

**EGI-Engage**

Technical design of the Disaster Mitigation Competence Centre Simulation Web Portal Services

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Abstract

The DMCC simulation Web Portal provide simulation services on tsunami and weather events. The web portal services take advantages of the integration of e-Infrastructure and event models so that users could enjoy high performance simulation for their studies, experiments, and analysis.

This document details the technical design of DMCC simulation Web Portal that and introduce new features in order to satisfy emerging user requirements.

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**TERMINOLOGY**

A complete project glossary is provided at the following page: <http://www.egi.eu/about/glossary/>

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# 1. Introduction

Disaster Mitigation Competence Centre (DMCC) Web Portal Service provides simulation services over the e-Infrastructure. Web portal is made by integration of core simulation tools such as COnell Multi-Grid Coupled Tsunami (COMCOT) model and Weather Research and Forecasting (WRF) model, with the EGI e-Infrastructure.

DMCC is designed to achieve early warning system for target disasters by deeper understanding of disasters with e-Science approach. By collaboration of science groups, e-Infrastructure providers and application supports, DMCC aims to provide accurate models and high performance simulation for disaster event analysis and reduce losses. The high-level collaboration model and objectives of DMCC are depicted as Figure 1.

Figure 1. DMCC Collaboration Framework and Objectives

Based on better scientific models validated by historical events and observation data, faster simulation over the e-Infrastructure could earn more time for potential impacts estimation and quick response. Innovative model is devised by combining atmospheric model and ocean model and higher resolution observation data of the whole life span of a disaster. Web portal is the best way to share the core tools of DMCC and to facilitate engagement of wider communities.

We live on a dynamic planet however our knowledge to the earth is very little. By e-Science approach, DMCC is not just developing innovative models based on recent knowledge about earth and environmental science and more detailed observation data, but also providing faster event simulations to understand potential impacts. Web portal services come from the core tools of DMCC and aim to disseminate the DMCC outcomes and the e-Science values.

This document describes the design of DMCC Web Portal Services, to support both the innovative model design and disaster analysis, and the applications of wider disaster mitigation community users. The next Section will describe the Web Portal Service architecture and process. In Section 3, Roadmap of DMCC Web Portal development will be illustrated.

# 2. Architecture of the DMCC Web Portal Services

During the EGI-Engage project period, DMCC web portal services are providing simulation tools for most of the case studies which are the tools for tsunami whole lifecycle and weather forecasting respectively. Basic DMCC Web Portal Services Architecture are depicted as Figure 2.

Figure 2. Basic DMCC Web Portal Service Architecture

The two portals were in continuous development since 2010 which are based on responsive web design principles and developed by javascript and cascading style sheets (CSS). Simulation software package is mainly recommended by the science group. Once it is determined, integration with the distributed e-Infrastructure and the recommended workflow will be implemented. Followed will be performance improvement investigation such as parallelisation and optimization. Web user interface then simplifies the workflow and user interactions.

Typically, involved Grid middleware components are the gLite UI, Workload Management System (gLite WMS), Computing Element (CE), Storage Element (SE) and GridFTP. Asia Pacific regional e-Infrastructure composed by Asia Pacific Grid Initiative partners are the primary resources for the portals at first. To keep a consistent environment in all available resources for the DMCC applications, CVMFS is used for a reliable software distribution services maintained by ASGC. This is one of the core components of the release process which will be described in detail in next Section 2.2. In the second project year, glide-submit and condor will be the new workload management mechanism of the regional e-Infrastructure supporting DMCC applications.

Because of different needs from different user communities in the beginning, iCOMCOT is opening to research community and education purposes by username and password. However, gWRF is providing to APGI partners by IGTF user certificate and EUAsia VO. Strategically, to make the portal services scalable to EGI, DMCC Web Portals will incorporate EGI AAI solutions in the next stage to implement a common authentication mode across organizations. From users feedback, certificate-based authentication mechanism is still too complicated for most users. Apart from integrating with existing institute identity management mechanism, multimodal authentication methods will be provided for various user groups in the future. EGI new AAI development (such as AARC) will be deployed in future release.

# 3. Processes

Requirement gathering process; Release Process; Validation Process

case study/requirement collection/process validation

DMCC Web Portal Services keep improving according to users experiences, more case studies and new collaborations. In order to guarantee the quality of Web Portal Services, DMCC manages the changes, release, and requirement gathering according to EGI instructions for production tools team[[1]](#footnote-1).

## 3..1 Requirement Gathering Process

First release of the two Web Portals provide basic simulation functions with simplified and geographical user interface supported interfaces according to suggestions from science group. From more case studies, collaborations and dissemination events, DMCC keeps collecting user requirements to improve the services. As iCOMCOT is also used for education, comments from teachers and students have helped to correct some mistakes and to make the workflow easier. Currently, email contact is the primary online channel to anticipate user feedback to the Web Portal services.

The Web Portal Expert Group formed by representatives from the scientists, application support group, e-Infrastructure provider group and dissemination group will investigate the collected requirements and determine the priority of development.

## 3.2 Release Management and Process

According to the user requirements with identified priorities, DMCC Web Portal Services production team will review the development plan every month and confirm the release plan for the next 6 months. The release plan is finalised with approval of the Web Portal Expert Group.

From development, test, pre-production and final release, the whole delivery pipeline are supported by Jenkins. Testbed is the last platform for the production team to validate if the new version could be move to pre-production. Well verified case studies are used at the pre-production platform to verify the version for next release. Production release is distributed by CVMFS to ensure the platform consistency at all e-Infrastructure resources. Savane[[2]](#footnote-2) is used internally for issue tracking on bugs, tasks, and team member management etc. during the development and release process.

# 4. Roadmap

Below is the summary of current roadmap of DMCC Web Portal Services.

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| Task | Goals | Expected Release Schedule | Remarks |
| EGI AAI Integration | flexible, multimodal and simples but secure authentication and authorization mechanism | March 2017 | Federated identity management with user institutes; Level of Assurance capability; Ref. to AARC outcomes; |
| Event Database Buildup | Compile event data with Web Portal for users reference | March 2017 | started from target case studies; will provide interface for users input; together with event data under data access policy; |
| Accounting Service | Provide detailed resource utilisation statistics with views of user, resource, etc. | March 2017 | Will make use of EGI Accounting Portal first; |
| API | Providing Restful APIs | March 2017 | Support flexible usage of DMCC services and easy integration with user existing applications |

1. <https://wiki.edi.eu/wiki/Instructions_for_Production_Tools_teams> [↑](#footnote-ref-1)
2. <https://gna.org/projects/savane> [↑](#footnote-ref-2)