



D-NA4.3.1: Dissemination and public outreach: updated report and evaluation

28/10/2013

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VERCE (“Virtual Earthquake and seismology Research Community e-science environment in Europe”) is a project co-funded by the European Commission as an Integrated Infrastructure Initiative within the 7th Framework Programme. VERCE began in October 2011 and will run for 4 years.

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TABLE OF CONTENTS

Copyright notice	2
Executive summary	5
1 Website	7
1.2 Website revamp and redesign	7
1.2 Web contents	9
1.3 Metrics	10
3 Social networks	13
3.1 Facebook, Twitter and Google+	13
3.2 LinkedIn	15
3.3 Youtube Channel	16
4 VERCE newsletters	18
4.1 Editorial board	19
4.2 Editorial guidelines	20
4.3 Graphics	21
5 Events	23
6 VERCE posters	24
7 Conclusion and perspectives	26

LIST OF TABLES

Table 1: Countries visitors' (5 first).....	11
Table 2: viewed pages	12
Table 3: Referrals	12

LIST OF FIGURES

Figure 1: The VERCE website before revamping.....	8
Figure 2: VERCE website after revamping.....	9
Figure 3: VERCE article on the website	10
Figure 4: Facebook sample post for VERCE	14
Figure 5: Google+ sample post for VERCE.....	14
Figure 6: VERCE Linkedin page	15
Figure 7: VERCE Youtube Channel	17
Figure 8: VERCE Newsletter (1)	21
Figure 9: VERCE Newsletter (2)	22
Figure 10: Sample Poster (1).....	24
Figure 11: Sample Poster (2).....	25

Executive summary

Within the VERCE project, WP4 is in charge of Dissemination and Public Outreach. Our mission is to:

- Elaborate a dissemination plan, identify the target audiences, the messages to deliver to each of them, the methods to distribute those messages;
- Work in close collaboration with WP3 “Training and user documentation” to disseminate the training materials that will be created for our targets;
- Keep the larger science community informed of the progress of the project;
- Reach the larger public, the seismological/scientific/ IT communities, as well as industry actors and non-specialist public, and generally raise interest in VERCE’s activities;
- Produce outreach documents that will be used for events (meetings, workshops, conferences);
- Work in close collaboration with WP1 in order to coordinate all internal and external communication flows.

The work package defined and set up adapted communication channels to reach the different targets:

- Web tools: VERCE website, social networks (Facebook, Google+ and Twitter), newsletters and partners’ websites
- Paper/electronic information and dissemination materials to present the project and its benefits such as leaflets and posters
- Events: main international conferences/workshops/meetings where VERCE can be presented or promoted.
- Collaboration with other EU projects linked to VERCE

WP4 is also in charge of gathering metrics and indicators of success of the tools that will be used to disseminate the project.

The main objectives of the period were to improve all the communication tools we got and started a new channel to promote VERCE:

- Digital marketing tools (website, general social media, professional social media, video social media)
- Paper/electronic dissemination materials.
- Metrics tools to measure the success of the dissemination tools we set up.

We have been improving the communication channels which we created to disseminate VERCE project:

- VERCE website: we worked on a complete revamp and redesign of the website. The website has been updated with several documents;
- Large public social networks (Facebook, Twitter, Google+): we have posted messages on partners’ social networks to promote the project
- VERCE’s branding through a professional social network: we started a special LinkedIn account dedicated to the VERCE project;
- VERCE Youtube Channel: we have branded the VERCE Youtube channel in order to improve the user experience and we embodied the project by video interviews of some WP leaders;

- VERCE Newsletter: we finalized the second issue of the newsletter, and spread it within the community but also for the large public.
- Events: VERCE were presented or promoted by our partners during several international conferences. Partners keep on updating the calendar of events on a regular basis on our shared platform, so that we know when they attend an event and send them materials to distribute;

We have also gathered metrics and indicators of success of the tools that have already been put into place and present them in this report (*VERCE website, social networks*).

1 Website

1.2 Website revamp and redesign

The previous version of the website has been completely revamped and redesigned.

A new Content Management System has been implemented. This new CMS is Joomla 2.5, a widely used and open source solution for website. It allows easy publications by an intuitive back office. Joomla enables to build Web sites and powerful online applications. Many aspects, including its ease-of-use and extensibility make Joomla one of the most popular Web site software available. Joomla is mobile-ready and user friendly.

This CMS is optimized for search engines like Google or Bing to find more easily VERCE in search result pages.

The new design is online since April 2013. The main objective of the redesign was to improve the look and feel and thereby increase the traffic (especially viewed pages per visitor).

The main PDF documents are now accessible from the homepage which is enlivened by a pictures' carousel.

Here are some new features of the VERCE website second version:

- Newsletter subscription
- Interactive map of the partner's
- Follow us section (on social media: Linkedin, Youtube)
- Breadcrumb navigation

VERCE - Virtual Earthquake and seismology Research Community in Europe e-science environment

VERCE

SEVENTH FRAMEWORK PROGRAMME

Partners restricted area

Home About VERCE Events Training Public Dissemination Repository

Pronunciation **verce**

Project number 283543

Call (part) identifier FP7-INFRASTRUCTURES-2011-2

Funding scheme Combination of CP & CSA

Start date 01/10/2011

Duration 48 months

ID Card

Earthquake and seismology research addresses fundamental problems in understanding the Earth's internal wave sources and properties, thereby aiding society in the management of natural hazards, energy resources, environmental changes, and national security.

