

HiPOP Design

1. Introduction

The goal of the HiPOP portal is to grow into a useful and resourceful tool for the worldwide Computational Science and Engineering (CS&E) and High Performance Computing (HPC) community.

The goal is to foster communication among researchers, educators and students in simulation sciences as well as to enable the outreach of computational science activities to the general public.

Furthermore, the purpose of the HiPOP portal is also an educational one for both high school and undergraduate students with the aim for them to appreciate the benefits arising through the use of computing and HPC in the domain of study across several scientific subjects.

1.1 Target audience

The intended target audience of the HiPOP web portal includes anyone wishing to obtain educational information concerning CS&E/HPC. The target audience thus includes students, parents, academics and even school children. Greater emphasis will be given towards high school and undergraduate students.

Students, both in secondary and tertiary education, and parents, may benefit from the portal through an international search for institutions offering degrees in CS&E/HPC related fields.

Academics may also benefit from the portal in various ways. High school teachers may look for ways in which their subject area has been used in CS&E/HPC – so as to stimulate the interest of their students in class. Lecturers in higher education can use the portal to advertise their institution in various ways such as posting information of the CS&E/HPC related degrees offered by their institution and to promote career opportunities.

Furthermore, school children should be able to use the portal to learn more about the wonderful and diverse world of high performance computing and the various fields in the world around us for which it is used. This will be achieved through real-world practical examples that demonstrate the importance of HPC to modern society.

1.2 Purpose

The purpose of the HiPOP web portal is to promote HPC to the general public and to attract young talent to the field. This will be achieved through the web portal that will allow registered users to contribute various forms of material so as to enrich the quality of CS&E-HPC educational material available for the portal's target audience.

1.3 HiPOP Content

The HiPOP community is encouraged to contribute materials including but not limited to HPC events, training and education, CS&E and HPC materials, books, journals, CS&E and HPC internships, fellowships, jobs and career opportunities as well as institutions of higher education and research - which grant academic degrees in a variety of CS&E/HPC related subjects, and related employment opportunities.

Users are welcome to upload training and educational materials (files of various formats) to the website or provide links to training and educational materials that can be found on other external sites.

Furthermore, users are encouraged to contribute to the portal through evaluation of content already in place through suggestions and comments they can post on pages where content can be found.

2. Overall Description

The portal will be developed using Drupal – a popular content management software (CMS) that allows users of the portal to add content dynamically. The reasons why Drupal was chosen include:

- It is open source.
- It has a huge community that provides very good support.
- It has a huge number of modules that can be enabled to further extend the functionality of the web page.
- It is very friendly to programmers. If a module needs to be tailored to the specific needs of the web page, it can be programmed, without having to change the actual code (which often causes bugs) of the module. Also, in the rare case where no module exists for a specific task, custom modules can be written.

- Drupal follows the html standards and uses jQuery that makes the web page (almost) browser independent. This will also be the case for any required custom modules to be developed.

The web portal will be hosted on a Linux server. Linux is an operating system frequently used for servers as it is lightweight, stable and secure. Different permissions will be granted to different server user groups, to ensure that no unauthorised user can gain access or tamper with the web portal.

Two different terms will be used to describe people who visit the portal – users and visitors. This has been done to differentiate between users - people who will have an account on the portal and can contribute material to the site, and visitors - people who do not have accounts (and thus cannot contribute material) but visit the portal site to obtain information. The term guest will refer to both visitors and users henceforth.

For people to become registered users of the portal they should request accounts from the portal administrator. Once this has occurred, by logging into the portal, users will be able to add the following content types to the site:

- Event
 - This will provide the details of various CS&E/HPC related events using a calendar based interface.
- Institution
 - This will provide the details of various higher education institutions that offer CS&E/HPC related degrees and research programs offered by an institution. Such detail could possibly include the location of the institution, a brief description of the degree and a link to the degree webpage where one can obtain more information, internships and computational science research projects.
- Training and Education Material
 - This will be CS&E/HPC related training and education material that users can access or use, or contribute for others to use either as a file which they can upload or through a link to the material which can be found on another website.

It should be noted that the above content will be submitted by registered users. To ensure quality, the content will not appear on the web portal until it has been reviewed and approved for publication by the web portal administrator.

