CEDAR, part II

HepData, HepML and HepForge

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Outline

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Re-introduction to CEDAR

CEDAR: Collaborative e-Science Data Analysis Resource

I expect Jon Butterworth will have already said this, but...
CEDAR is an e-Science project with several sub-projects:

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

www.cedar.ac.uk

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HepData — the HEP reaction database

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HepData's history

- Searchable ∼30 years' worth of scattering data, PDFs etc.
- Stored in hierarchical BDMS database: very little modern support
- Data available as text files, PAW kumacs or GIF images
- Db stores pretty much everything as a string
- Adding records requires writing a Fortran routine
- Mirrors to SPIRES, PDG info

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HepData in CEDAR (1)

HepData is undergoing active development:

- Migration to relational MySQL database
- Database sanitising e.g. uniform units…
- Database improvements e.g. axis-level properties, more searchable quantities…
- Using HepML for I/O: XSLT transformations to data formats like HTML and AIDA

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HepData in CEDAR (2)

And more...

- Java object model for data abstraction: interface for JetWeb
- Java/JSP-based Web front-end using Apache Tomcat
- JBoss Hibernate used to abstract the object-relational binding
- Similar system planned for XML persistency
- Grid authentication for expts. to submit data directly (modulo sanity checking)

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HepData HepML

HepML is a set of XML-based data format defns. for HEP

- XML representation for generator configs and HepData data sets (and more to come?)
- (I'll just mention the HepML data schema here)
- To be backed up with Python, Java (and C++?) interfaces
- Version for comment has been released. Please check it out: **`http://hepforge.cedar.ac.uk/hepml/`**
- Experiments will submit data to HepData: we need your comments on what HD and HepML should allow you to do. Abstracted interfaces to HepML (e.g. ROOT routine)?

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HepML fragment (1)

```
<?xml version="1.0" encoding="UTF-8"?>
<hepml xmlns="http://www.cedar.ac.uk/hepml/hepdata/0.1/">
  <data timestamp="2006-04-07 13.09.27">
    <paper irn="3326047" paperId="3552">
      <dataset datasetId="1">
        <comment>
          FITTED, BACKGROUND SUBTRACTED, PEAK OMEGA CROSS SECTION,
          ...
        </comment>
        <property name="RE(Q=MU)" value="E+ E- --&gt; MU+ MU-" />
        <property name="RE(Q=HAD)" value="E+ E- --&gt; PI+ PI0 PI-" />
        <xaxis header="SQRT(S) IN GEV" xaxisId="1">
          <bins>
            <bin pointId="1" value="0.7726" />
            <bin pointId="2" value="0.7776" />
            ...
          </bins>
        </xaxis>

...
```

HepML fragment (2)

```
...
<yaxis header="SIG(Q=HAD) IN MUB" yaxisId="1">
  <points>
    <point pointId="1" value="0.269" />
    <point pointId="2" value="0.74" />
    ...
    <point pointId="7" value="0.065" />
  </points>
  <axiserror norm="percent" source="sys" plus="11.0" minus="11
     description="FROM NUCLEAR ABSORPTION CORRECTION" />
  ...
  <pointerrors norm="abs" source="stat">
    <pointerror plus="0.096" minus="0.096" pointId="1" />
    <pointerror plus="0.192" minus="0.192" pointId="2" />
    ...
    <pointerror plus="0.036" minus="0.036" pointId="7" />
  </pointerrors>
</yaxis>
```

