NRML: The Natural Hazards' Risk Markup Language

Fabian Euchner (1,2), Marco Pagani (1,3), Damiano Monelli (1,2), Vitor Silva (1,3), and the GEM Model Facility
Team

(1) GEM Model Facility, ETH Zurich and GEM Foundation Pavia, (2) Swiss Seismological Service, ETH Zurich, 8092
Zurich, Switzerland, (3) EUCENTRE, Via Ferrata 1, 27100 Pavia, Italy

The Global Earthquake Model (GEM) is a public-private initiative on global scale that aims at establishing a uniform and independent standard to communicate earthquake risk worldwide, and to support earthquake risk reduction policies and actions. A key component of GEM is the upcoming user-intuitive web-based risk assessment platform OpenGEM, which will be powered by the OpenQuake computation engine. OpenQuake is an open source project that can be found at www.openquake.org.

NRML is a data model and XML-based data interchange format that is being developed in the course of GEM. It is being used in the communication layer beween different components of the OpenQuake engine, as an output and archive format for computations performed with the engine, and for data interchange with external applications.

The present scope of NRML is seismic hazard and risk. In the future, it is planned to extend the scope to other natural hazards, such as floods and tsunamis. The seismic hazard part covers seismic source parameters and rupture geometries, hazard curves and ground motion fields. The seismic risk part contains loss and loss ratio curves, exposure portfolios, and vulnerability curves. NRML leverages existing standards, such as the Geography Markup Language (GML), and QuakeML, a data model for seismology.