

HepForge and HEP software engineering

A new, lightweight development environment
for small HEP projects

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CHEP06, Mumbai 2006-02-16

Outline

HEP software development
HepForge
Summary



HEP software development

Before I begin...

- ▶ **I will probably say some things that are controversial!**
In the first half, anyway

Before I begin...

- ▶ **I will probably say some things that are controversial!**
In the first half, anyway
- ▶ Please interrupt and challenge me at any point

HEP software overview

- ▶ HEP software development divides into
 - ▶ **small projects** by individuals and small groups
 - ▶ **big projects**, typically by experiment collaborations
- ▶ In the big projects, there is a rather unhealthy obsession with frameworks
- ▶ “No silver bullet” — *Fred Brooks, 197?*
- ▶ I want to emphasise the importance of small, well-engineered tools

HEP software overview

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- ▶ “No silver bullet” — *Fred Brooks, 197?*
- ▶ I want to emphasise the importance of small, well-engineered tools
- ▶ **Compare & contrast: history of Unix tools vs. history of HEP tools!**

An aside on “frameworks”

- ▶ In principle no bad thing; in practice may be **heavyweight**
 - ▶ Build system and infrastructure (e.g. Gaudi/Athena with CMT)
 - ▶ Monolithic (e.g. ROOT)
- ▶ Problem arises when doing simple things becomes hard (the “how short is ‘Hello World’ ” test)
- ▶ Too abstruse: factories, ‘very smart’ references. . . Should **hide infrastructure!**
- ▶ **Monolithic**: tendency to “place all our eggs in one basket”
- ▶ Not enough emphasis placed on
 - ▶ **real modularity**
 - ▶ **common exchange formats and interfaces**
- ▶ We need to encourage more modular design. . . for real! (cf. OSS, even without the hype. e.g. StatPatternRecognition)

The importance of software *engineering*

For large projects

- ▶ Physicists often sceptical / condescending about SE
- ▶ It is **genuinely** important
- ▶ Issues: environment sensitivity in general (env.vars., /**cern**, framework overheads, installation and build management issues. **Wastes time**.
- ▶ Why not using standard packaging and build systems? RPM/DPKG/**Portage**? **automake** and **autoconf**?
- ▶ Experimental physics (i.e. numbers we publish) **depends** on good engineering
- ▶ Many small sub-projects implementing the same features: another case for modularity

The importance of software *engineering*

For small projects

On the phenomenology side (i.e. matrix element calculators, Monte Carlo integrators, general purpose MC, precision MC):

- ▶ Still an entrenched Fortran culture — general purpose MC is a relative island of enlightenment (Herwig++, ThePEG, Sherpa, Pythia 8)
- ▶ Build systems tend to be convoluted hand coded Makefiles
- ▶ ⇒ interfacing to generators harder for experiments
- ▶ Encourage good software practice in small pheno projects

Software engineering problems for small projects

- ▶ Not using standard build/installation procedures
e.g. **autotools**... SCons?
- ▶ **Strong dependences on execution/build environment**
- ▶ **Informal quality control, feedback and bug tracking** (by email and memory)
- ▶ Failure to use version control systems
(Quote: “—— is our version control: we email our changes to him and he merges them by hand”!)
- ▶ **Inadequate documentation**: physics is usually documented via arXiv: software manual may be less developed

Getting started

- ▶ Everyone has written code that might be re-used. . .
- ▶ . . . but few get round to providing it for use by others.
- ▶ The open source community has got the hang of it:
many excellent free tools
- ▶ But!
 - ▶ also lots of chaff (usually based on PHP),
NB. `www.sf.net` \approx 80% garbage, \sim 1% gold
 - ▶ time spent installing them detracts from “physics time”
 - ▶ most physicists do not have deep knowledge of Web service config.
- ▶ Why painfully re-invent the wheel so often?

Existing development sites

- ▶ Good development practice #1: see if there's already something you can use!
- ▶ Existing collaborative devel. sites:
 - ▶ **FreeHEP**: not open to all, facilities?
 - ▶ **LCG Savannah**: confusing, inflexible (my opinion... YMMV)
 - ▶ **SourceForge**: restricted facilities, not HEP specific
- ▶ For us, no existing system has an intuitive enough interface, combined with powerful tools and robust engineering.
- ▶ This leads us (slightly reluctantly) to HepForge...