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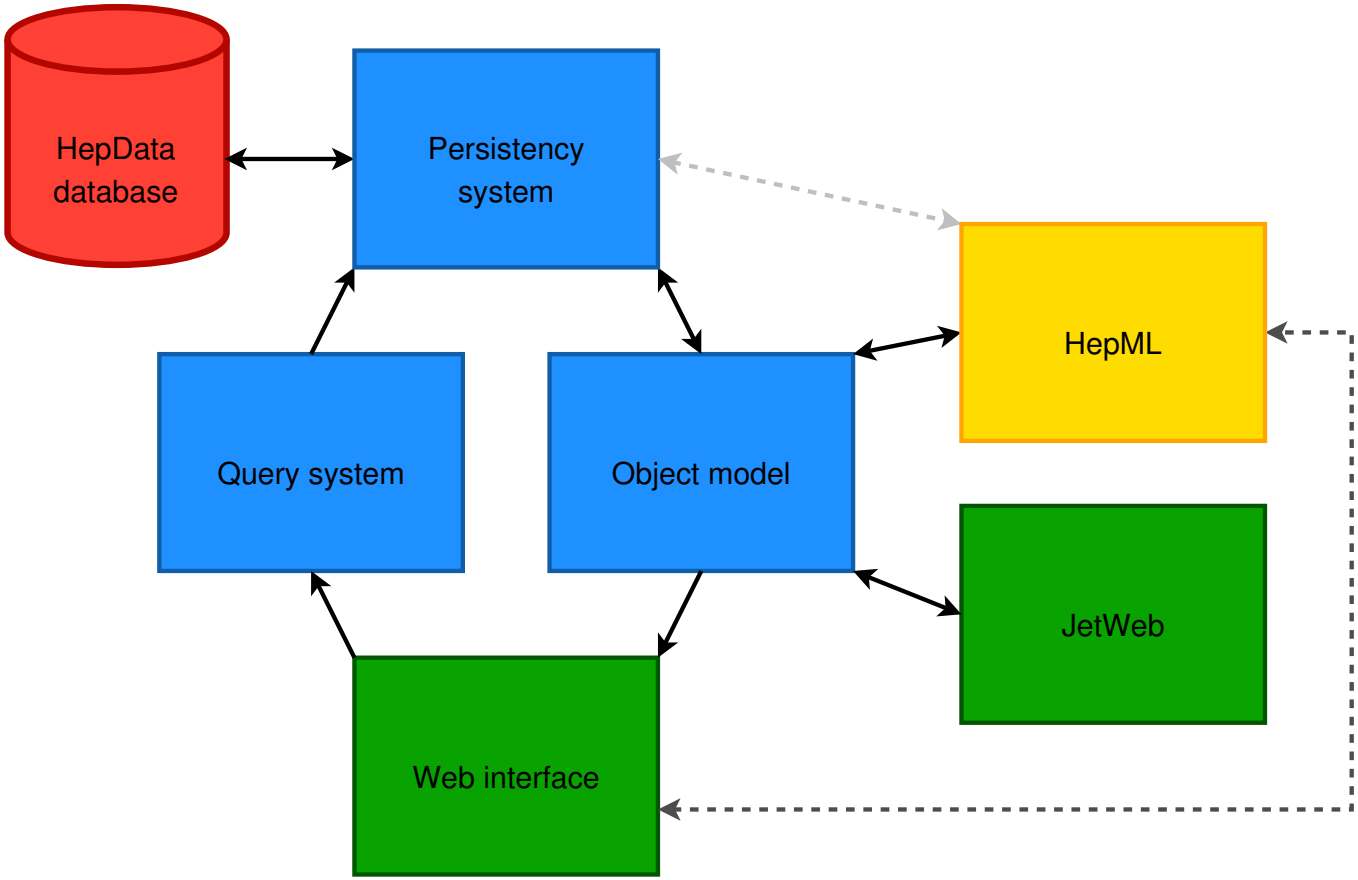
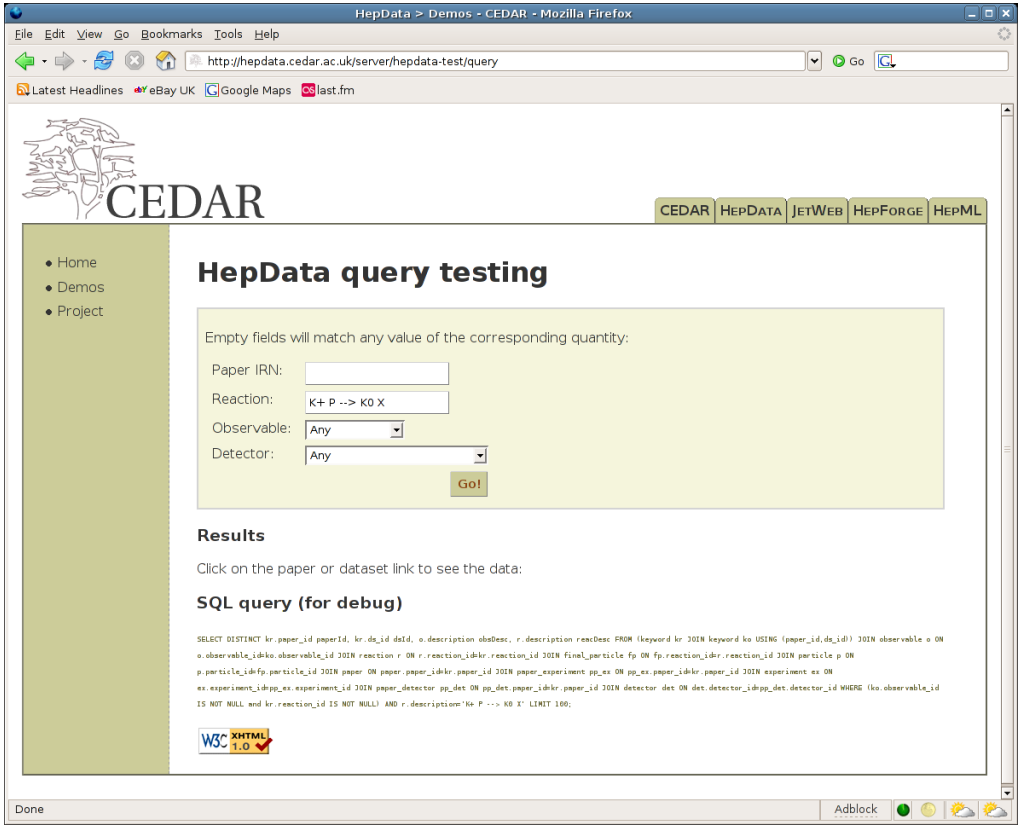
HepData behind the scenes



HepData demos (1)

Query interface (breaking the rules — spot the SQL!)



