

A GEOSPATIAL INFORMATION PORTAL FOR EMERGENCY MANAGEMENT OF NATURAL DISASTERS

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1. INTRODUCTION

One heavy earthquake with degree 8.0 occurred on May 12, 2008 in Wenchuan County, Sichuan province of China, which has affected many provinces (Shanxi, Chongqing, Gansu) in China. According to the international strategy for disaster reduction (ISDR), the Wenchuan earthquake and severe climate has caused about 111 billion dollars in 2008, which makes China the most severely affected country in 2008 worldwide. Emergency management for natural disasters is a cycle of activities beginning with *mitigating* the vulnerability and negative impacts of disasters, *preparedness* in responding to operations, *responding* and providing relief in emergency situations, and aiding in *recovery* after a disaster. Spatial information and related technologies has been proven crucial in the whole cycle of the disaster management. The response to the May 12 Wenchuan earthquake was just an example of the wide utilization of spatial information and related technologies in effective and efficient disaster management. After the earthquake, a large amount of geospatial information had been collected, and varied geospatial information systems had been built to monitor and provide services for the serious disaster. One of the challenges concerned with this earthquake is the access and usage of reliable, accurate and up-to-date spatial information.

2. PROBLEMS

During this disaster, although we had collected huge number of geospatial data, we could find out that the locating and access to the required data was still difficult. The problems can be described as follows:

Firstly, there was no entrance for different organization to publish and share the emergency spatial data, each of the involved agencies is responsible for producing and updating geospatial information and upload them to one central node before or after the disaster. The involved organizations for the disaster must be connected to the node through the inter- or intranets, so that each organization can then utilize required datasets from the node for their own use. It's through such a network that organizations can share and access their required datasets.

Secondly, there was no metadata standard to describe the emergency resources. Metadata was important to build an portal to realize the concept of information sharing, different agencies had gathered various geospatial data resources, stored the data in separate repositories, they could upload the metadata and the data linking address to the central portal, but each of them had adopted different metadata standards, the various geospatial information from them couldn't be integrated easily together to provide a uniform retrieval services.

Thirdly, it was very difficult to find and access the data on one single website, for there was no such access point to provide the one-stop service that they could obtain the right data through one interface.

3. SOLUTIONS

So a geospatial information portal is a useful and practical way to solve the above problems, which acts as a gateway providing a single access point to multiple emergency remote sensing data, emergency facility resources and etc. It is also a web environment that allows an organization or a community of information users and providers to publish and share emergency resources, so that this precious emergency spatial data can be integrated and managed in the portal to help further decision making.

In this paper, a referenced geospatial information portal architecture is designed for emergency management, which will close the gaps between different organizations and communities that have heretofore shared geospatial information only with great difficulties. A unified reference metadata standard is also designated to describe all the emergency information resources. The portal provides the basis for an open, vendor-neutral one that is intended to be a first point of discovery for geospatial content in the context of designing and implementing the spatial data infrastructure for emergency management.

A GOS(Geospatial one-stop) service complying with OGC interoperability standards is provided in the portal, which includes:

(1)portal services:provide the single point access to the emergency geospatial information on the portal, and this service also provide the management and administration of the portal.

(2)catalog service:use the uniform and standardized metadata to describe the emergency spatial data during the process of the emergency management. A unique DOI(digital object identifier) is awarded to identify the resources and to locate the geospatial services and information wherever it locates.

(3) portrayal service:used to process the emergency geospatial information and prepare the required results(an online map or 3D visualization and etc) to the user.

(4) data service:used to provide emergency geospatial data if permitted.

4. CONCLUSIONS AND ACKNOWLEDGMENT

Geospatial information is vital for the whole cycle of emergency management of the natural disasters, we have presented a reference architecture of the information portal to integrate the various distributed emergency geospatial information and non-spatial resources, although this portal is designed for this 5.12 earthquake, it will make sense when other new disasters occurs. There will still be lots of work to perfect the portal to be more flexible and effective in the emergency management of natural disasters.

This work was supported by State Key Development Program for Basic Research of China(No.2006CB701306) from June 2006,initiated by the Ministry of Science and Technology of China. With special thanks to Prof Qi Li for her constructive advice.