2.1 Use Cases

Different scenarios with different actors of the target audience as users of the HiPOP portal are outlined below:

Use Case 1: A student who has not decided his/her future career decides to consider computational sciences as a possible area of study and consults the HiPOP web portal. The site provides a quick definition and overview of the various aspects of CS&E/HPC. It also provides examples of practical applications of CS&E/HPC in the modern world. Finally, it shows the many career opportunities that are available to someone who studies CS&E/HPC (in the “Jobs” section of the portal described in Section 3).

Use Case 2: A student who has already decided to study some aspect of CS&E/HPC consults the HiPOP web portal. The site provides a list of institutions that offer courses and research programs in CS&E/HPC. The student then filters the list to show only institutions that satisfy his/her criteria (criteria might be subject, type of course, location etc.).

Use Case 3: A student or practitioner of CS&E/HPC needs help and information about some specific topic. By consulting the “Training and Education Material” section of the HiPOP web portal that contains material that can easily be browsed or searched, as well as links to other external site material, they are able to find the information they are looking for.

Use Case 4: A lecturer wants to promote the institution in which they teach along with the CS&E/HPC related courses on offer. By registering to the HiPOP web portal, they are able to upload information with associated metadata that will facilitate browsing and searching by prospective students.

Use Case 5: A high school teacher who wants to learn about the potential of simulation methods in teaching mathematics and the sciences in class, visits the HiPOP web portal to access material to this end. On the portal, the teacher will find various case studies where for various scientific fields simulation has been used in the research of a scientific problem.

Use Case 6: A parent who wants information about possible education/career patterns for giving advice to his/her child with talents/interests in mathematics, physics and/or computing can find all the required information by visiting the HiPOP web portal. There they will find information on the careers that a HPC graduate can follow. In the

“Jobs” section of the portal they will also find the vast array of opportunities that this field of science has.

3. HiPOP Web Portal Design

As the target audience of the HiPOP web portal is so diverse and includes people from the general public, the design of the portal is architected to be user-friendly.

This means that the web portal is designed so that it is easy for both users and visitors to use the site. It should thus be easy for users to contribute content to the portal and it should be easy for visitors to search for and find content on the portal. By the term “easy” we mean that people using the site should find what they are looking for in a logical and accessible location on the website and with as low number of mouse clicks as possible. Furthermore, if any information is requested from guests of the portal (such as search criteria or details of content a user will contribute), then these will not be complex and information guiding the site guest will be readily available.

To achieve the above, it is of the opinion that the overall design of the web portal should be kept as simple as possible.

The following web pages have been identified as those required for the portal:

- Home
- Overview of CS&E/HPC
- Institutions
 - List View
 - Map View
- Events
- Training Material
- Jobs
- Tutoring
 - School Kids
 - School Teachers
 - Prospective Students
 - Undergraduate Students
- Contribute
- About Us
 - The HiPOP Project

- The HiPOP Consortium
 - Contact Us

It should be noted that the main bullet points will constitute elements of the web portal's main menu and that indented bullet points will be sub-elements of a main menu item.

3.1 Web Portal Page Description

A brief description of the pages that are or will be implemented in the HiPOP portal follows.

Page	Description
Home	<p>This will be the homepage of the web portal. It should welcome guests to the portal, describe the objectives of the web portal and what they will be able to achieve using the site.</p> <p>To capture the interest of users, the homepage should be visually attractive, e.g. with CS&E/HPC related simulation pictures displayed.</p>
Overview of CS&E/HPC	<p>This page should provide an overview of CS&E/HPC. It should not be too technical in nature to fend off interest from visitors but should be detailed enough to capture the imagination and interest of potential future users of CS&E/HPC.</p> <p>The page should not be limited to text but can include pictures and possible videos.</p>
Institutions	<p>From this page, visitors will be able to find institutions – which have been contributed by various users, with CS&E/HPC related activities – such as various degrees, one day events, open days or summer schools. From this page, visitors should be able to filter institutions relative to their location, the type of activity or their related subjects (Physics, Chemistry, Biology, Computational Sciences, Other). Using the sub-pages (List View or Map View) associated with this page, visitors can either find institutions in a list of other institutes (List View) or over</p>

