Central America Probabilistic Risk Assessment
A regional SDI for disaster risk reduction

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What is CAPRA?

CAPRA is an ongoing initiative to develop and enhance a set of GIS-based tools to understand, communicate and support decisions related to disaster risk at the local, national and regional levels in Central America.

Primary Products

1) Compendium of hazard and risk maps
   - Printed Atlas
2) CAPRA Geo Node
   - Online data and maps
3) Hazard and risk reports
   - Country Risk profiles
   - Indicators of Risk and Risk management
4) Software to evaluate risk
   - Hazard models, vulnerability and risk visualization
5) Training courses & materials
6) Series of user-friendly applications
   - Hazard assessment report for territorial planning;
   - Cost-benefit application for analysis of retrofitting projects;
   - Calculator of technical premiums for insurance.
MULTIPLE NATURAL HAZARDS

- Earthquake
  - Ground Shaking / Liquefaction
  - Tsunami

- Hurricane
  - Strong Winds
  - Storm Surge
  - Hurricane Rainfall

- Intense Rain
  - Other Rainfall

- Volcano
  - Ash Falls
  - Ballistic Ejections
  - Pyroclastic Flows
  - Lava Flows

- Landslides
  - Ground Shaking

Floods

- Hurricane Rainfall
- Other Rainfall

PROBABILISTIC RISK MODELING

Hazard (i.e. earthquake)
Exposure (i.e. houses)
Vulnerability (of house to quake)
Risk (i.e. probable loss)

Disaster Impact Analysis
- Scenario or Stochastic -
Managua, Nicaragua
1972

Magnitude 6.4
Risk (i.e. probable loss)

Hazard (i.e. earthquake)

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Make the best decisions today to mitigate the disaster of tomorrow
1. Locate the data that already exists
2. Access and share that data
3. Create the data that is not in existence

Spatial Data Infrastructure (SDI)

- Necessary, but not sufficient to just have policies, requirements & mandates
- Necessary, but not sufficient to just have best of breed software
- **Align incentives** to create a single Spatial Data Infrastructure
There are many examples of effectively aligning incentives using the internet.

"Architectures of Participation"
—Tim O’Reilly

An “Architecture of Participation” is both social and technical, leveraging the skills and energy of users as much as possible to cooperate in building something bigger than any single person or organization could alone.
“Architectures of Participation”

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Web 2.0

contributors not just consumers

Portals

“The early days of the internet were flush with people making ‘portals’, to attract users to view things. This hasn’t been in fashion since 2001, yet the mapping world and SDIs in particular still seem tied to the concept.”

– Chris Holmes
Web Portals

Portals

Too often portals have:
- No benefit to registering
- Few real users
- No recognition
- No reward for the effort
- Uses stick, not carrot

There is little incentive to participate

Geo Node = Web Portals + Web2.0

Geo Node

- Compelling and relevant
- User at the Center
- User Responsibility
- No Barriers or Difficulty
Geo Node = Web Portals + Web²

Make beautiful maps

User accounts

- User statistics
- Comments, ratings, tags
- Collaborative Filtering
- Rankings of best ‘views’ and data sets contributed
- Highest rated, most viewed, most shared
Geo Node = Web Portals + Web².0

Easy upload data and maps

Choose File

Upload

Geofile.shp

Searchable by Google
Geo Node = Web Portals + Web\textsuperscript{2.0}

Leverage visualization platforms

Metadata

- Derive from data and user actions
- Wiki type editing of metadata
- Automatically available with the Catalog standards
Geo Node = Web Portals + Web²

Editing

Geo Node = Web Portals + Web²

Versioning and advanced workflow
How can CAPRA contribute to existing SDI efforts?

- Internet data and map server
- Create maps online
- Easily share created maps

Future development
- Web 2.0 collaborative features
- Statistics
- Feedback on maps
- Feedback on data usage and quality
- Online tools for data collection collaboration

Welcome to CAPRA’s GeoNode

The GeoNode is a data clearinghouse for CAPRA. Currently a prototype, it provides tools for the distribution and composition of hazard and risk map data. Its purpose is to inform decisions about future data management developments for CAPRA.

DEMO
Welcome to CAPRA's GeoNode

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Simple to use and maintain

Still work to be done
Where do you place these Geo Nodes?

- Everywhere!
- Anywhere you might put a portal
- Anywhere you have an ‘Enterprise GIS System’
- Anywhere people share data with each other

We will be placing the Geo Nodes as requested in CAPRA countries

Countries control the data locally

Nodes sync regional information
- **Free and Open Source Software**
- **Anyone** can access the same package we use
- Designed so **other** domains and regions will **improve software** in other ways that all nodes can use
- Encourage internal use, make it the easiest way to create and share data
- **Sync nodes** up and down for increased **performance**
- Result is a **true information infrastructure**
Tool for cooperative data collection

- Align efforts so that amateur, commercial, NGO and governmental creators all naturally collaborate
- Figure out workflows, tools and licenses that work for everyone – to assure Data Quality
- Towards living data, constantly evolving - authoritative and always up to date
Open for collaboration

Thank You

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We are infusing this open architecture ideology at all levels of CAPRA:

1) At the user community level
2) At the software architecture level
3) At the data level

“To harness the collective work of thousands of contributors, creating a ‘living instrument’.”

Ultimately improve disaster risk management
Let commercial players run SDI?

- SDI’s are a public good
- Commercial players have profit motive
- Commercial players seek monopoly

**DANGER:** Governments are handing over data without opening it to anyone else!

### Spatial Data Infrastructure (SDI)

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“…the sources, systems, network linkages, standards, and institutional issues involved in delivering spatially-related data from many different sources to the widest possible group of potential users at affordable costs.”

– Groot & McLaughlin 2000
San Juan del Sur NICARAGUA
San Juan del Sur, NICARAGUA

1000 year Tsunami Hazard Map

San Juan del Sur, NICARAGUA

Building by building analysis
San Juan del Sur NICARAGUA

CAPRA - Central American Probabilistic Risk Assessment
Evaluación Probabilística de Riesgos para Centro América