The Tsunami Service Bus, an integration platform for heterogeneous sensor systems

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The Sensor Integration Platform was developed to access sensor measurements and events as well as to task and control sensor system components in a uniform manner. Its core consists of the so called Tsunami Service Bus (TSB), built on top of a service and messaging backbone. The TSB realizes functional integration compliant to a service-oriented architecture pattern: Functionality is implemented in form of dedicated components communicating via a service infrastructure. These components provide their functionality in form of services via standardized and published interfaces which can be used to access data maintained in - and functionality provided by dedicated components. Functional integration replaces the tight coupling at data level by a dependency on loosely coupled services. If the interfaces of the service providing components remain unchanged, components can be maintained and evolved independently on each other and service functionality as a whole can be reused. The TSB provides four services that are realized in conformance to the Sensor Web Enablement (SWE*), a standard specified by the Open Geospatial Consortium (OGC):

- A Sensor Observation Service (SOS) to retrieve sensor measurements (e.g. time series).
- A Notification Service (TSB_NS) to provide any notifications (e.g. sensor system state changes).
- A Sensor Alert Service (TSB_SAS) to deliver sensor alerts (e.g. earthquake events).
- A Sensor Planning Service (SPS) to task special sensor features (e.g. filtering).

Beyond services SWE specifies data encoding both to access sensor measurements and to describe the sensor itself in a comprehensive way:

- Observations & Measurements (O&M)
- Sensor Model Language (SensorML)

Because SWE-services define operations like “describeSensor” to access meta-information, data of new sensors could be provided dynamically without any change of service interfaces allowing the realization of dynamically configurable early warning systems.

* SWE is an initiative of the Open Geospatial Consortium, Inc. ® (OGC) [5]. It‘s an acronym for Sensor Web Enablement and defines standard interfaces to access sensor data via Web Services.

For further information see

http://www.gitews.de

The Meteorological and Geophysical Agency of Indonesia (BMG), see http://www.bmg.go.id

The National Coordinating Agency for Surveys and Mapping (BAKOSURTANAL), see http://www.bakosurtanal.go.id

The Agency for the Assessment & Application of Technology (BPPT), see http://www.bppt.go.id

Open Geospatial Consortium, Inc.® (OGC), see http://www.opengeospatial.org

The open source application server JBoss, see http://www.jboss.org

Java Enterprise Edition, see http://java.sun.com/javaee

KBSt - Federal Government Co-ordination and Advisory Agency, see http://www.kbst.bund.de

Business Process Execution Language, see http://www.oasis-open.org/committees/wsbpel