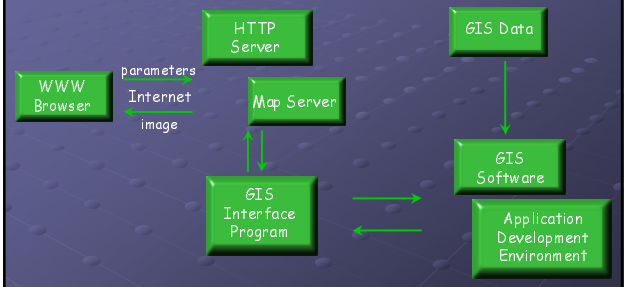
Architecture of the World Wide Web, a classic client/server design



Forms of Internet GIS

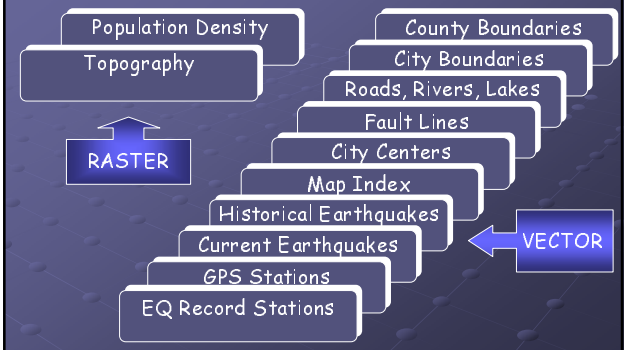
1. Raw Data Download
2. Static Map Publishing
3. Static Web Mapping
4. Interactive Web Mapping (Dynamic Maps)
5. Distributed GIServices

Structure



Developing an Internet GIS Application

DATA TYPES

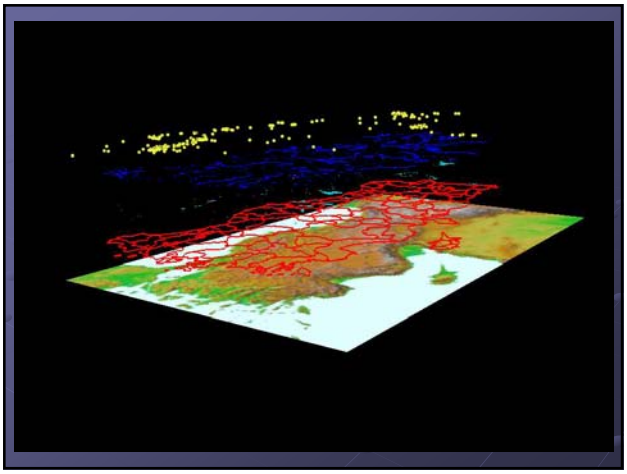


DATA ACQUISITION

Digital Chart of the World
www.gisdatadepot.com
scale: 1/1,000,000
format: shp (esri)
projection: geographic
datum: wgs-84
unit: decimal degree
→ Cities, Counties, City Centers, Roads, Lakes, Rivers

USGS GTOPO30 Project
http://edcdaac.usgs.gov/gtopo30
projection: geographic
datum: wgs-84 → DEM
unit: decimal degree
z-unit: meter
ellipsoid: wgs-84

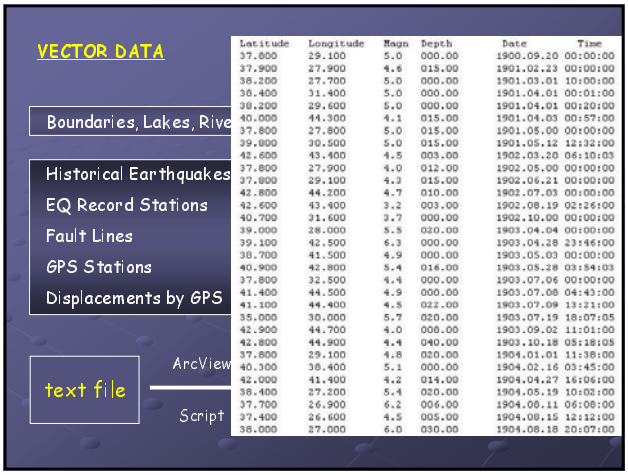
Kandilli Observatory and Earthquake Research Institute
(Boğaziçi University-Turkey) http://www.koeri.boun.edu.tr
Current Earthquakes
Historical Earthquakes
Earthquake Record Stations
Fault Lines
→ projection: geographic, datum: ed-50, unit: dms
GPS Stations
Displacements by GPS
→ projection: geographic, datum: wgs-84, unit: dms

