

An user focused approach to use WPS processes for the natural hazard domain and multi-risk assessment

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Abstract

The risk to society due to natural hazards has increased around the globe in the past decades. To mitigate the threats, an efficient risk management is necessary, which takes the cascading effects between different types of hazards, like earthquakes, tsunamis and effects on the critical infrastructure, into account. This information being relevant for all citizens is often structured and displayed for domain experts. To bridge this gap and to provide relevant information for different user groups the RIESGOS project (Multi-risk analysis and information system components for the Andes region) is developing a web-based information system for the focus regions in Chile, Peru and Ecuador.

A typical workflow has to integrate multiple research domains, which have to be jointly analysed, aligned and displayed.

To tackle this issue, a distributed approach was chosen in RIESGOS, where OGC web processing services (WPS) encapsulate the domain-specific methods and a user-friendly web application serves as entry point for the different user groups.

Using this procedure, all participating research groups are connecting their analysis methods, in the following referred to as “processes” and their resulting data. This workflow is implemented internally in the web application as a graph with multiple branches connecting the different processing nodes – for the sake of simplicity it is displayed to the user as a linear sequence of processing steps generated, using a topological sorting of the nodes. To encourage the user to explore different settings for the analysis, they get the possibility to go back to the already processed steps and to modify the previously defined parameters. As a consequence of the implemented dependency resolution, which is applied to the workflow graph, only the steps affected by this modification will be reprocessed. This approach facilitates the explorative usage of the system.

A clear definition of the process input and output parameters mandated by the WPS protocol and workflow definition, adds the benefit of making different implementations of processes

interchangeable. This helps to make the work of different research teams comparable and lowers the barrier for new research implementations to be deployed in the system. As such a system geared to be used by different user groups, this also helps in the scientific exchange between research groups.

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