VERCE is supporting this effort by developing a **data-intensive e-science environment** to enable innovative data analysis and data modelling methods that fully exploit the increasing wealth of open data generated by the observational and monitoring systems of the global seismology community.

VERCE's strategy is to build upon a **service-oriented architecture** and a data-intensive platform delivering services, workflow tools, and software as a service, and to integrate the distributed European public data and computing infrastructures (GRID, HPC and CLOUD) with private resources and the European integrated data archives of the seismology community.

VERCE is a major contribution to the e-science environment of the European Plate Observing System **EPoS**, the ESFRI initiative of the solid Earth community. VERCE is in synergy with the European Infrastructures (PRACE and EGI), and a number of European projects of the seismology and IT communities.

Latest News

Nov 2012: [Tutorials](#)

Oct 2012: [Subscribe](#) to receive the first issue of the VERCE newsletter, [get the first issue](#)

Oct 2012: [Draft deliverables](#) of the midterm second reporting period

www.verce.eu - Last modification: 19/04/13 - [Site Map](#) [Contact](#)

Figure 1: The VERCE website before revamping

The screenshot shows the VERCE website homepage. At the top left is the VERCE logo. To the right are the logos for the Seventh Framework Programme and the European Union. Below the logos is the text "Virtual Earthquake and seismology Research Community in Europe e-science environment". A navigation menu on the left includes links for Home, Project, Training, Resources, News & events, Follow us, and Sitemap. The main content area features a large word cloud with terms like "VERCE", "data", "community", "users", "earthquake", "analysis", "platform", "computing", "modelling", "scientific", "applications", "tools", "natural", "hazards", "wave", "society", "architecture", "GRID", "global", "resources", "integrated", "e-science", "sources", "HPC", "access", "training", "monitoring", "data-intensive", "support", "Earth", "services", "environment", "virtual", "software", "distributed", "innovative", "structures", "service-oriented", "systems", "infrastructure", "Europe". Below the word cloud is a "Project info" section with links to "VERCE Fact Sheet", "VERCE Newsletter Summer 2013", "VERCE Newsletter Autumn 2012", and "VERCE article International Innovation". A paragraph of text describes the project's goals and strategy. At the bottom, there are social media icons for Twitter, LinkedIn, and YouTube, and a footer with the text "An FP7 Infrastructure Project" and "VERCE is a project co-funded by the European Union under the Seventh Framework Programme Copyright © VERCE 2011-2015 | All rights reserved".

Figure 2: VERCE website after revamping

1.2 Web contents

A tab “Project info” highlights on every page of the website, including of course the homepage, the article and new documents published by VERCE.

A new section was created in this second version of the website: VERCE newsletters are now available in the same page.

We have been adding different elements on VERCE website during the period:

- VERCE Fact Sheet
- VERCE Newsletters
- VERCE article in *International Innovation*: “Fostering Europe’s eScience environment” by Jean-Pierre Vilotte
- Interviews with project partners

VERCE

Fostering Europe's eScience environment

Driven by the needs of earthquake and seismology data-intensive applications, a pan-European effort is building a platform for data mining and modelling. Professor Jean-Pierre Vilotte discusses their work

to aid new emerging data-intensive applications of the community?

Driven by the needs of data-intensive applications in data analysis and modelling, VERCE's strategy aims to provide a comprehensive service-oriented architecture and framework adapted to the scale and diversity of those innovative applications and integrating the community data infrastructure with Grid, High-Performance Computing (HPC) and Cloud infrastructures.

Currently, VERCE is enabling a set of pilot data analysis and modelling applications within the Dispel data-intensive workflow environment, relying in particular on OGSA-DAI and other Grid services. The Dispel language is chosen for three main reasons: firstly, it is data flow-based for multi-site enactment; secondly, it has functions to describe work patterns; and finally, it is designed for human communication and to avoid details that inhibit automated mapping and optimisation.

Why is the Virtual Earthquake and Seismology Research Community in Europe eScience environment (VERCE) so important for improving our understanding of earthquakes and seismology?

The nature of earthquake and seismology science is changing – new discoveries and new monitoring methods will emerge from statistical analysis of large amounts of complex data continuously transmitted by increasingly dense global and regional seismology and high-rate GPS networks. Today, our ability to acquire datasets outpaces our ability to manage, explore and analyse them. Data-intensive research challenges conventional methodology and requires a new and holistic approach. VERCE will develop a user-centric, data-intensive eScience environment specifically designed to enable data analysis and modelling tasks that are simply not possible today.

VERCE's objective is to provide a DataScope instrument of unprecedented capabilities, built upon a service-oriented architecture, and providing a set of work and data flow tools and services that allow efficient use of the European computer and data infrastructures together with the distributed seismology archives infrastructure.