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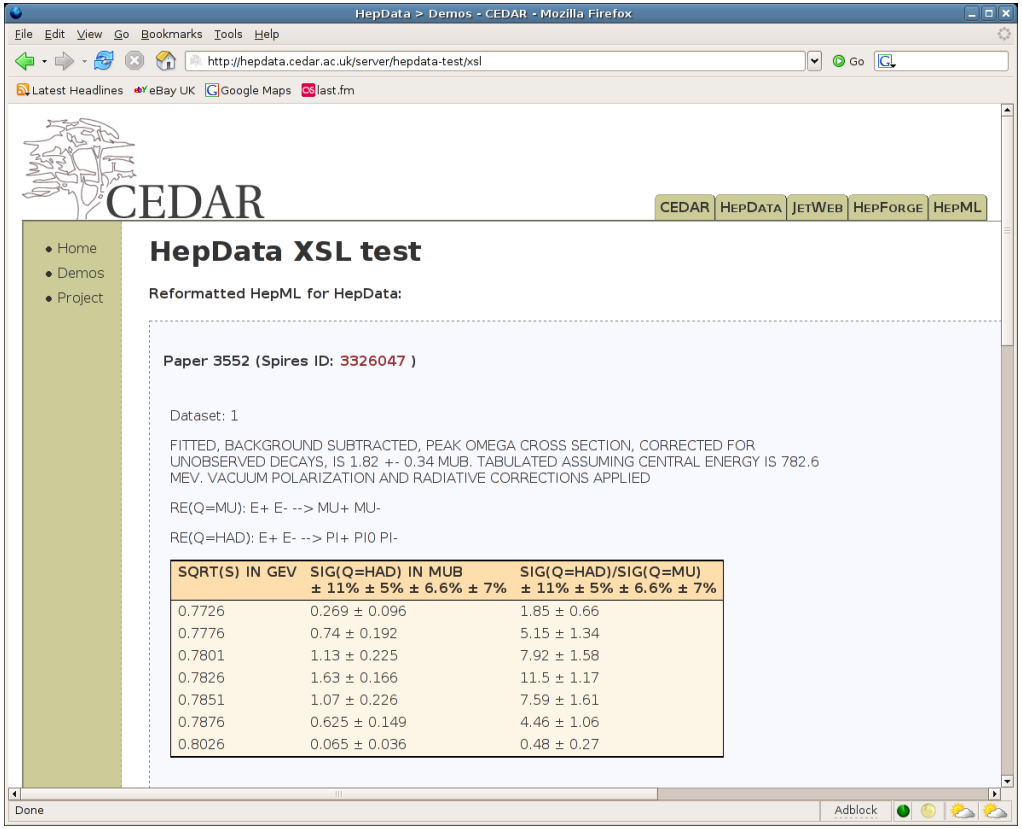
HepData demos (2)

