Report on 2014 Seismic Portal Activities

www.seismicportal.eu

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EXECUTIVE SUMMARY

The Earthquake Data Portal (SeismicPortal)\(^1\) provides a single point of access to diverse, distributed European earthquake datasets provided through a unique joint initiative by observatories and research institutes in and around Europe. The Data Portal aggregates web-based Data Explorers providing search and access to datasets from several institute or organization, including event parametric information from the EMSC\(^2\), broadband waveform data from the European Integrated Data Archive from ORFEUS\(^3\), accelerometric parameter and waveform data from participating EuroMed accelerometric networks, and historical data from the Archive of Historical Earthquake Data.

2014 has been the last year of the NERA\(^4\) Project financing the development and evolution of the Seismic Portal. In 2013, a major rewrite of the backend database, a new user interface and new services has been developed and the result was the deployment of the production release in May 2014. As usual the EMSC will continue to maintain the deployed services even if NERA has finished.

The new Seismic Portal continues to be a bridge between different European Projects. For example, event’s selection can be directly exported into the VERCE\(^5\) Document Store to be used by the different applications and be processed on HPC. Marsite\(^6\) project uses also the SeismicPortal Web Map Service capabilities to display events on their map. SHARE data from the EFEHR\(^7\) portal are also easily integrated into the SeismicPortal through OGC WMS.

In the year 2014, the new portal has been visited by more than 33000 unique visitors. But Web Services are far more used by third party applications (Mean of 3 200 000 accesses per month\(^8\), >80% by Mobile Hardware).

![Map Layer Offering](image)

the SeismicPortal with a foreign layer\(^9\)

(SHARE area source model V6.1)

Partners:

![NERA](image)

![SHARE](image)

http://www.orfeus-eu.org

http://www.emsc-csem.org

http://www.orfeus-eu.org/

http://www.nera-eu.org

http://www.verce.eu

http://marsite.eu/

http://www.efehr.org:8080/jetspeed/portal/HazardMaps.pxml

http://www.efehr.org:8080/jetspeed/portal/HazardMaps.pxml

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\(^{1}\) http://www.seismicportal.eu

\(^{2}\) http://www.emsc-csem.org

\(^{3}\) http://www.orfeus-eu.org/

\(^{4}\) http://www.nera-eu.org

\(^{5}\) http://www.verce.eu

\(^{6}\) http://marsite.eu/

\(^{7}\) http://www.efehr.org:8080/jetspeed/portal/HazardMaps.pxml

\(^{8}\) Statistics from the last 6 months with the new FDSN Web Service

\(^{9}\) http://www.efehr.org:8080/jetspeed/portal/HazardMaps.pxml
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INTRODUCTION

In this document we will present you the new SeismicPortal deployed during the 2014 year. The new portal provide a nice graphical user interface to search and download events informations as well as web services conformant to the FDSN WS-Event standard. A near realtime notification system is also deployed, offering a PUSH system so that user can be notified when an event is created, modified or deleted.

In the next chapters we will introduce all these new services followed by some usage statistics.
II PORTAL OFFERING

II.1 A Friendly User Interface

The SeismicPortal has a new graphical user interface providing a nice Map View conformant to the OGC Web Map Service\(^\text{10}\) standard. Users can add, remove, layout different layers from the SeismicPortal and foreign Map provider conformant to the OGC WMS.

II.1.1 Map and List View

The home page of the SeismicPortal provides a zoomable map allowing the user to visualize all events found from search criteria. A list view of events is also displayed showing some information about them. A click on a line in the list display the event details.

II.1.2 Map Layer

Several map layers can be added on the map. After a click on the “layers” button, a dialog page display the current layers in use with their respective legend. Layers can be removed or re-ordered. To add more layers the user can click on the “Add Layer” button.

\(^{10}\) http://www.opengeospatial.org/standards/wms
Figure 1: Layer management

A dialog showing a list of current Map Layer Providers is displayed. The user can browse it to see all layers available from a provider. The SeismicPortal offer a WMS analyser, so new providers can be added and an automatic discovering is performed to see all layers available using a pre-visualization of the layers.

Figure 2: OGC WMS Provider list
II.1.3 Filtering Events

By default, the map and list view display all events from the EMSC database. But a search form is provided to filter data using different criteria (event parametric, space and time). Event map and list view are impacted by these criteria.

11 [http://www.brgm.eu/]
II.1.4 Export

From the list view, events can be selected to be included in a file to be downloaded in different file format: QuakeML, JSON and Text. The selected events can be sent directly to the VERCE platform.

Choose your output file format

II.2 OGC Maps Layer Offering

The SeismicPortal can consume map layers from foreign providers onto his global map but the SeismicPortal itself is a map layer provider conformant to the OGC WMS\(^\text{12}\). The SeismicPortal offer 4 layers: events, world base map, crust and mantle\(^\text{13}\).