Could you elaborate on some of the tools that VERCE has established?

Can you offer a brief summary of the concept of grid integration?

Grid integration, especially for data movement, is very important for VERCE. Greater support for GridFTP for reliable file movement has been integrated into OGSA-DAI in accordance with the specifications of the Globus project. Collaboration with the EUDAT project investigates the use of data management systems such as IRODS.

In order to promote uptake of any platform, ObsPy integration allows researchers to easily continue using the languages, tools and libraries with which they already work. Finally, a close collaboration with the ERC project WHISPER (see p17) focuses on enabling its data-intensive analysis library within the Dispel environment allowing enactment on Grid and HPC infrastructures.

How are you testing early prototypes?

A data-intensive seismic cross-correlation and an HPC waveform modelling use cases were put together in order to assess the prototype platform and identify early requirements in terms of data handling, data movement, and distributed process execution. A test case was trialled on the Edinburgh Data Intensive Machine (EDIM) a data-brick computer cluster operated by the University of Edinburgh. The Seismic Data Explorer (SDX) application – developed at Liverpool University, initially as part of the RapidSeis project – is a tool for seismic waveform analysis and has been further refined within VERCE.

Are you collaborating with any other countries or partners to meet your project requirements?

The VERCE project was launched in early October 2011 in Paris. It is composed of 10 European partners, all of whom have a specific added value, ranging from seismology to informatics research, to help achieve our objectives. Those partners will be working in close collaboration to complete this ambitious project during the next four years. Each of the partners brings important expertise to VERCE, and a number of them are leading contributions to the European Grid (EGI), HPC (PRAISE) infrastructures, and international seismology data.

VERCE takes advantage of the invisibility and established network to disseminate major news, events or promotional contents. The project has strategic synergies and collaborations with a number of related European projects in seismology: the ERC projects WHISPER and WAVETOMO; the ITN project QUEST; the research infrastructures projects NERIA, SHAR E and REAKT.

Through KNMI-ORFEUS and EMSC – the two seismological European NPOs of the consortium – VERCE has collaborations with other international NPOs in seismology like IRIS and Earthscope in the US; JAMSTEC and NIED in Japan. VERCE is also collaborating with large-scale European data infrastructure projects such as EUDAT, and with the European data and computing infrastructures: EGI and PRAISE. Through EPoS, VERCE is involved in bilateral collaborations with the US National Science Foundation by way of the new COPEUS and i-CORDI initiatives.

22 INTERNATIONAL INNOVATION

Figure 3: VERCE “International Innovation” article on the website

1.3 Metrics

Joomla provides basics metrics. In order to improve its data by a mainstream software, we added Google Analytics in the website to be able to analyze the users behaviors.

The following metrics are registered for the period going from April 1st 2013 until September 2013.

Country	Percentage of visits
Germany	29.47%

France	9.47%
Italy	7.89%
Netherlands	7.37%
United Kingdom	5.79%
United States	4.74%
Romania	3.68%
Spain	3.16%
Greece	2.63%
Russia	2.63%

Table 1: Countries visitors' (10 first)

Page name	Visits
Home	21632
Introduction	1624
News & events	1577
Resources	1124
Training	1089
Follow us	920
Deliverables	919
Project partners	691
Structure	530
Objectives	523
Simulations	519

Background	518
Applications software & libraries	493
Knowledge Base	493
Partners' interviews	488
Newsletters	479
Related projects	457
Leaflet & promotional materials	456
Tutorials	441
Glossaries	365
Partners' social networks	315
IT coordination meeting	228
TOTAL	36767

Table 2: viewed pages

Channel	Percentage of the total
Direct	44.33%
Referral	27.32%
Organic Search	23.20%
Social	5.15%

Table 3: Referrals

NB: according to the Google settings and policy, keywords data and downloads data for the VERCE website cannot be provided anymore.

Regarding the metrics we have, we can say that VERCE website has been mostly viewed by Europeans users, the Germans now exceeding the French people on the site (compared to the previous period).

The most viewed page (except the homepage) is the presentation of the project. This fact has to be related to the data from the partial ones we get from Bing search engine (Google is the most used search engine over the world but it doesn't provide anymore information about keywords): Verce is the most searched keyword entered by our visitors and this shows that the project name is pretty well identified

Compared to the previous period, social media are now in the metrics about referrals. This results from our special effort towards social media. The most effective websites which bring traffic to VERCE confirms how important the links between partners in EU projects are.

3 Social networks

3.1 Facebook, Twitter and Google+

Facebook, Twitter and Google+ are used for a large audience who shares information about seismology.

After a survey made during the first six months of the project gathered all partners' social networks, the digital strategy on social media for VERCE consists to use partners' social network to spread the messages through the web.