HepForge

HepForge

- ▶ HepForge is a new collaborative development system
- ▶ Online at <http://hepforge.cedar.ac.uk>
- ▶ Features including:
 - ▶ Shell access with full set of dev tools
 - ▶ Web space (with several convenient features)
 - ▶ CVS and Subversion version control
 - ▶ Wiki and bug tracker
 - ▶ Mailing lists for developers and users
 - ▶ Downloads manager
- ▶ We've done the "boring bits"!
- ▶ "Went live" in January: ~6 months of beta activity from e.g. Herwig++ and RunMC before that.



CEDAR: Collaborative e-Science Data Analysis Resource

HepForge is a component of **CEDAR**:

- ▶ JetWeb: global tuning of Monte Carlo generator parameters
- ▶ HepData: archival of published experimental data
- ▶ **HepForge**: development environment for HEP software
- ▶ **HepCode**: centralised repository of pheno code/programs
- ▶ HepML: set of XML data formats for data sets and MC config



www.cedar.ac.uk

HepForge exists (officially) to implement **HepCode**

Who should be interested in HepForge

- ▶ Who's it for? Small–medium size projects.
- ▶ Stand-alone preferred but not reqd. Aids re-use.
- ▶ Intentions to use standard external systems
Don't re-invent or *break expected behaviour* (UI design)
- ▶ Intention to document properly
- ▶ General responsible development, essentially

In return, HF provides powerful **software management infrastructure with minimum entry level and learning curve**

HepForge backend (1)

For the interested. . .

- ▶ Python-based with shell scripts for acc. management
- ▶ Various Subversion things, e.g.
 - ▶ re-write of CVS: almost complete UI compatibility
 - ▶ support for symlinks, metadata, dirs, **mv/cp!**
 - ▶ anon read access over HTTP; rw dev access over SSH
 - ▶ **use it!** Migration from CVS is easy.
- ▶ ViewVC with multi-site hack (also via SSI)

HepForge backend (2)

For the interested...

- ▶ Trac bug tracker and wiki:
 - ▶ SQLite backend and SVN integration
 - ▶ Moin-compatible wiki
 - ▶ excellent tool!
- ▶ Web system with post-processing scripts
 - ▶ HTML Tidy
 - ▶ transparent header and footer handling
- ▶ Download manager (personalisable via SSI)

HepForge tour

Home page

The screenshot shows a Mozilla Firefox browser window displaying the HepForge website. The address bar shows the URL `http://hepforge.cedar.ac.uk/`. The page features the CEDAR logo on the left and a navigation menu with links for CEDAR, HEPDATA, JETWEB, HEPML, HEPFORGE, and DEV. A sidebar on the left contains a list of links: Home, About, Register, Projects, SVN / CVS, Downloads, and Documentation. The main content area is titled "CEDAR HepForge" and includes a paragraph describing it as a development environment for high energy physics software, followed by a list of benefits: Shell account with up to date development tools, Web page hosting, and CVS and Subversion code management systems. A hammer icon is highlighted with a blue circle.

HepForge > Home - CEDAR - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

`http://hepforge.cedar.ac.uk/`

CEDAR CEDAR HEPDATA JETWEB HEPML HEPFORGE DEV

- Home
- About
- Register
- Projects
- SVN / CVS
- Downloads
- Documentation

CEDAR HepForge

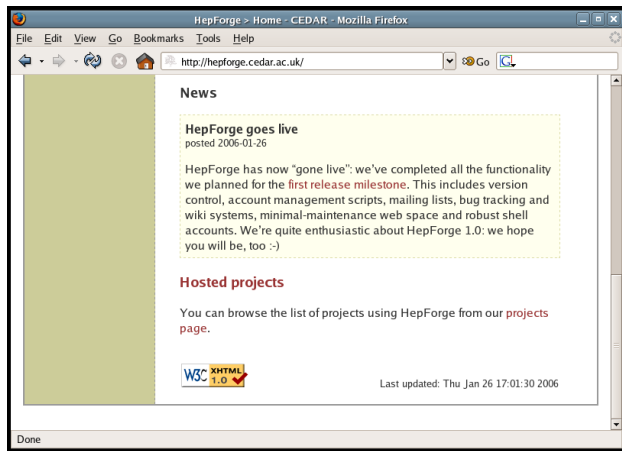
HepForge is a development environment for high energy physics software development projects. Some of the benefits offered by HepForge are:

- Shell account with up to date development tools
- Web page hosting
- CVS and Subversion code management systems



HepForge tour

Home page (W3C auto-validation)



The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://hepforge.cedar.ac.uk/`. The page content includes:

- News**
 - HepForge goes live**
posted 2006-01-26
 - HepForge has now "gone live": we've completed all the functionality we planned for the **first release milestone**. This includes version control, account management scripts, mailing lists, bug tracking and wiki systems, minimal-maintenance web space and robust shell accounts. We're quite enthusiastic about HepForge 1.0: we hope you will be, too :-)
- Hosted projects**
 - You can browse the list of projects using HepForge from our **projects page**.