HepData → HepML $\xrightarrow{XSL}$ HTML



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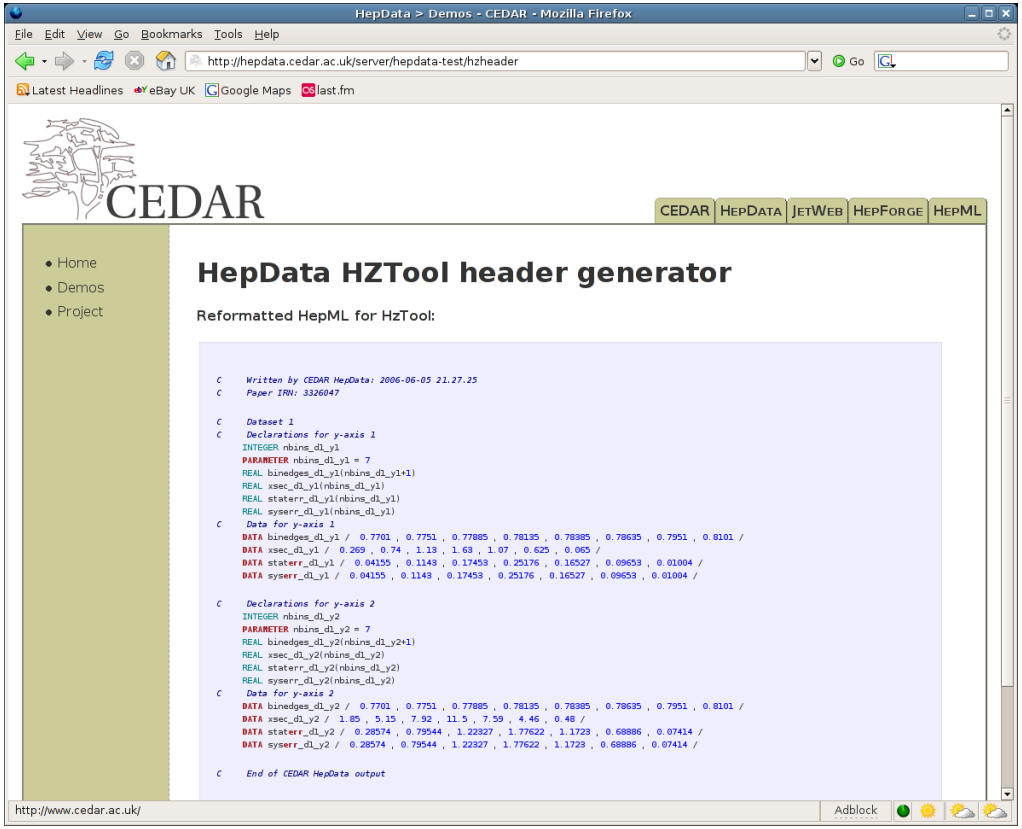
HepData demos (3)

HepData → HepML $\xrightarrow{XSL}$ HZTool Fortran



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HepData summary

- HepData re-engineering in progress:demos at **`http://hepdata.cedar.ac.uk`**
- Not everything is finalised yet...
- Your chance to make sure that it can do everything you want!
- HepML is also incomplete: metadata is not yet fully handled, for example
- Do we need to provide special data set support like correlation matrices?
- Get involved!

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HepForge — a lightweight development environment for HEP

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Software engineering for small HEP projects

- Everyone has written code that might be re-used...
- But: "energy barrier" to tidying up / managing it as a project
- Small projects don't have resources for nice things like:
  - Use std. build/install systems e.g. autotools, libtool
  - Independence of build/run environment (e.g. `/cern`!)
  - "Formal" quality control, feedback and bug tracking
  - Version control systems (Subversion, CVS)

HepForge aims to reduce this barrier and encourage more publically released, well-developed HEP code

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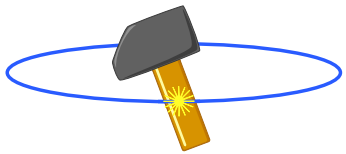
HepForge

- Collaborative development system for HEP
- Online at **`http://hepforge.cedar.ac.uk`**
- Features including:
  - Shell access with full set of dev tools
  - Web space (with several convenient features)
  - Subversion/CVS version control (+ Web viewers)
  - Wiki and bug tracker
  - Mailing lists for developers and users
  - Downloads manager
- We've done the "boring bits"!
- Many users already: Herwig++, Pythia6, LHAPDF... and ∼25 others



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Who should be interested in HepForge?

- Who's it for? Small–medium size projects
- *Probably* not experiments! But not necessarily...
- *You* should:
  - Stand-alone code preferred, since it aids re-use
  - Use standard methods, e.g. support `make install`
  - Intention to document properly
  - Support users
  - (General responsible development, essentially!)

In return, HF provides powerful software development tools with a minimal learning curve