The partners that use social networks are the following:

- UEDIN for Twitter and Facebook.¹ The posts are also put on their Data-Intensive Research Group website and emailed to several relevant mailing lists: their own School of Informatics mailing list, a Data-Intensive Participants list, an e-Science list and an HPC related mailing list.
- Fraunhofer SCAI for Twitter and Facebook²
- EMSC for Twitter, Facebook and Google+³

As of today and for the period, the following posts were published:

1/ VERCE project - for Virtual Earthquake & seismology Research Community in Europe e-science environment is funded by the European Commission. The project started October 1, 2011 and will last 4 years. Ten European partners from IT and scientific communities work together to deliver a data-intensive e-science environment built upon a service-oriented architecture and a platform of services and tools integrating the seismological European data archives with the public HPC, Grid and Cloud infrastructures and private seismological computing and data resources. Learn more about VERCE objectives on the website: <http://www.verce.eu>

2/ Interested in computational seismology? Have a look to EC-project VERCE Newsletter: data and CPU intensive applications <http://verce.eu/index.php/news-events/newsletters>

3/ EU project - VERCE project - View partners' interviews and watch them talk about teamwork, seismology and IT involvement within the project <http://verce.eu/index.php/project/partners-interviews>

¹ <http://www.facebook.com/UniversityOfEdinburgh>
<http://twitter.com/uniofedinburgh>

² <http://www.facebook.com/fraunhofer.scai>
http://twitter.com/#!/fraunhofer_scai/

³ <https://twitter.com/lastquake>
<http://www.facebook.com/EMSC.CSEM>
<https://plus.google.com/110355370165808827925#110355370165808827925/posts>

4/ EU PROJECT - VERCE project - View the video introduction of the project that EMSC realized <http://verce.eu/index.php/project> Interview of the coordinator, JP Vilotte, from Institut du Globe de Paris

5/ EU project - Please discover VERCE project first newsletter and learn more about the virtual Earthquake and seismology Research Community seismology in Europe e-science environment <http://www.verce.eu/Repository/Newsletters/VerceNewsletter1.pdf>

During the period, through this social medias, the VERCE messages reached 8 490 people (according to the metrics provided by Facebook, Twitter and Google+)



Figure 4: Facebook sample post for VERCE



Figure 5: Google+ sample post for VERCE

3.2 LinkedIn

LinkedIn is used by VERCE for discussion, exchange, and dissemination within a professional and scientific community as well as with other stakeholders.

LinkedIn is the world's largest professional network and the scientific community has greatly expanded the last 3 years. This network is now one of the major social media where people are not only connected in a passive way but also a place where people publish, increase their social influence and educate each other.

We thought our LinkedIn page as an interactive extension of the VERCE website with an overview of the project and we fill it with status updates: VERCE Youtube videos, news and publications.

At the opening, we invited partners to connect to our page and we are currently building the community.

The LinkedIn VERCE page is promoted on our website and our Youtube Channel.

Our next steps in our LinkedIn strategy are to:

- Increase actively our network
- Post regularly in our feed
- Optimize with keywords the profile page to be easily found by the seismologist community
- Ask for recommendations

The screenshot shows the LinkedIn profile for the VERCE PROJECT. The profile header includes the LinkedIn logo, a search bar, and navigation links. The main content area features the VERCE PROJECT profile, which describes it as a 'Virtual Earthquake & seismology Research Community in Europe e-science environment' based in Paris, France. It lists 'Current' members as CNRS and shows 52 connections. Below the profile is an 'Activity' section with a post from the VERCE PROJECT about a newsletter. The right sidebar contains 'People You May Know' (featuring Atanas Atanasov), 'ADS YOU MAY BE INTERESTED IN' (with links to travel awards, DF&TT 2014, and business in India), and 'Who's Viewed Your Profile' (showing 11 views in the past 90 days).

Figure 6: VERCE LinkedIn page

3.3 Youtube Channel

YouTube is the most popular video-sharing social media site. More than 4 billions videos are viewed a day, and YouTube has more than 800 million unique visitors each month.

The content marketing strategy of VERCE on Youtube is based on educational videos. The Youtube channel started in March 2013 with three first 3D INGV animations, showing simulated ground motion for 2012 MI 5 Mormanno Earthquake.

To get more engagement, VERCE had to introduce people involved in the project to embody it. This has been done by:

- A 7'30" video interview of Jean-Pierre Vilotte about:
 - Background of VERCE project (illustrated by charts)
 - Collaboration with different partners
 - Important challenge within VERCE
 - Expectations of the project

- 4 other interviews:
 - Frank Anton explains what LZR does within VERCE (1'44").
 - Torild Van Eck, ORFEUS, explains how teamwork is essential within VERCE (1'20") and the ORFEUS interest within VERCE (1'37").
 - Heiner Igel, LMU, explains the added value of VERCE project for seismologists (2'16").

During the period, the Youtube Channel has been customized by the VERCE graphic materials and is linked to the VERCE website and the Linkedin page. A brief overview of the project has been added.

The Youtube channel has got 408 views. The users spent 369 minutes viewing VERCE videos coming from 44 countries. The top 5 countries are:

- France
- Germany
- Italy
- United States
- Netherlands

The majority of the users viewed the videos embedded in the new VERCE website and through the IPGP website.