At the bottom left, there is a W3C XHTML 1.0 logo. At the bottom right, it says "Last updated: Thu Jan 26 17:01:30 2006". The status bar at the bottom of the browser shows "Done".



HepForge tour

Project list (1)

HepForge - CEDAR - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hf/projects

CEDAR

CEDAR HEPDATA JETWEB HEPML HEPFORGE DEV

- Home
- About
- Register
- Projects
- SVN / CVS
- Downloads
- Documentation

HepForge projects

Here is the current list of projects using HepForge to do their development. (We will be introducing keyword sorting of projects in time.)

- **ExHuME** : C++ generator of central Exclusive Hadronic Monte-carlo Events
- **FastNLO**
- **FeynML**
- **Fortran Herwig** : Fortran-based Monte Carlo event generator with parton shower
- **HepData** : HepData database and Web interface development project
- **HepForge** : Project to build and maintain the HepForge system!

Done



HepForge tour

Project list (2)

The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://hepforge.cedar.ac.uk/hf/projects`. The page content is a list of project descriptions:

- **HepML** : Proposed interchange formats for MC parameters and HepData records
- **HepTeX** : Collection of HEP-specific TeX/LaTeX packages
- **Herwig++**
- **HZSteer** : IO and steering utilities for HZTool.
- **HZTool** : Data-MC comparison histogramming
- **JetWeb** : Web-based system for MC event generator validation
- **Jimmy** : Multiple iterations implementation for Herwig
- **KtJet** : C++ implementation of the kt jet clustering algorithm
- **LHAPDF** : Les Houches Accord PDF library and interface
- **Professor** : Tuning tool for MC generators
- **PyFeyn** : Python library for programatically drawing Feynman diagrams
- **Rivet** : C++ re-implementation of the HZTool MC validation tool
- **RivetGun** : Generator interfacing system for Rivet
- **RunMC** : C++ frond-end of Monte Carlo models
- **ThePEG** : Platform for using and building C++ event generators

At the bottom of the browser window, there is a "Done" status bar and a "W3C XHTML 1.0" logo.



HepForge tour

Subversion/CVS (VC) listing

The screenshot shows a Mozilla Firefox browser window displaying the HepForge website. The address bar shows the URL `http://hepforge.cedar.ac.uk/hf/vc/svn/`. The page title is "HepForge version control". The main content area features a "Project Root:" dropdown menu set to "Repository Listing" and a "Go" button. Below this is a list of project names, each with a folder icon and a blue highlight:

- exhume
- fastnlo
- feynml
- fherwig
- hepdata
- hepforge
- hepml
- heptex
- herwig
- hzsteer
- hztool
- ietweb

The left sidebar contains a navigation menu with the following items:

- Home
- About
- Register
- Projects
- SVN / CVS
 - Subversion
 - CVS
- Downloads
- Documentation

The top navigation bar includes links for CEDAR, HEPDATA, JETWEB, HEPML, HEPFORGE, and DEV. The CEDAR logo is visible in the top left corner of the page content.



HepForge tour

Project VC listing (also personal copy via SSI)

HepForge > SVN / CVS > Subversion - CEDAR - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hf/vc/svn/hepdata/trunk/

HepForge version control

[hepdata] / trunk Project Root:

Current revision: **516 (of 516)**

Jump to directory revision:

Files shown: **0**

File	Rev.	Age	Author	Last log entry
Parent Directory				
hdbdmsmigrate/	433	2 months	whalley	'changes since move to svn'
hdcommon/	498	12 days	buckley	Moving DBMatch back due to problems with pro
hdmigrate/	499	12 days	buckley	Moved DBMatch back for convenience
hdmodel/	512	8 days	buckley	Added hasZeroSize() method for determining w
hdxml/	488	12 days	buckley	Making a new package for HepData HepML wr
hepdata/	516	4 days	buckley	Adding errors as expected...