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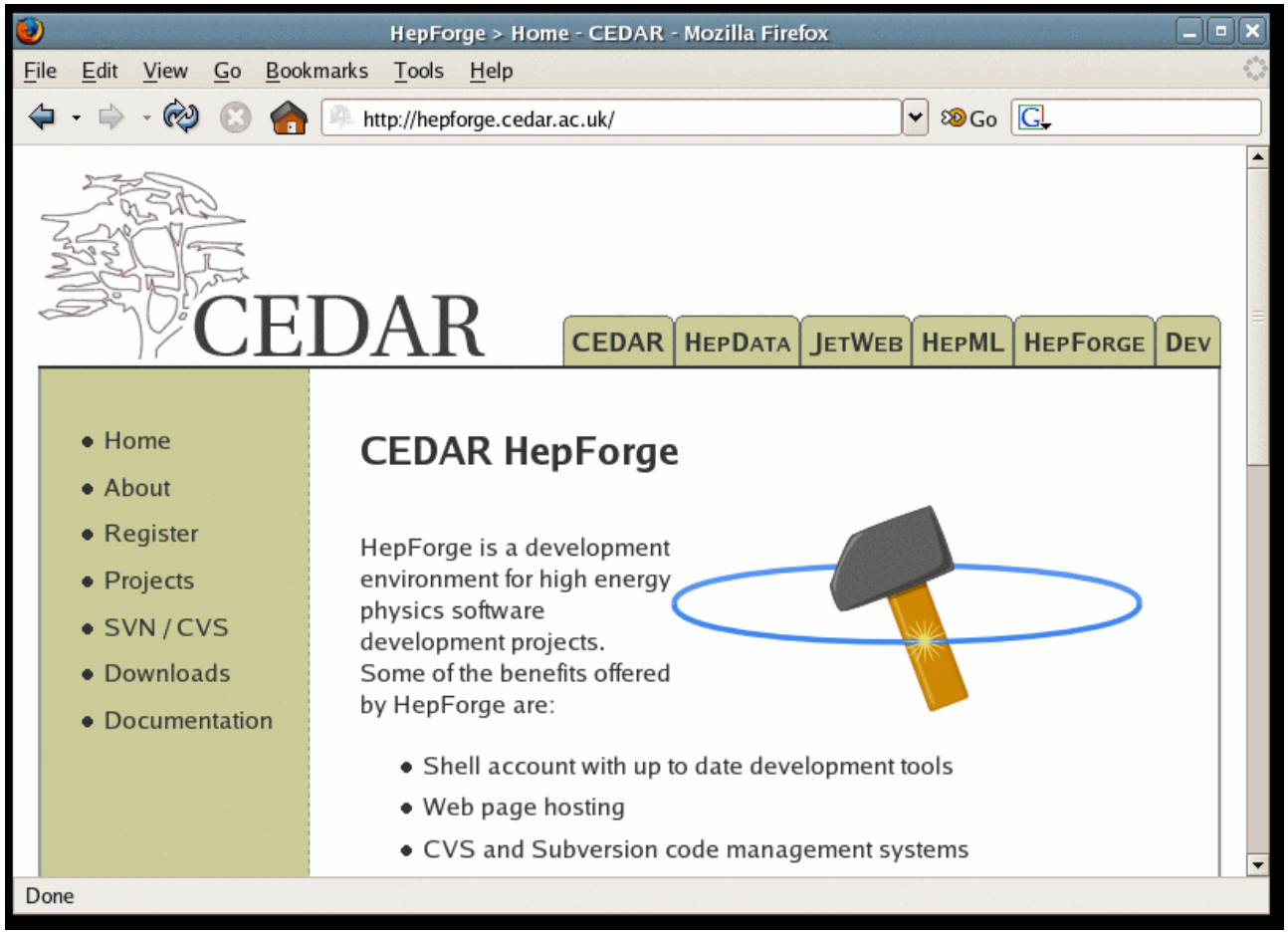
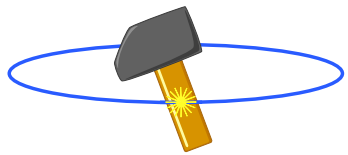
HepForge tour

Home page





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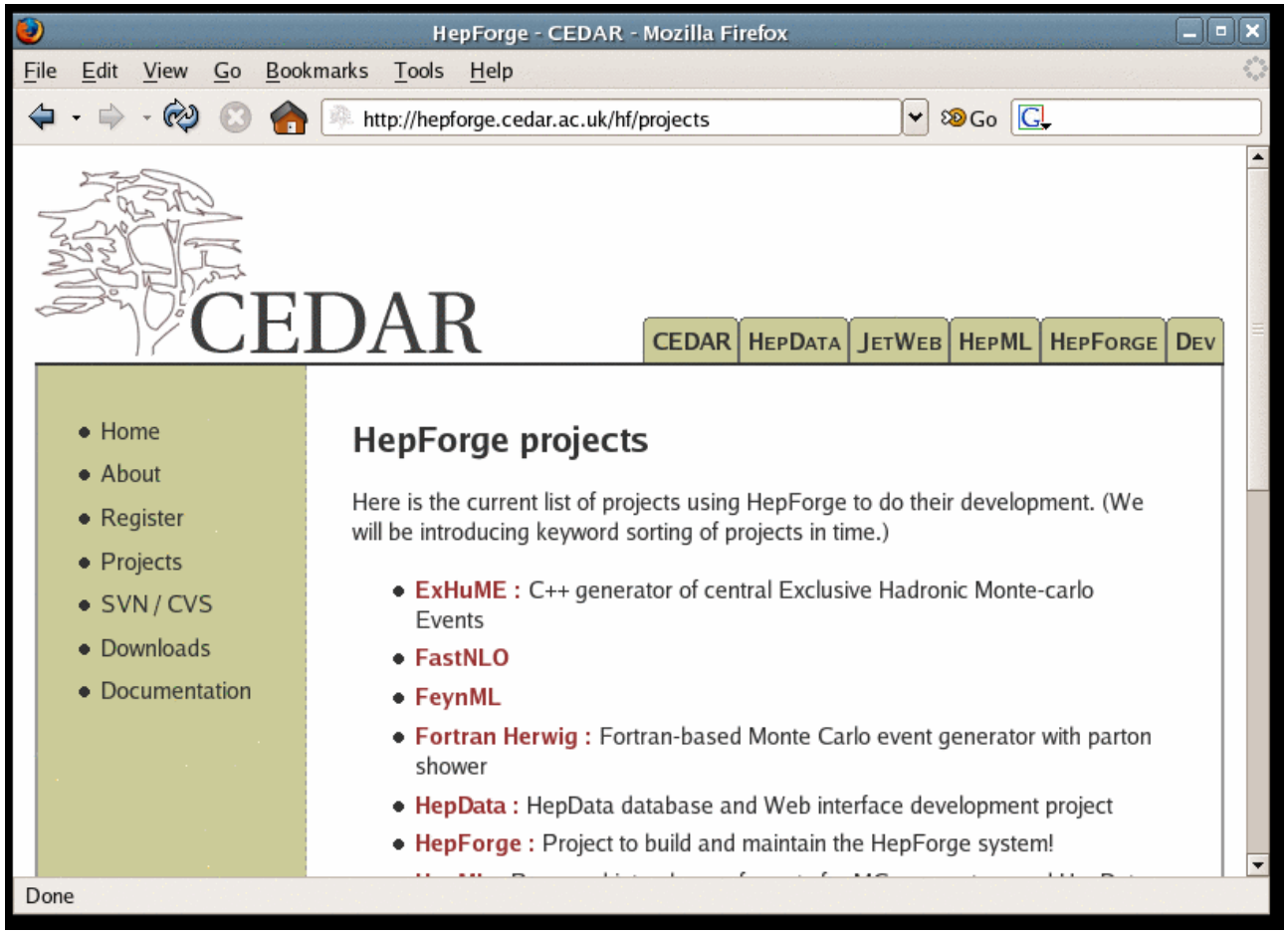
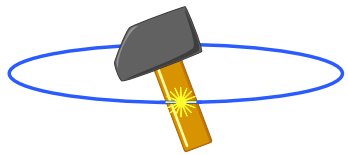
HepForge tour