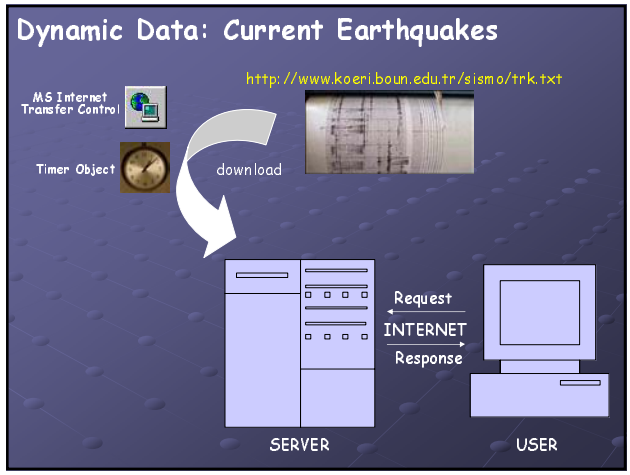


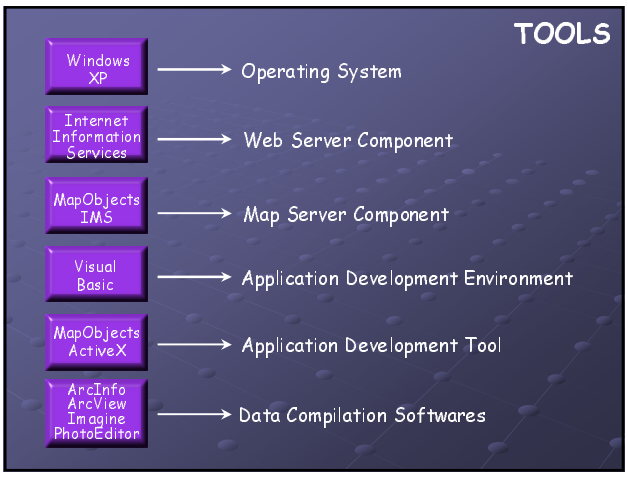
DATA PREPARATION

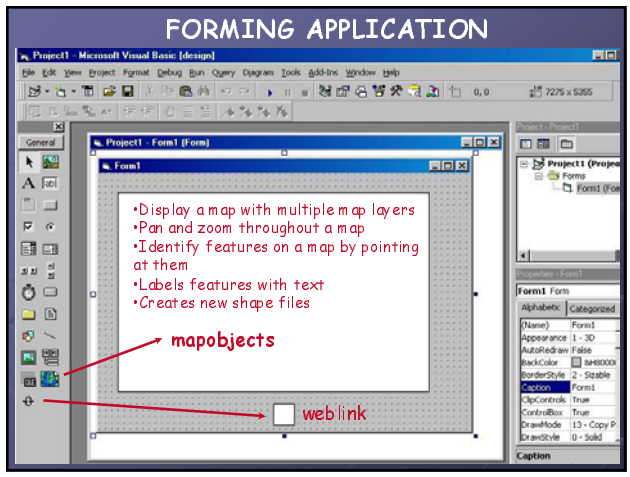
TOPOGRAPHY

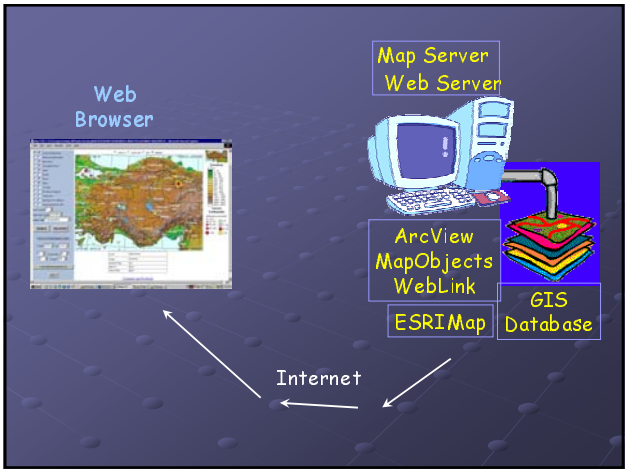
POPULATION DENSITY

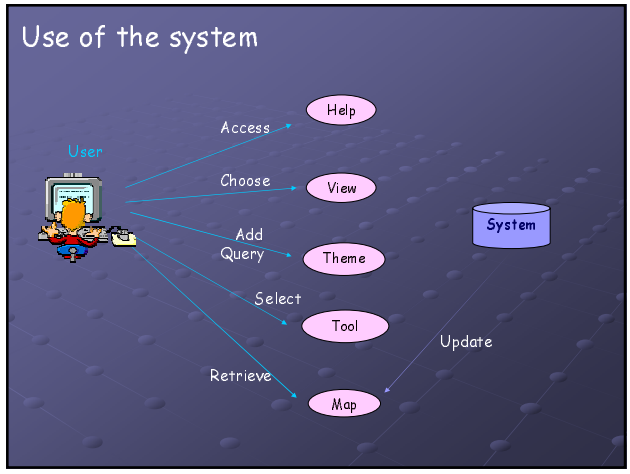

VECTOR DATA
Boundaries, Lakes, Rive
Historical Earthquakes
EQ Record Stations
Fault Lines
GPS Stations
Displacements by GPS
text file
ArcView
Script
Latitude Longitude Magn Depth Date Time
37.800 29.100 5.0 000.00 1900.09.20 00:00:00
37.900 27.900 4.6 015.00 1901.02.23 00:00:00
38.200 27.700 5.0 000.00 1901.03.01 10:00:00
38.400 31.400 5.0 000.00 1901.04.01 00:01:00
38.200 29.600 5.0 000.00 1901.04.01 00:20:00
40.000 44.300 4.1 015.00 1901.04.03 00:57:00
37.800 27.800 5.0 015.00 1901.05.00 00:00:00
39.800 30.500 5.0 015.00 1901.05.12 12:32:00
42.600 43.400 4.5 003.00 1902.03.20 06:10:03
37.800 27.900 4.0 012.00 1902.05.00 00:00:00
37.800 29.100 4.3 015.00 1902.06.21 00:00:00
42.800 44.200 4.7 010.00 1902.07.03 00:00:00
42.600 43.400 3.2 003.00 1902.08.19 02:26:00
40.700 31.600 3.7 000.00 1902.10.00 00:00:00
39.000 28.000 5.5 020.00 1903.04.04 00:00:00
39.100 42.500 6.3 000.00 1903.04.28 23:46:00
38.700 41.500 4.9 000.00 1903.05.03 00:00:00
40.900 42.800 5.4 016.00 1903.05.28 03:54:03
37.800 32.500 4.4 000.00 1903.07.06 00:00:00
41.400 44.500 4.9 000.00 1903.07.08 04:43:00
41.100 44.400 4.5 022.00 1903.07.09 13:21:00
35.000 36.000 5.7 020.00 1903.07.19 18:07:05
42.900 44.700 4.0 000.00 1903.09.02 11:01:00