hepforge@cedar.ac.uk
Powered by ViewCVS 1.0-dev



HepForge tour

Downloads listing (projects with files highlighted)

HepForge - CEDAR - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hf/downloads

CEDAR

CEDAR HEPDATA JETWEB HEPML HEPFORGE DEV

- Home
- About
- Register
- Projects
- SVN / CVS
- Downloads
- Documentation

HepForge downloads

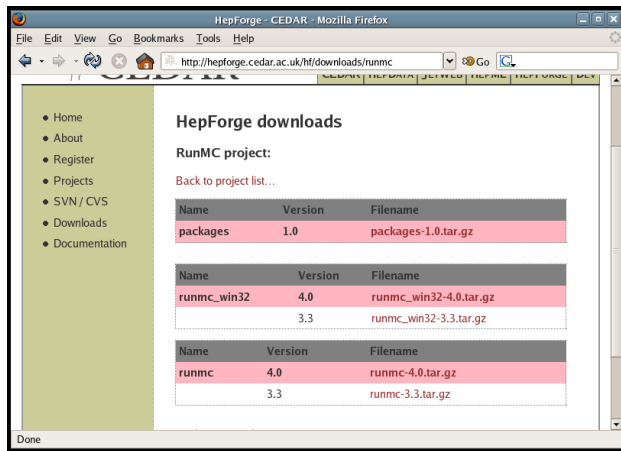
- ExHuME (0)
- FastNLO (0)
- FeynML (0)
- Fortran Herwig (0)
- HepData (0)
- HepForge (0)
- HepML (0)
- HepTeX (0)
- Herwig++ (2)
- HZSteer (2)

Done



HepForge tour

Project downloads listing (also personal copy via SSI)



The screenshot shows a Mozilla Firefox browser window displaying the HepForge website. The address bar shows the URL `http://hepforge.cedar.ac.uk/hf/downloads/runmc`. The page title is "HepForge - CEDAR - Mozilla Firefox". The main content area is titled "HepForge downloads" and lists the "RunMC project". A link "Back to project list..." is provided. Below this, there are three tables listing available downloads:

Name	Version	Filename
packages	1.0	packages-1.0.tar.gz

Name	Version	Filename
runmc_win32	4.0	runmc_win32-4.0.tar.gz
	3.3	runmc_win32-3.3.tar.gz

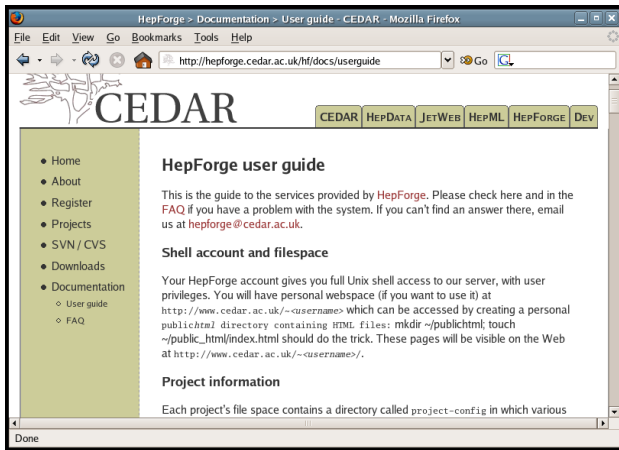
Name	Version	Filename
runmc	4.0	runmc-4.0.tar.gz
	3.3	runmc-3.3.tar.gz

The browser's status bar at the bottom left shows "Done".



HepForge tour

Documentation: user guide (note scrollbar!)



The screenshot shows a Mozilla Firefox browser window displaying the HepForge user guide. The browser's address bar shows the URL `http://hepforge.cedar.ac.uk/hf/docs/userguide`. The page features the CEDAR logo at the top left and a navigation menu with buttons for CEDAR, HEPDATA, JETWEB, HEPML, HEPFORGE, and DEV. A left-hand sidebar contains a list of links: Home, About, Register, Projects, SVN/CVS, Downloads, and Documentation (with sub-links for User guide and FAQ). The main content area is titled "HepForge user guide" and contains the following text:

This is the guide to the services provided by **HepForge**. Please check here and in the **FAQ** if you have a problem with the system. If you can't find an answer there, email us at hepforge@cedar.ac.uk.