Project list (1)





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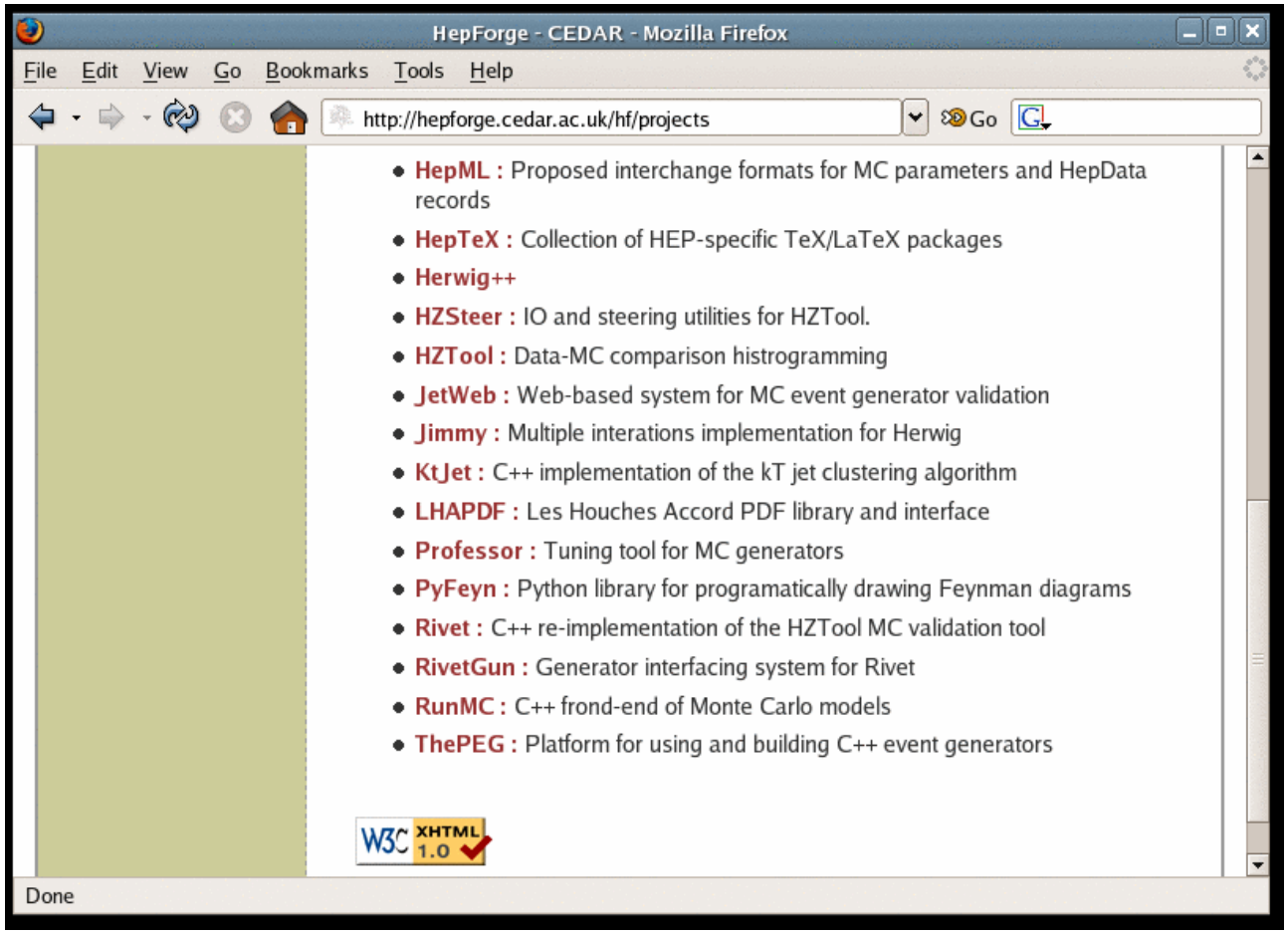
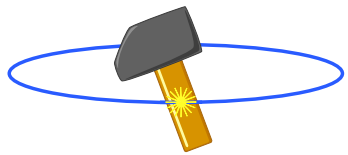
Project list (2)