\(^{12}\) Accessing at the url: http://www.seismicportal.eu/wms

\(^{13}\) Crust and mantle are from the INGV Reference Model
Figure 4: the Events Layer

Figure 5: the crust layer

Figure 6: the mantle layer, available at different depth

Figure 7: the World BaseMap Layer
II.3 Web Services

II.3.1 FDSN WS-EVENT

The new SeismicPortal is now conformant with the FDSN WS-EVENT standard. All parametrics events information are available through this web service. To help user constructing the correct url to access the web service we provide a web page showing all the available parameters.

The user can fill in parameters and see the final url with the corresponding result clicking on the ‘Call the Web Service’ button.
II.3.2 Near real time notification

The portal offers a near real time notification system using the WebSocket protocol. To see an example of integration into a web page we provide a nice map and the list of near real time messages:

![Map of near real time notification](image)

II.3.3 Flinn endgdahl Region

The last Web Service provided by the SeismicPortal is the ability to find the Flinn-engdahl region name from any lat,lon location. A Web page demonstrating the service is also provided:

![Map of Flinn-Engdahl regions](image)
II.4 Access to Foreign Earthquake related Portal

The SeismicPortal is also an access point to other Web Portal related to Seismology:

The Waveform Explorer portlet allows the users to search and request broadband seismic data from the whole EIDA network, which offers continuous data coming from c.a. 1000 stations, which are stored in several Data Centers In EU.

The Seismic Hazard Portal currently provides access to input data and time-independent hazard results produced within the EU-FP7 project "Seismic Hazard Harmonization in Europe".
AHEAD, the European Archive of Historical Earthquake Data 1000-1899, is a distributed archive aiming at preserving, inventorying and making available, to investigators and other users, data sources on the earthquake history of Europe, such as papers, reports, Macroseismic Data Points (MDPs), parametric catalogues, and so on.

The objective of VERCE is to provide a data-intensive e-science environment enabling transformative methods that can fully exploit the increasing wealth of data generated by observational and monitoring systems, and guarantee optimal operation and design.
OSAP is a crowd-sourced community portal to assess civil buildings. The main idea behind OSAP is, to motivate people like you to collect data of buildings, like the one you live in, and add it to our database.

II.5 Integration

Due to his implementation design and use of standard, the seismicportal services (map, data) can be integrated into third party software, like GIS Desktop applications, Mobile phone applications or other web portal.

Third party Application example: UDig\(^\text{14}\) a GIS Desktop Application, EQInfo\(^\text{15}\) a mobile application and Marsite Web site\(^\text{16}\)

\(^{14}\)http://udig.refractions.net/
\(^{15}\)https://play.google.com/store/apps/details?id=de.gempa.android.eqinfo&hl=en_EN
\(^{16}\)http://marsite.brgm-rec.fr/marsite/map.html
III BEHIND THE SCENE

III.1 Architecture

III.2 Open source technologies

III.2.1 Server Side

III.2.2 Client Side

III.3 Standards
IV Statistics

The following reporting statistics period is from January 2010, date of the official opening of the seismic portal to the public, to December 2014. In April 2014, a new release of the Seismic Portal have been published, changing all the infrastructure from the backend to the User Interface.

IV.1 Event Parametric Web Service

![Figure 8](image1.png)

**Figure 8**: This figure shows the total Hits of Event parametric Service, per month. The red curve shows the new Web Service compliant to the FDSN WS-EVENT standards.

![Figure 9](image2.png)

**Figure 9**: Event parametric Service access per unique IP, per month.
Figure 10: This figure shows the total volume in GB of data transferred of event parametric information.

Figure 11: Geolocalisation of users based on their IP (using: NetAcuity DB). Red points denote Mobile users and Blue points Desktop users.
IV.2 Waveform volume transfer

Figure 12: shows the volume of waveform transferred, in TeraBytes, from Orfeus Data Center.

IV.3 Portal Access

Figure 13: Unique IP Hit per month on the SeismicPortal. Red curve represents the new SeismicPortal Design access.

Figure 14: Geolocalisation of users based on their IP (using: NetAcuity DB). Red points denote Mobile users and Blue points Desktop users.
V Service’s Evolution

In spite of the end of the NERA project, financing the development and evolution of the SeismicPortal, the services will be maintained as long as possible by the EMSC.

The next work could be to add a fail over management for the PostGresql Database. And add new services useful for the community and the public. The EMSC gather a lot of information from witnesses (comments, photo …) and these materials could be included as map layer as well.

VI Conclusions

Interoperability is the key point of the new development took for the SeismicPortal. Using a very valuable and mature Web Standard for geolocalised data we can integrate a very large foreign map into the visual user interface, but also to spread our data to all other applications compliant with the OGC Web Map Service. Another evolution is the use now of the FDSN Event Web Service Standard used by IRIS, ORFEUS, and a lot other Agency. A user will be able to query data from these Agency in the same way and protocol.

Connection with other European project is very important. In a short time, the SeismicPortal will directly inject user’s selected event data to the Verce Document Store using a very simple way. Our event map is already integrated into the Marsite project and can be used by all OGC WMS client (desktop, web, …) from the GIS world.