Shell account and filesystem

Your HepForge account gives you full Unix shell access to our server, with user privileges. You will have personal webspace (if you want to use it) at `http://www.cedar.ac.uk/~<username>` which can be accessed by creating a personal `publichtml` directory containing HTML files: `mkdir ~/publichtml; touch ~/public_html/index.html` should do the trick. These pages will be visible on the Web at `http://www.cedar.ac.uk/~<username>/`.

Project information

Each project's file space contains a directory called `project-config` in which various



HepForge tour

Documentation: FAQs (note scrollbar!)

HepForge > Documentation > FAQ - CEDAR - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hf/docs/faq

CEDAR CEDAR HEPDATA JETWEB HEPML HEPFORGE DEV

- Home
- About
- Register
- Projects
- SVN / CVS
- Downloads
- Documentation
 - User guide
 - FAQ

HepForge FAQs

Here are some questions and answers relating to HepForge. Please ask us some more questions to make this document more useful!

Version control

- **How do I use a HepForge project's Subversion repository?**

First-off, you might want to check the project's online repository viewer at <http://hepforge.cedar.ac.uk/<projname>/vc/svn/>. If you just want to browse the repository or download a tarball, this is perfectly good.

If you want to use Subversion directly, then you have the choice of using the anonymous read-only system over HTTP or the full read-write system via SSH. To use the full permissions system you will need to have a HepForge shell account and be a registered developer on the relevant project.



HepForge tour

Project Web page: LHAPDF

LHAPDF :: HepForge - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/lhapdf/

LHAPDF the Les Houches Accord PDF Interface

- LHAPDF Home
- Installation
- PDF sets
- User manual
- Theory review
- C++ wrapper
- Mailing list
- ChangeLog
- Contact

hepforge

Home

LHAPDF provides a unified and easy to use interface to modern PDF sets. It is designed to work not only with individual PDF sets but also with the more recent multiple "error" sets. It can be viewed as the successor to PDFLIB, incorporating many of the older sets found in the latter, including pion and photon PDFs. In LHAPDF the computer code and input parameters/grids are separated thus allowing more easy updating and no limit to the expansion possibilities. The code and data sets can be downloaded together or individually as desired. From version 4.1 onwards a configuration script facilitates the installation of LHAPDF.

Contents:

- Installing LHAPDF.
- List of all available PDF sets.
- On-line user manual.
- A wrapper for C++.
- A little bit of theory.

Downloads:

Latest released version:

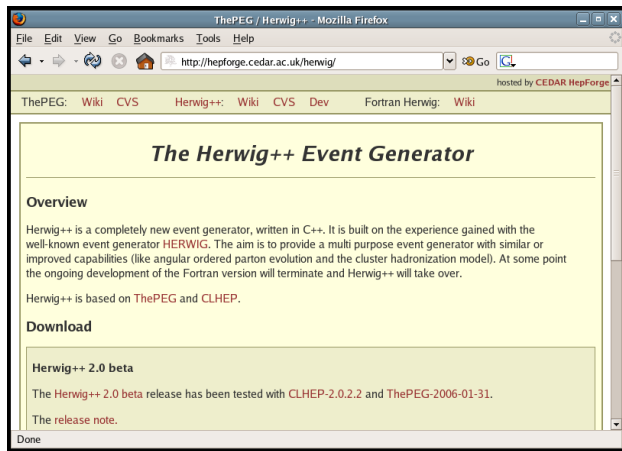
- 4.2 (full): [lhapdf-4.2.tar.gz](#)
- 4.2:(no pdfsets): [lhadpf-4.2-nopdf.tar.gz](#)

Done



HepForge tour

Project Web page: Herwig++



The screenshot shows a Mozilla Firefox browser window displaying the Herwig++ project page. The address bar shows the URL `http://hepforge.cedar.ac.uk/herwig/`. The page content includes:

- Navigation links: ThePEG: Wiki CVS, Herwig++: Wiki CVS Dev, Fortran Herwig: Wiki
- Section: **The Herwig++ Event Generator**
- Section: **Overview**