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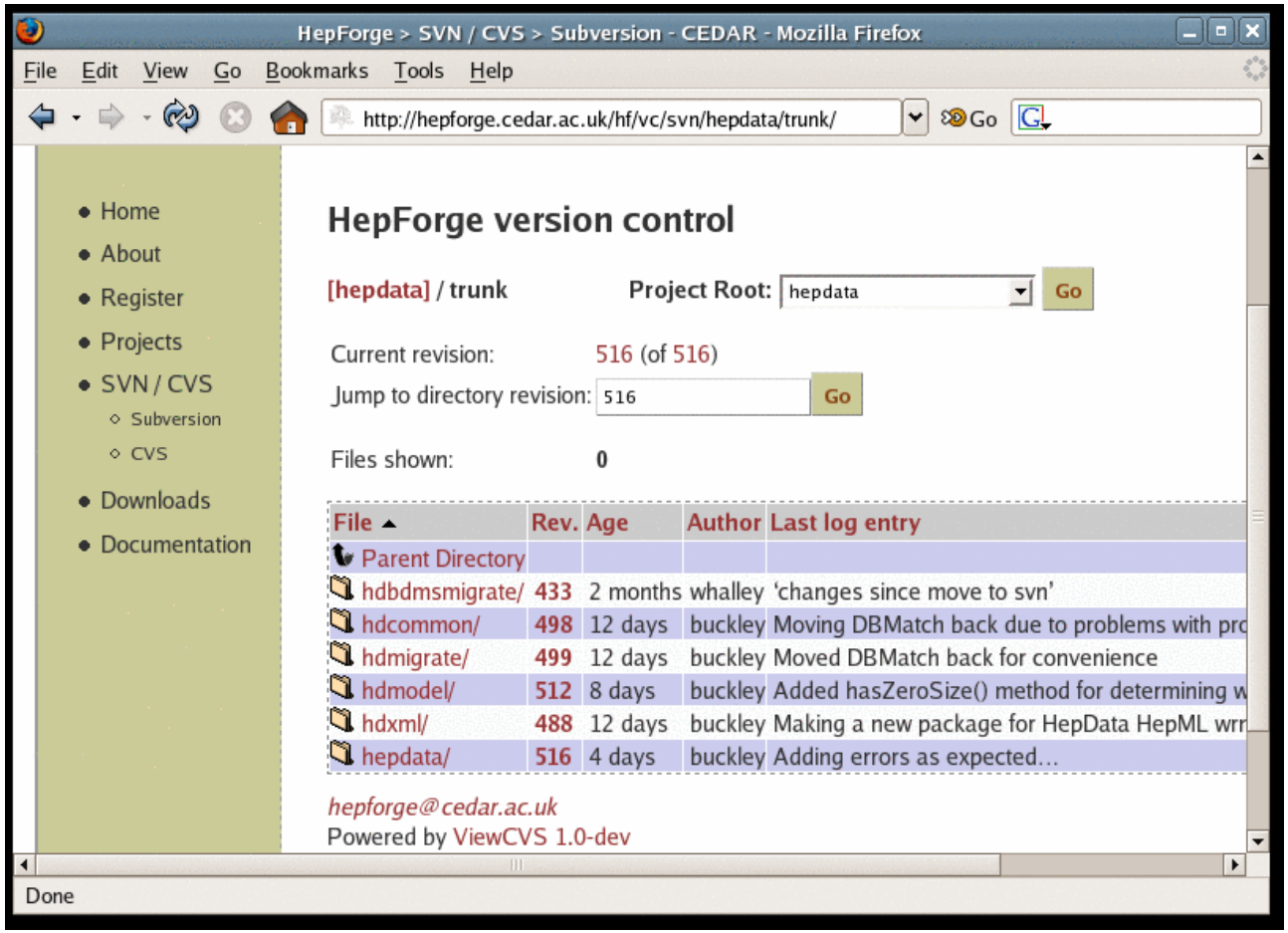
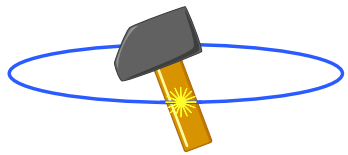
Project VC listing