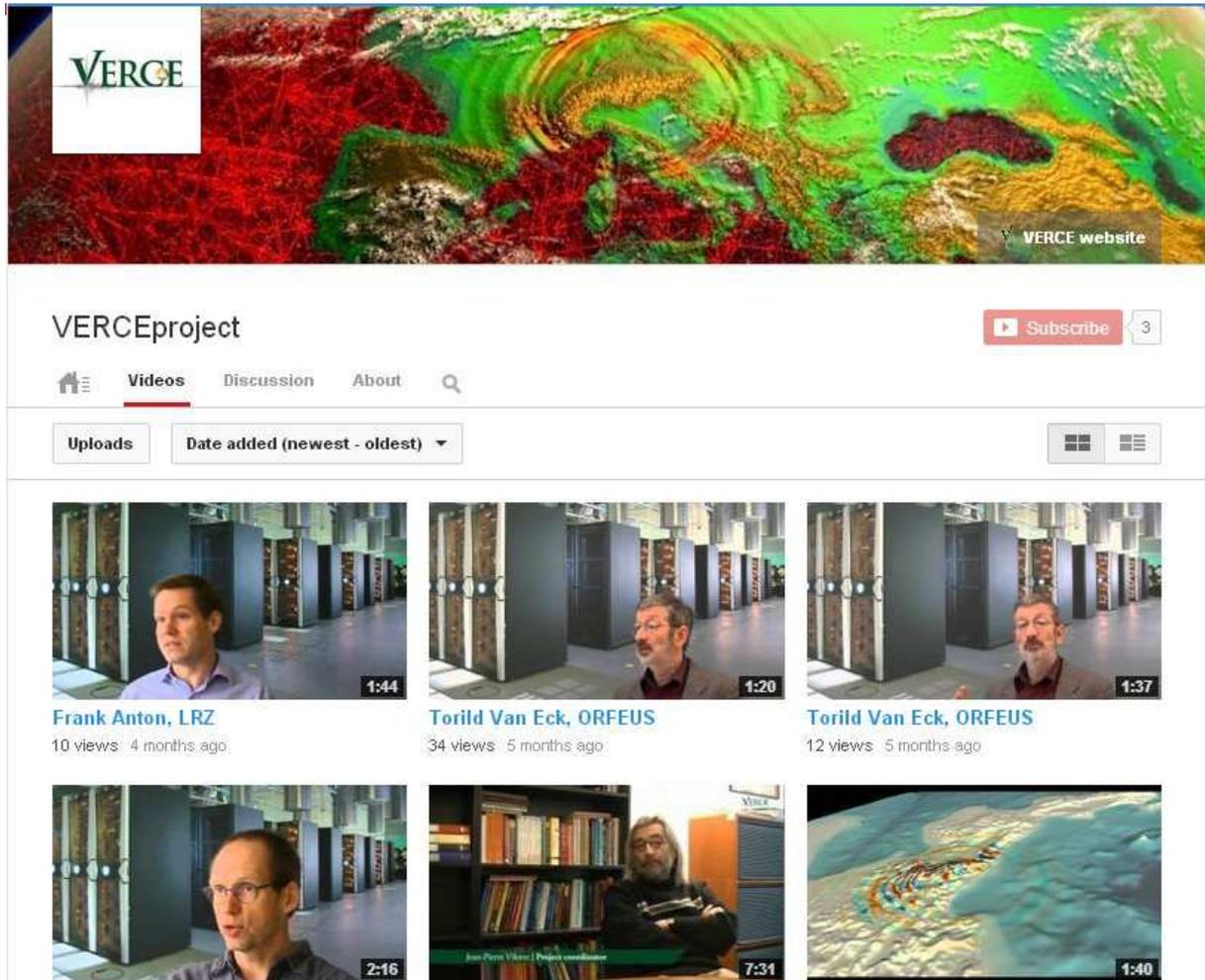


Figure 7: VERCE Youtube Channel

4 VERCE newsletters

We planned to issue the second edition of VERCE newsletter during the month of September.

The audience of this newsletter is the following:

- VERCE Partners
- Seismological/scientific community
- Industry actors via VERCE partners or on request
- Non-specialist public on request

The newsletter was published:

- via EMSC networks within the seismological community (email list)
- on the website
- on social networks (link to PDF)
- to any person who registered to receive it

Next edition is planned on April 2014.

Every issue of the newsletter is published on the website in the “Newsletters” section and archived in the “Repository” section of the Redmine of the project.

4.1 Editorial board

All partners are encouraged to contribute to the newsletter by giving information on: project progress, special focus within their framework, news, events and illustrations. However, in order to control the content that goes public, and to select thematics and suggest authors, we set up an editorial board that will:

- Suggest topics of articles and possible authors and inform the Steering Committee;
- Coordinate the drafting of articles and collecting of images and make sure all articles are handed in on time;
- Identify Reviewers;
- Control the content of the newsletter before it goes public;
- Present the final newsletter version to the Steering Committee for approval.