	<p>a world map (using a web mapping service application such as Google maps).</p> <p>From either of the two views, visitors should be able to view some detail of the institutions and should be able to navigate to the appropriate contributed institution element for more details.</p>
Events	<p>From this page, visitors will be able to find various CS&E/HPC related events – which may have been contributed by users of the portal or obtained from other web portals (such as that of HPCU). This display will use a calendar display. Similar to the Institutions page, visitors will be able to filter these events using their related subjects (Physics, Chemistry, Biology, Computational Sciences, Other), brief details of the events will be provided and full details of events will be available to visitors upon selection of each event.</p>
Training Material	<p>Using this page – similar to the description of the previous two pages, visitors will be able to view details of contributed training material, filter contributed material to allow visitors to find what they are looking for easily and will also allows users to navigate to the contributed material for full and more complete details. This material may be present as a file, or an external link to another website which hosts the training material. Visitors could possibly be allowed to rate the material using a rating system such as a 5 star basis.</p>
Jobs	<p>Using this page, visitors will be able to view details of job postings in CS&E/HPC contributed by web portal users or obtained from other web portals (such as that of HPCU).</p> <p>Similar to the previous pages visitors will be able to filter these relative to various criteria and navigate to the posting for further details.</p>

Tutoring	The aim of this section will be to offer information and provide references to learning for teachers and students who would like to be introduced to the opportunities that HPC can offer. Different sections will exist for school kids, school teachers, prospective students and undergraduate students.
Contribute	Using this page, users will be able to contribute material to the HiPOP web portal. This menu item will only be viewable (and thus selectable) to users – which are in effect visitors to the site who have logged into their user accounts, who will have the rights to add content to the web portal. Details on how this will be done by users is detailed after the description of all the pages.
About Us	This page will allow visitors of the portal to learn more about the HiPOP project and the partners that constitute the HiPOP consortium.
Contact Us	This will be a simple page providing information on how users can contact the HiPOP project.

Further to the above pages, the web portal will also contain the following pages which will only be accessible to registered users once they login to the web portal:

Add Content	This page will allow users of the web portal to select which content they would like to add – choosing one of event, institution and training material.
Create Event	This page will allow a user to create a new event for the web portal. Using a simple, helpful and concise interface, users will enter the required details to create a new event. The set of required details will be composed of a Title, a date and time, the event subject, the event description, the location of the event and a link to the event's web page.
Create Institution	This page will allow a user to create a new institution for the web portal. Using a simple, helpful and concise interface, users will enter the required details to create a

	<p>new institution.</p> <p>The set of required details will be composed of a Title, types of activities the institution is engaged in, the CS&E/HPC subjects offered by the institution, a brief description of the institution which should include a hyperlink to the institution home page and the location of the institution.</p>
Create Training Material	<p>This page will allow a user to create and upload new training material for the web portal. Using a simple, helpful and concise interface, users will enter the required details to create new training material entries.</p> <p>The set of required details will be composed of a Title, text – which can be the training material itself or may be a link to the training material, and possible file uploads.</p>

3.2 Web Portal Additional Features

Enablement of social networking features through social networking services such as Facebook or Twitter will also be implemented. This will enable enables students, educators and other interested people to share ideas through social networking services.

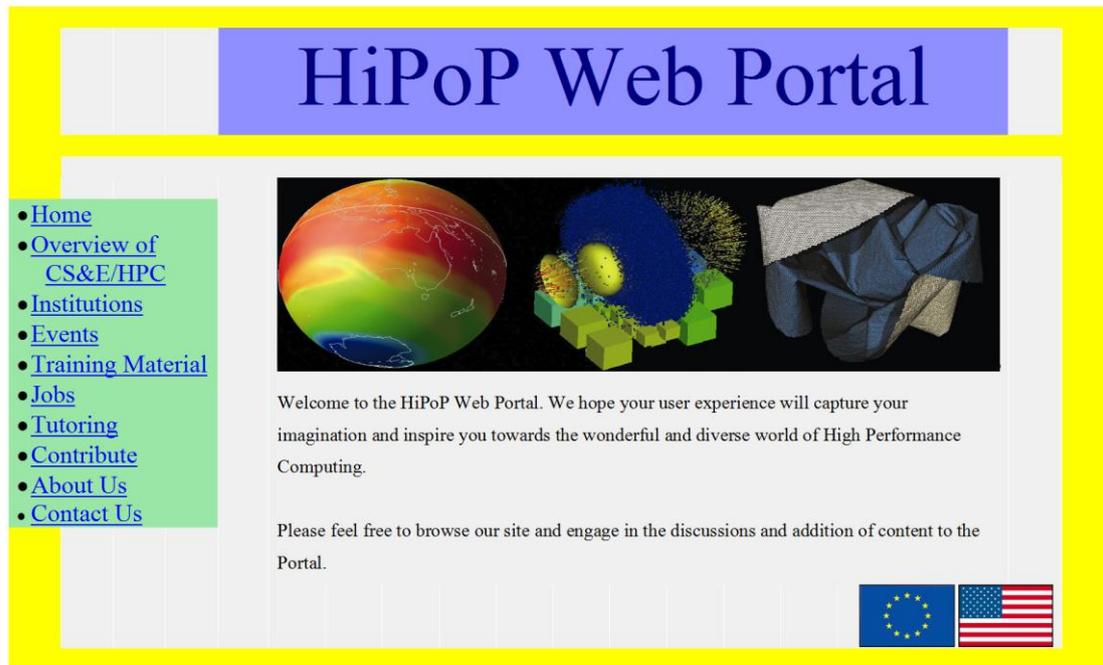
This we believe to be very important in the promotion and marketing of the web portal along with the usability of the portal for a more enhanced user experience.