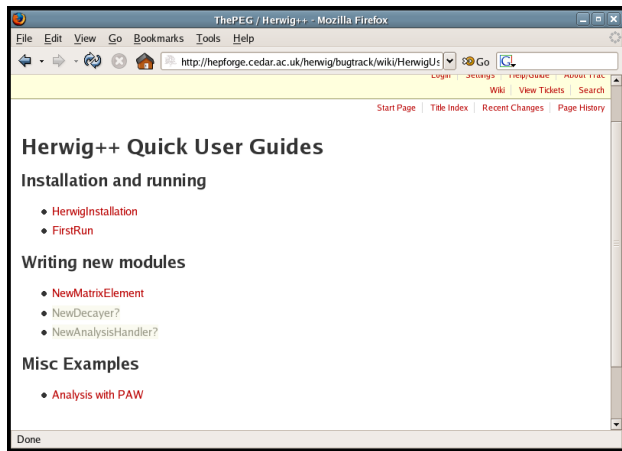
Herwig++ is a completely new event generator, written in C++. It is built on the experience gained with the well-known event generator HERWIG. The aim is to provide a multi purpose event generator with similar or improved capabilities (like angular ordered parton evolution and the cluster hadronization model). At some point the ongoing development of the Fortran version will terminate and Herwig++ will take over.
- Text: Herwig++ is based on [ThePEG](#) and [CLHEP](#).
- Section: **Download**
- Section: **Herwig++ 2.0 beta**

The Herwig++ 2.0 beta release has been tested with CLHEP-2.0.2.2 and ThePEG-2006-01-31.
- Text: [The release note.](#)



HepForge tour

Project wiki



The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://hepforge.cedar.ac.uk/herwig/bugtrack/wiki/HerwigUs`. The page content is titled "Herwig++ Quick User Guides" and includes the following sections:

- Installation and running**
 - [HerwigInstallation](#)
 - [FirstRun](#)
- Writing new modules**
 - [NewMatrixElement](#)
 - [NewDecayer?](#)
 - [NewAnalysisHandler?](#)
- Misc Examples**
 - [Analysis with PAW](#)

The browser's status bar at the bottom shows "Done".



HepForge tour

Project bug tracker: milestones

The screenshot shows the HepForge Roadmap page. The browser title is 'HepData :: HepForge - Mozilla Firefox' and the address bar shows 'http://hepforge.cedar.ac.uk/hepdata/bugtrack/roadmap/'.

Navigation: Home, Subversion, Tracker (Milestones, All tickets, MS tickets, Timeline), Wiki, Contact.

Tools: Login, Settings, Help/Guide, About/Track, Search.

Milestone 1: JetWeb Accessing HepData
 Due in 2 months
 Progress: 80% (green bar)
 Closed tickets: 6, Active tickets: 1
 Also a CEDAR Milestone.

Milestone 2: JetWeb and HepData development version
 Due in 5 months
 Progress: 100% (green bar)
 Closed tickets: 3, Active tickets: 0



HepForge tour

Project timeline (integrated with SVN)

HepData :: HepForge - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hepdata/bugtrack/timeline

hosted by CEDAR HepForge

Home
Subversion
Tracker
Milestones
All tickets
MS tickets
Timeline
Wiki
Contact

Wik | Timeline | Roadmap | Browse Source | Login | Settings | HelpGuide | AboutTrac | View Tickets | New Ticket | Search

Timeline

View changes from 15/02/06 and 30 days back.

- Milestones
- Ticket changes
- Repository checks
- Wiki changes

Update

10/02/06:

- 17:34 **Changeset [516] by buckley**
Adding errors as expected...
- 15:19 **Changeset [515] by buckley**
Making progress, thanks to new use of XSLT 2.0 rules and the Saxon ...

07/02/06:

- 15:57 **Changeset [514] by buckley**
Getting HzTool? Fortran headers working

Done



HepForge tour

Project bug listing

HepData :: HepForge - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hepdata/bugtrack/report/3

JetWeb Accessing HepData

Ticket	Summary	Component	Version	Type	Owner	Created
#2	Create XSL transformer for data HepML -> HzTool Fortran headers	hepdata	1.0	task	buckley *	01/11/05

Object model and db persistency refactoring

Ticket	Summary	Component	Version	Type	Owner	Created
#42	Refactor the object model / db interaction	model	1.0	task	buckley *	17/01/06
#54	Improve error representation in the object model	model	1.0	task	buckley *	01/02/06
#46	Consider using SQL double for data values	migration	1.0	enhancement	buckley *	21/01/06
#26	Separate HepData model from migration code	hepdata	1.0	defect	buckley *	25/11/05
#53	Use enums for error type	model	1.0	enhancement	buckley *	01/02/06
#56	Separate stat/sys and	model	1.0	enhancement	buckley *	02/02/06

Done



HepForge tour

Project bug details (1)

The screenshot shows a Mozilla Firefox browser window with the address bar containing `http://hepforge.cedar.ac.uk/hepdata/bugtrack/ticket/2`. The page title is "Ticket #2 (task)".