We have a diverse editorial board, composed of different experts in IT, seismology and communications:

- Jean-Pierre Vilotte (IPGP)
- Malcolm Atkinson or Michelle Galea (UEDIN)
- Torild van Eck (ORFEUS)
- Alberto Michelini (INGV)
- Caroline-Etivant Dernoncour (EMSC)
- Silvia Filosa (responsible for EPOS newsletter)

4.2 Editorial guidelines

We have set up specific editorial guidelines so that VERCE newsletter structure is validated and changes have to be approved by the editorial board. Articles should talk about:

- VERCE progresses, achievements
- Related fields of VERCE expertise: seismology, Earth Sciences and IT
- Other EU related projects connected to VERCE.

We decided that articles should not be too long and complex and show illustrations, not only because they are aimed at a wider public (from scientists to general public), but also because VERCE is already a complex project that at this stage needs to be better explained.

A procedure has also been set up to call for articles:

1/ Editorial board defines topics / authors / reviewers and informs the Steering Committee.

2/ Mail are sent to authors for their approval, with the following instructions:

- Topic of article
- Requested number of words
- 1 picture in high quality with one caption to illustrate article
- Authors: Deadline for submission
- Reviewers: Deadline for review

3/ Steering Committee approves, either during a meeting or via email.

The articles' topics we have published for the last release were:

- Lead story: DISPEL: describing VERCE's data centric workflows – Dr. Amrey Krause, Applications Consultant (at EPCC, The University of Edinburgh).
- 1 article on First VERCE training in Liverpool - Andreas Rietbrock, University of Liverpool.
- 1 article on Collaboration with another EU project - Michel Campillo, Université de Grenoble, WHISPER and Jean-Pierre Vilotte, Institut de Physique du Globe de Paris, VERCE coordinator.
- 2 experts' testimonies on the added value of VERCE in their related field: Malcolm Atkinson, University of Edinburgh, IT Architect and Massimo Cocco, Istituto Nazionale di Geofisica e Vulcanologia.

4.3 Graphics

The last VERCE newsletter is the following:

VERCE Newsletter
Virtual Earthquake & seismology Research Community in Europe e-science environment

Summer 2013 • Issue 2

NEWS & ANNOUNCEMENTS

- VERCE article in *International innovation*, is available at: <http://www.verce.eu/index.php/resources/international-innovation.pdf>
- VERCE deliverables of the midterm second reporting period are available at: <http://www.verce.eu/index.php/resources/deliverables>
- EPOS latest Newsletter is available at: <http://www.epos-eu.org/newsletter/>
- The European Super-sites Coordination Workshop was held in Brussels on June 10-11 2013.
- Book on data-intensive strategies for all disciplines including the geophysical sciences just published: M. P. Atkinson et al., *The DATA Bonanza: Improving Knowledge Discovery in Science, Engineering, and Business*, John Wiley & Sons Inc., 2013, p. 580

DISPEL: describing VERCE's data centric workflows

Dr. Amrey Krause,
Applications Consultant (at EPCC, The University of Edinburgh)

VERCE is addressing the challenges of data-intensive distributed workflows for the seismology community. Data-intensive use cases in VERCE are defined as a network of datastreams which are distributed across a number of private and public infrastructures. A typical scenario might combine compute-intensive simulations on HPC resources with the pre- or post-processing of large data volumes on dedicated data-intensive computing infrastructures. The orchestration of distributed workflows presents the seismology community with challenges in many areas, for example security, accounting and data transfer, which VERCE will address by using European data and computing infrastructures such as EUDAT and PRACE. Data flows are defined in a domain specific language, DISPEL, that creates an abstract representation of data stream-based applications at a high level. Through a separation of concerns, DISPEL offers flexibility for the enactment of a dataflow graph. An enactment gateway validates and optimises a DISPEL data flow and manages the orchestration across a number of execution engines. The abstract level of DISPEL allows the selection of appropriate execution engines, such as submitting jobs to HPC or Cloud environments, testing on a local cluster or a data intensive computing facility, so shielding the user from low level details.

Separation of concerns through DISPEL

Experts Opinion

Malcolm Atkinson
University of Edinburgh, IT Architect

The challenge for an IT architect is to deliver computational power that will enable substantial advances in seismology on an affordable and sustainable technological platform. Seismologists need access to data in their institutions, from their monitoring networks and from their archives. They need to interconnect two patterns of computation: the data-intensive processes where the speed of handling data is the limiting factor, and finite-element models of the physics of earthquakes and wave propagation. This requires new methods of working and new software infrastructure to create and steer compositions that cross the divide between

European grid and HPC infrastructures. To make this affordable and sustainable, we depend on alliances with EGI, PRACE, EUDAT, SCI-BUS and ER-Flow and on fast reliable digital interconnection from the big computational centres and the seismology archives to the institutional clusters and researchers' mobile computers. For new science to flood from the VERCE computational "building" it needs a balance of familiarity and innovation, coherence in the presentation of its many facilities, consistency with the evolving neighbouring sciences and a stimulating ethos. Not a lot to ask of its builders and designers!