3.3 Web Portal Visual Design

We now provide mock-ups of web portal pages to present their possible visual layout.

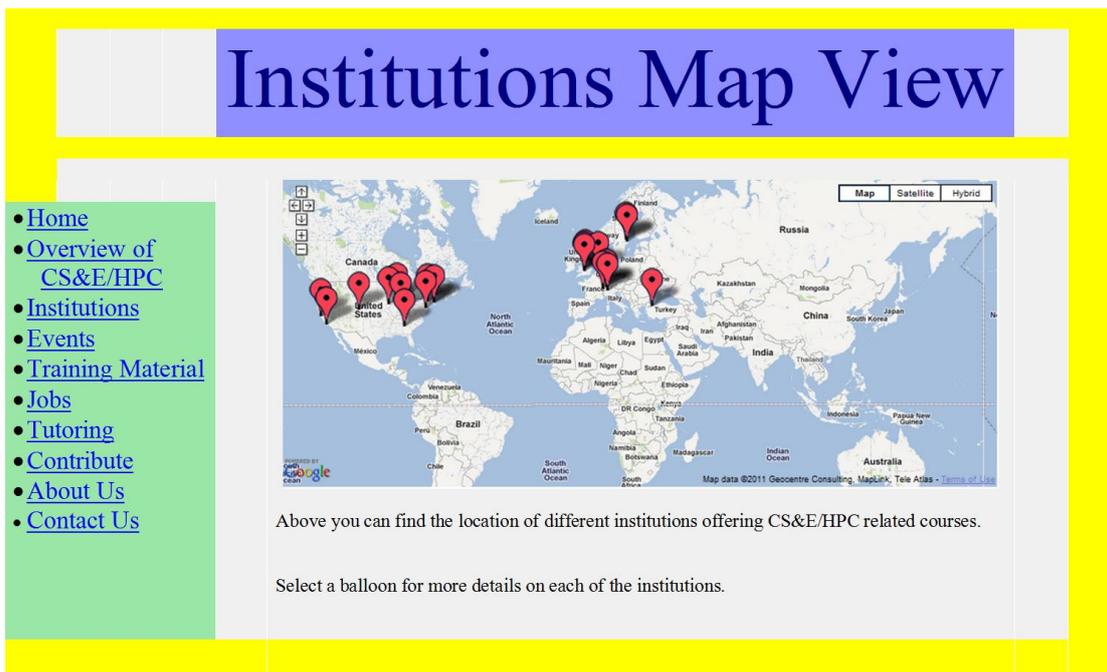
Home Page

The home page of the portal will look similar to the following.



The page will have a welcome message for visitors, inspiring CS&E-HPC diagrams and the logo of the HiPOP web portal sponsor.

Institutions → Map View



The Institutions → Map View page will be similar to the above diagram and will enable a visitor to the web site portal to zoom in and out the map and view more details on each institution in an easy manner.

It is important to note that such functionalities will be implemented using common and popular internet features – such as Google maps. This choice has been made to ensure the functionality of such features is something visitors to the site will already have encountered – thus allowing for a more user friendly portal experience.