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e-Science on Earthquake Hazard Mitigation

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Overview

In EUAsiaGrid, ASGC coordinates the construction of a pilot virtual research environment (VRE) on earthquake disaster mitigation, by streamlining the primary research process and component - seismic sensor network, seismic wave propagation simulation and earthquake data center. Based on these, Strain Green's Tensor (SGT) methodology was also deployed to support hazard modeling much efficiently in Taiwan. All the VRE and e-Science applications are now supporting Asia-wide collaboration and customization.

Impact

With accurate regional seismic data, domain-specific services and the e-infrastructure, we are able to greatly enhance the earthquake hazard alleviation and conduct unique seismology researches in Asia.

Description of the work

Under EUAsiaGrid framework, we have been implementing a series of wave propagation forward simulation and analysis applications, from the generation of accurate earthquake wave propagation, simulation of seismogram on-demand of any place on earth for any event, to the cost reduction of seismic wave propagation analysis by pre-calculated Strain Green's Tensor (SGT) function method. All the works are not just porting designated computational models to gLite-based World Wide Grid, but also establishing research-oriented production services and long-term collaboration mechanism among partners. Given the SGT database (a 50-station 20 second case of Taiwan costing 76,800 cpu-hour had been done), the hazard mapping and disaster potential analysis could be much efficiently buildup without re-calculating required seismograms. Development of the VRE on seismic hazard mitigation with aforementioned applications will be described in this presentation.

Conclusions

Value of e-Science and regional collaboration is exemplified by this work. More federation on various regional resources and customization will be realized on the same e-Infrastructure which is entirely compatible with EGI.

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