Massimo Cocco
Istituto Nazionale di Geofisica e Vulcanologia

The European Plate Observing System (EPOS) represents a scientific vision and an IT approach in which innovative multidisciplinary research is made possible for a better understanding of the physical processes controlling earthquakes, volcanic eruptions, unrest episodes and tsunamis as well as those driving tectonics and Earth surface dynamics. EPOS has a long-term plan to facilitate integrated use of data, models and facilities from existing (but also new) distributed research infrastructures for solid Earth science. One primary purpose of EPOS is to take full advantage of the new e-science opportunities becoming available. The aim is to obtain an efficient and comprehensive multidisciplinary research platform for the Earth sciences in Europe. This of course will include the availability of computational resources and IT platforms for data massive applications.

Project coordinator: J.-R. Vilotte (IPGP-CNRS) | Project manager: A. Busch (CNRS)
Director: J. Dixon (IPGP) S. Vlahavasoulis (EMSC) | Contact: info@verce.eu

<http://www.verce.eu>

Figure 8: VERCE Newsletter (1)



VERCE Newsletter

Virtual Earthquake & seismology Research Community in Europe e-science environment

Summer 2013 • Issue 2

First VERCE training in Liverpool

Andreas Rietbrock
University of Liverpool

A first internal training workshop was organised at Liverpool University on 3-4 September 2012. The motives of this workshop were to get the two communities of ICT and seismology nearer, to make experts and researchers of the above two fields better understand each other needs, and to allow better progress towards project goals. The target group was focused to be project members from the seismological and IT groups working on the VERCE project. The workshop was organised in two parts: presentations and hands-on sessions. Seismology introduction, Use-cases of seismology, data-intensive processes and technologies, for example DISPEL and technical introduction of GridFTP, iRODS and Unicare were presented to give relevant background information. The exercises, access to HPC resources and usage of DIS-

PEL were provided in hands-on sessions. 27 participants attended this workshop. Selected presentations are available from link of <http://www.verce.eu/index.php/training/tutorials>, but all workshop presentations and hands-on materials had been uploaded in the Redmine Wiki.



Collaboration with another EU project

Michel Campillo & **Jean-Pierre Vilotte**
Université de Grenoble, WHISPER & *Institut de Physique du Globe de Paris, VERCE*

WHISPER is a 4-year project supported by an Advanced Grant of the European research council (whisper.obs.jf-grenoble.fr). WHISPER focuses on the use of the seismic ambient noise to monitor slight changes of properties in the solid Earth. Our passive approach that uses the waves mainly produced by the oceanic swell and not by sophisticated artificial sources, can be applied repeatedly for long periods of time to monitor the evolution of the rocks at depth. We develop new tools to interpret the changes in seismic data in term of spatial-temporal variations of the rocks properties at depth with the objective of understanding natural phenomena associated with dangerous hazards. For example, we found signals that precede volcanic eruptions or landslides and studied the changes that accompany the earthquakes. The developments in WHISPER rely on the processing and analysis of massive data sets. The new observation networks in seismology can reach several hundreds of sensors recording continuously the 3 directions of ground motions. This results in millions of correlations functions every day that contain a wealth of information on the structure of the Earth and its temporal evolution. When dealing with such large data set, computational time and data management become a major difficulty and we devoted our efforts to make possible to handle present day large data sets. With a distributed storage (iRODS) and a grid of clusters, both provided by the Ciment Project at University of Grenoble, the codes of the WHISPER suite succeeded in handling and processing large data sets (~100 TBs), such as several year of continuous recording –

before and after the great Tohoku earthquake (Mw 9.1, 2011, North East Japan) – of the NIED Hi-net network in Japan. The VERCE initiative will provide the e-science environment that is critically needed for the new scientific and data-intensive computing challenges of WHISPER, and that will leverage those new research methodologies for the seismology research community. Today WHISPER and VERCE are actively collaborating toward an innovative data-intensive e-science environment in support for these data-intensive applications that consist of multiple phases where data acquisition interleaves with data processing and analysis, generating highly parallel and asynchronous data workflows together with massively parallel data access. In particular, VERCE will provide efficient scalable and transparent distributed data storage, data management and data transfer services, together with stream-oriented execution models that enables overlapping data processing and analysis computation with I/O operations, in support for high throughput under heavy asynchronous versioning-based access to data. The collaboration between WHISPER and VERCE will provide a new data-intensive research paradigm allowing extraction of new scientific information from the rapidly wealth of data – continuous time-series – provided by the dense observation and monitoring networks of the seismology community, with important implications to added societal applications, such as seismic hazard and risk assessment and monitoring, and seismic exploration and exploitation of energy resources.




