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A Framework for Monitoring and Maintenance of a Tsunami Early Warning System using ITIL®

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Within this work, we present our approach and ongoing efforts to establish monitoring and maintenance processes for Tsunami Early Warning Systems. Practical work is done within the context of the Indonesian Tsunami Warning System (INATEWS) at Badan Meteorologi, Klimatologi dan Geofisika (BMKG) in Jakarta, Indonesia. The German contribution is well known as GITEWS. INATEWS is composed of several thousand integrated system components and numerous software processes. Due to the heterogeneity and complexity of the system, as well as the high availability needs, being an operational TEWS, real-time monitoring, reporting and scheduled preventive maintenance are needed. To develop and install an organizational and operational methodology for maintenance processes for INATEWS, we asserted ITIL® methods and are in development of Standard Operating Procedures (SOP) together with BMKG operational and management staff.

ITIL®-conforming methods are one means of IT Service Management which has been adopted by a variety of service oriented IT providers. An early warning system does not expose classical consumer services, but the dissemination of warning messages and an early warning as a product may nevertheless be viewed as distinct services provided by a TEWS. We applied methods from ITIL® to the modular and hierarchical components of an early warning center, where minimum requirements on service availability, reliability and correctness of the warning product exist, from dissemination down to each sensor component. We describe functions of actors that ensure management of incidents and problems, as well as managing applications, IT operations and further technical issues.

For the components of the early warning system, we present a model of event detection and event resolution. Real-time monitoring provides automated health-checks. Errors lead to reports to designated targets. Preventive maintenance provides findings on data and system availability, and data quality. Each of the three may lead to event detection, which is filtered, categorized and prioritized. As soon as an event is detected, a corrective maintenance process is triggered, which is modeled as a circular process.

The developed procedure is being tested on the full process chain for the seismic component. Afterwards, the model will be applied to the full INATEWS system. Although we present a tailor-made approach for INATEWS, the general schema of our approach can be useful for large and complex warning systems with a multitude of sensors and sensor systems that are widely geographically distributed. It may help to keep each component at a functional level, so that the final product, the dissemination of a warning message, is not going to be endangered, due to malfunction of a sub-component.