

ITIC DEVELOPMENT OF SEA LEVEL STATION METADATA LOOKUP TOOL

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Performance Period: March 2005 - February 2006

Project Objective:

Analysis of Extreme Events and Trends in Pacific Ocean Water Level Data and its Application to Risk and Vulnerability Assessment In order to facilitate the easy lookup of data for this project, it was decided to develop a user-friendly tool that would allow query and lookup of sea level station inventories from a number of network operators.

Sub-Task: Water Level Station Systems Database Integration via an XML Web Service

Objective: Integrate databases held by multiple agencies, institutions and organizations and used to describe water level station (tide gauge) specifications including station, system, and data path, format, and product parameters to provide a web-based tool for the easy lookup of station metadata in support of tsunami warning.

Rationale: Currently, information used to describe water level station specifications is distributed among databases held by multiple agencies, institutions and organizations. For example, the NOAA National Ocean Service (NOS) Center for Operational Oceanographic Products and Services (CO-OPS) manages the National Water Level Observation Network (NWLON), a network of over 175 permanent, continuously operating tide observations stations. In addition to basic tidal information, water level data from these stations are used to support the National Weather Service (NWS) tsunami warning system and storm surge monitoring programs. The long-term records of this water level data are used to monitor relative sea level rise, as part of the NOAA Climate and Global Change Program.

The WMO JCOMM and UNESCO IOC GLOSS Core Network is a network of 290+ tide gauge stations and station data managed cooperatively by the University of Hawaii Sea Level Center (UHSLC), the British Oceanographic Data Centre and the Permanent Service for Mean Sea Level (PSMSL). Related data is maintained by the UHSLC in the form of the 'fast delivery' GLOSS/CLIVAR 90+ station data base and the Joint Archive for Sea Level (JASL) 'research quality' 300+ station database. The UHSLC also provides real time data from 40+ stations. The NOAA National Weather Service (NWS) Pacific Tsunami Warning Center (PTWC) and West Coast/Alaska Tsunami Warning Center (WC/ATWC) maintain an inventory of approximately 100 tide stations that continuously report water level data on a near-real time basis and are used to support tsunami detection and warning.

Integration of the information contained in these various databases would greatly enhance the ability to access and use water level data. For example, an integrated database of water level station specifications could be used to support the establishment and expansion of regional tsunami detection and warning networks.

Web Service: The term Web Services describes a standardized way of integrating Web-based applications using open standards and descriptions over an Internet protocol backbone. Web services allow organizations to communicate data without intimate knowledge of each other's IT

systems behind the firewall. Unlike traditional client/server models, such as a Web server/Web page system, Web services do not provide the user with a GUI. Web services instead share business logic, data and processes through a programmatic interface across a network. The applications interface, not the users. Developers can then add the Web service to a GUI (such as a Web page or an executable program) to offer specific functionality to users. Web services allow different applications from different sources to communicate with each other without time-consuming custom coding, and because all communication is in XML, Web services are not tied to any one operating system or programming language.

Thus, the basic concept involves establishing XML schemas, pushing this data out to and/or pulling this data in from multiple provider databases, transforming it, and pushing it out in multiple report formats through a central client server.

Initial efforts will focus on the integration of the NOAA CO-OPs NWLON, UHSLC, and PTWC-WC/ATWC databases as a means to demonstrate the viability of this approach. To further narrow the scope, this effort will focus on the integration and dissemination of information that could be used by tsunami warning center managers to support the establishment and expansion of regional tsunami detection and warning networks. Specifically, the collection and sharing of information needed to determine if a given station is able to support tsunami detection and warning is the target of this initial effort.

This 'web service' approach is consistent with the Integrated Ocean Observing System (IOOS) Data Management and Communications (DMAC) efforts underway to support interoperable data access, recovery, and archiving. It will serve as an example of a data system that could be adopted into the data transport component of IOOS. Correspondingly, it is also consistent with the IOC Committee on International Oceanographic Data and Information Exchange (IODE) XML Steering Group's efforts to promote the use of XML as a mechanism for the efficient exchange of oceanographic data. It supports the development of a data communications and management subsystem (DMS) for the seamless discovery and delivery of data within GOOS and

Tide Station Web Service

Objective:

Integrate tide station databases for tsunami warning center managers to determine if given station supports tsunami monitoring

Integrate:

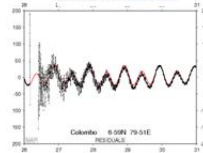
Center for Operational Oceanographic Products and Services (CO-OPS)

National Water Level Observations Network (NWLON)

Univ of Hawaii Sea Level Center (UHSLC)

Pacific Tsunami Warning Center (PTWC)

West Coast/Alaska Tsunami Warning Center (WC/ATWC)



for interoperability with other relevant observing systems and research programmes, identified as a high priority by the IODE and the IOC/WMO JCOMM. Further, the focus of this effort is closely aligned with IODE efforts to create an Ocean Data and Information Network (ODIN) with a special emphasis on tsunami forecasting.

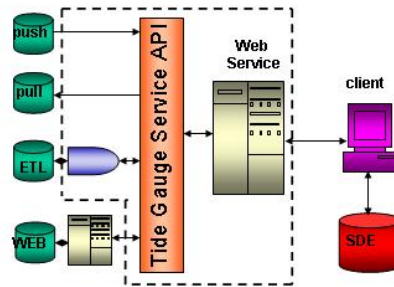
UH Sea Level Center (UHSLC) and International Tsunami Information Center (ITIC)
NOAA Pacific Region Integrated Data Enterprise (PRIDE) Project

Tide Station Web Service

Concept:

Web Services = way of integrating information using open standards (e.g., XML) over Internet backbone.

Allows information exchange without intimate knowledge of data owner's inner workings using self-describing documents and interfaces.



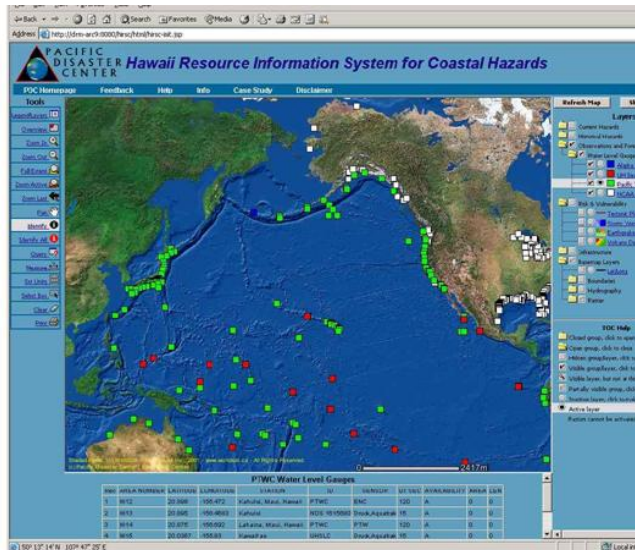
Involves establishing XML schemas,
pushing data out to,
pulling data in from multiple provider databases,
transforming, pushing out
In multiple report formats through central client server

*UH Sea Level Center (UHSLC) and International Tsunami Information Center (ITIC)
NOAA Pacific Region Integrated Data Enterprise (PRIDE) Project*

Products: Tide Station Web Service Prototype

XML
Tide Station
Metadata
Schema

ArcIMS
Tide Station
Inventory
Application



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