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<http://www.verce.eu>

Figure 9: VERCE Newsletter (2)

5 Events

Lately, VERCE has been presented during:

- 27-28 February 2013, Cloudscape V – Brussels, Belgium – Poster Session by Iraklis A. Klampanos, Jean-Pierre Vilotte, Michelle Galea, Amrey Krause, Paul Martin, Alessandro Spinuso, Luca Trani, Malcolm Atkinson “*Towards Supporting Service-oriented Seismology Research in Europe*”.
- 8-12 April 2013, EGCIF132-OMB – Manchester, United Kingdom – 2 presentations by Mario David, David Weissenbach, Jean-Pierre Vilotte, Genevieve Moguilny, André Gemünd, Horst Schwichtenberg, Iraklis Klampanos (IPGP/CNRS, SCAI, UEDIN): “*Data management across multiple infrastructures: the VERCE use case*” and “*Workflows by the VERCE project for Earthquake and Seismology Research*”.
- 19-25 May 2013, 4th QUEST Workshop – Benodet, France – Presentation by Heiner Igel, Marek Simon (LMU Munich): “*VERCE: Virtual Earthquake and Seismology Research Community in Europe e-science environment*”. Poster Session by Marek Simon.
- 18 June 2013 - UNICORE Summit 2013 – Leipzig, Germany – Presentation by Michele Carpené (Cineca), “*Combining HPC with Data-Intensive Research via UNICORE for Seismological Applications*”.
- 19 September 2013, Globus Europe 2013 – Madrid, Spain – Presentation by Siew Hoon Leong (Cerulean): “*VERCE and Europe e-science environment*”.

6 VERCE posters

Here it is an overview of the posters produced and presented during the period.

Towards Supporting Service-Oriented Seismology Research in Europe **VERCE**

Iraklis A. Klampanos, Jean-Pierre Vilotte, Michelle Galea, Amrey Krause, Paul Martin, Alessandro Spinuso, Luca Trani, Malcolm Atkinson

Core components

- Workflow language
- Registry
- Enactment-Execution
- Science Gateway

Overview

Modern seismologists are presented with increasing amounts of data that may help them better understand the Earth's structure and systems. However:

- they have to access these data from globally distributed sites via different transfer protocols and security mechanisms;
- to analyse these data they need to access remote powerful computing facilities;
- their experiments result in yet more data that need to be shared with scientific communities around the world.

In the vast majority of cases, the labourious tasks of data management, transfer and execution of scientific codes is handled manually by the scientist and on an ad hoc basis. This hinders seismologists from making full use of the data and tools they have at their disposal for scientific discovery.

The VERCE project is designing and developing a research platform to deliver a seismology and earthquake community e-infrastructure, an integrated computational and data environment that presents a coherent virtual environment in which to conduct research.

- VERCE Platform -

Services Integration Layer

- Scientific Catalogues
- Data and metadata Stores
- Computing Resources

Science Gateway

User

VERCE-wide Registry of components, Provenance

Symphony: EUOAT, PRACE, EGI, SO-BUS, etc.

Globus, UNICORE, OGSA-DAI, SAGA, etc.

Project 283543 - FP7-INFRASTRUCTURES-2011-2

Partners:

Figure 10: Sample Poster (1)



Visit our website at www.verce.eu



FP7 Infrastructure project
(2011-2015)

Virtual Earthquake & seismology Research Community in Europe e-science environment

ABOUT THE PROJECT

- Earthquake and seismology research addresses both fundamental problems in understanding the Earth's internal wave sources and properties, and augment applications to societal concerns about natural hazards, energy resources, environmental changes, and national security.
- VERCE aims at developing a **data-intensive e-science environment** to enable innovative data analysis and data modelling methods that can fully exploit the increasing wealth of open data generated by the observational and monitoring systems of the seismology community around the world, and guarantee optimal operation and design of these high-cost systems.

- The strategy of VERCE is built upon a **service-oriented architecture** and a data-intensive platform delivering services, workflow tools, and software as a service, and integrating the distributed European public data and computing infrastructures (GRID, HPC and CLOUD) with private resources and the European integrated data archives of the seismology community.

VERCE is a major contribution to the e-science environment of the European Plate Observing System (EPOS), the ESFRI initiative of the solid Earth community.

INTERNATIONAL ASPECT



- **Strategic synergies with related European projects in seismology:** the ERC projects WHISPER, WAVETOMO; the ITN project QUEST; the research infrastructures projects NERA, SHARE, REAKT.
- Through **KNMI-ORFEUS & EMSC**—the 2 seismological European NPOs in seismology like **IRIS, Earthscope** in the US; **JAMSTEC** and **NIED** in Japan.
- **With European multi-disciplinary infrastructure projects** such as EUDAT and ENVRI, and with the European data and computing infrastructures: EGI and PRACE.
- Through **EPOS**, VERCE is involved in bilateral collaborations with the US National Science Foundation through the new COPEUS and i-CORDI initiatives.



The VERCE project is a large scale international study that shall be implemented by a consortium embracing 10 partnering teams from 5 EU countries.

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J.-P. Villette (IPGP)

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Figure 11: Sample Poster (2)

7 Conclusion and perspectives

The activities collected in this report have showed dissemination and collaboration efforts with the aim to promote objectives, ongoing activities and results of the VERCE project.

The main achievements for this period are:

- the deployment of the revamped/redesigned website with a new metric system;
- the start of the VERCE LinkedIn page;
- the re-branded Youtube channel;
- the last issue of the newsletter;
- the spread of the VERCE messages on social media.

Next steps are:

- the active and regular update of the website;
- the LinkedIn page improvement by building an larger community;
- the next issue for the newsletter;
- a detailed analysis of the website metrics to improve contents and social media presence.