42.800 44.900 4.4 040.00 1903.10.18 05:18:05
37.800 29.100 4.8 020.00 1904.01.01 11:38:00
40.300 38.400 5.1 000.00 1904.02.16 03:45:00
42.000 41.400 4.2 014.00 1904.04.27 16:06:00
38.400 27.200 5.4 020.00 1904.05.19 10:02:00
37.700 26.900 6.2 006.00 1904.08.11 06:00:00
37.400 26.600 4.5 005.00 1904.08.15 12:12:00
38.000 27.000 6.0 030.00 1904.08.18 20:07:00


Dynamic Data: Current Earthquakes
http://www.koeri.boun.edu.tr/sismo/trk.txt
MS Internet Transfer Control
Timer Object
download
Request
INTERNET
Response
SERVER
USER


TOOLS
Windows XP
Operating System
Internet Information Services
Web Server Component
MapObjects IMS
Map Server Component
Visual Basic
Application Development Environment
MapObjects ActiveX
Application Development Tool
ArcInfo ArcView Imagine PhotoEditor
Data Compilation Softwares


FORMING APPLICATION
•Display a map with multiple map layers
•Pan and zoom throughout a map
•Identify features on a map by pointing at them
•Labels features with text
•Creates new shape files
mapobjects
weblink


Web Browser
Map Server
Web Server
ArcView
MapObjects
WebLink
ESRIMap
GIS Database
Internet


Use of the system
User
Access
Help
Choose
View
Add
Query
Theme
Select
Tool
Retrieve
Map
Update
System

CONCLUSIONS

- ✓ online earthquake information
- ✓ low technological requirements
- ✓ software-independent system
- ✓ maps are alive on the Internet
- ✓ maximum functionality with minimum effort
- ✓ update and develop the service easily
- ✓ data come from different sources
- ✓ response time

THANK YOU!