Subversion

- Tracker
 - Milestones
 - All tickets
 - MS tickets
 - Timeline
- Wiki
- Contact

Ticket #2 (task)

Create XSL transformer for data HepML -> HzTool Fortran headers

Opened 4 months ago
Last modified 2 weeks ago

Status: assigned

Reported by:	buckley	Assigned to:	buckley (accepted)
Priority:	major	Milestone:	JetWeb Accessing HepData
Component:	hepdata	Version:	1.0
Keywords:		Cc:	jmb

HZTool requires a Fortran header file for each paper. The existing XSLT stylesheet for the HepML -> Fortran transformation is very incomplete and needs work.



HepForge tour

Project bug details (2)

HepData :: HepForge - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://hepforge.cedar.ac.uk/hepdata/bugtrack/ticket/2

Attachments

Attach File

Change History

17/01/06 17:55:28: Modified by buckley

- **description** changed.
- **milestone** set to *JetWeb Accessing HepData*.

I've re-written the XSL transformer classes somewhat.
The next steps are:

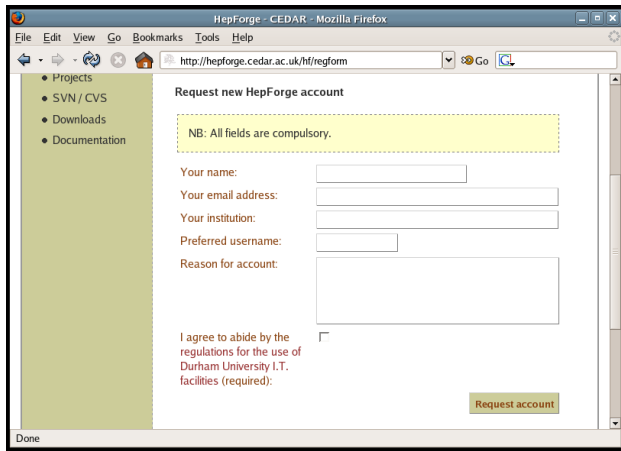
- abstract the re-formatter classes to be more generic: HepMLReformatter, HepMLSplitReformatter, HepMLTextReformatter etc. (need better names)
- provide a superclass/interface common to

Done



HepForge tour

The HepForge registration form! **Think about it...**



The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://hepforge.cedar.ac.uk/hf/regform`. The page title is "Request new HepForge account". A yellow dashed box contains the text: "NB: All fields are compulsory." Below this, there are five input fields: "Your name:", "Your email address:", "Your institution:", "Preferred username:", and "Reason for account:". At the bottom, there is a checkbox for "I agree to abide by the regulations for the use of Durham University I.T. facilities (required):" and a "Request account" button.



Features still to come

- ▶ **Keyword and category project metadata**
(for HepCode & general user convenience)
- ▶ **Web interface to project metadata**
(keywords, description, “pretty” project name. . .)
- ▶ FAQ handler (SSI again)
- ▶ More Web post-processors:
 - ▶ selective email obfuscator (whitelist for pass-through)
 - ▶ Markdown/SmartyPants, ReStructuredText, Moin, others?

Join us!

If you have a re-useable HEP project and you would like to maintain it, please think about using HepForge!

- ▶ Current users include: Herwig++, ThePEG, LHAPDF, RunMC, FastNLO, Jimmy, KtJet. . .
- ▶ Plus all the CEDAR sub-projects, of course!
- ▶ Requirements:
 - ▶ has to be for a **re-useable** HEP project
 - ▶ not for processor-intensive use
 - ▶ commitment to document and support your project
 - ▶ encouraged to use standard build procedures etc.

We can and will help with this!

Visit <http://hepforge.cedar.ac.uk> to register

Summary

Summary

- ▶ HEP *needs* to consider **modularity** and **interfaces** more
- ▶ HepForge is a small spin-off from CEDAR's main thrust (building and operating a MC generator tuning system)
- ▶ HepForge will be used to implement the HepCode system
- ▶ **HepForge is available for HEP software development now!**
- ▶ Feedback has all been very positive: system is powerful but very easy to use
- ▶ If you have written / are going to write a small–medium **re-useable** HEP application, **please consider HepForge!**