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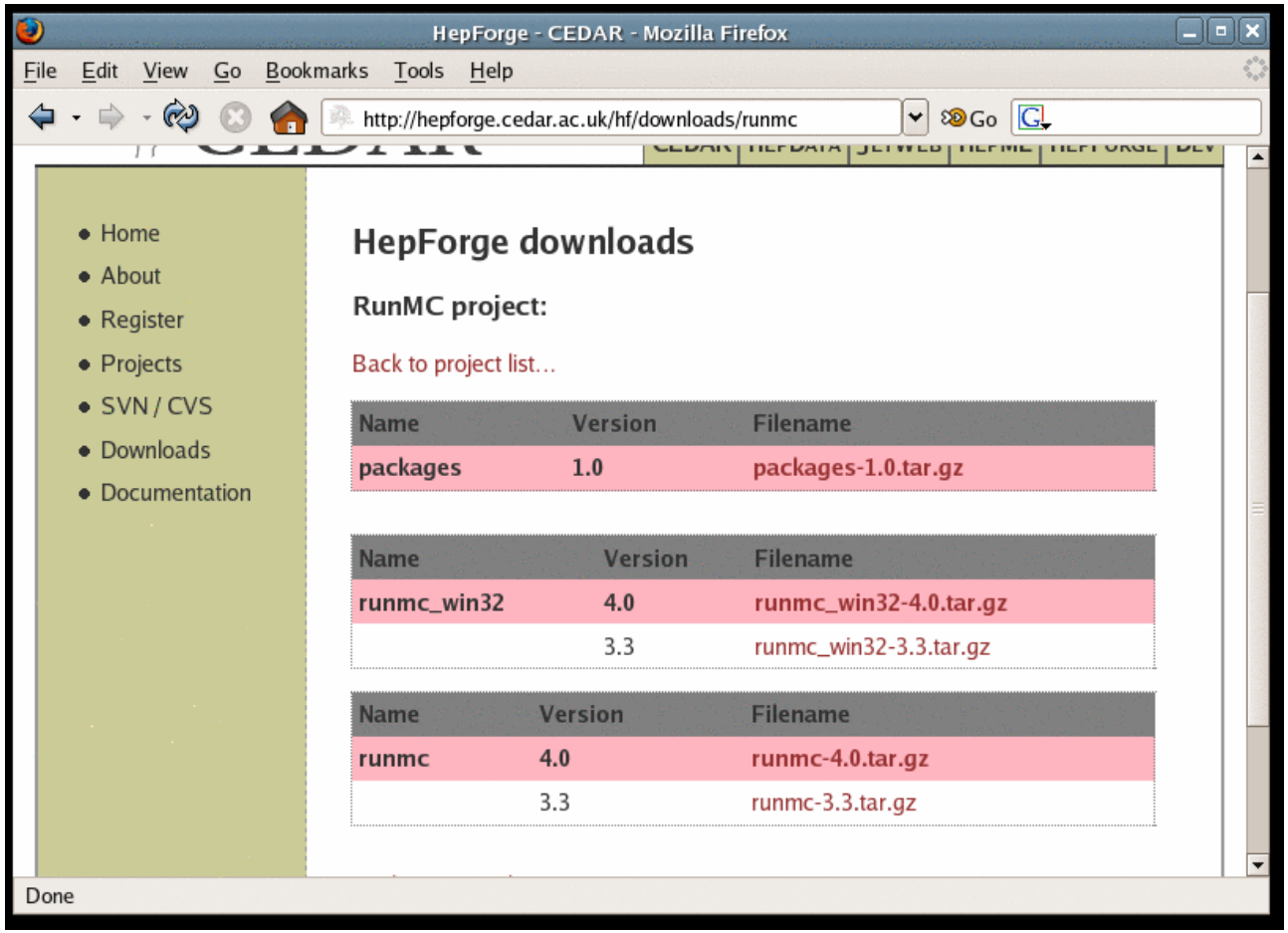
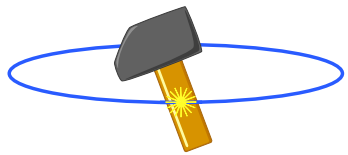
Project downloads listing (also personal copy via SSI)





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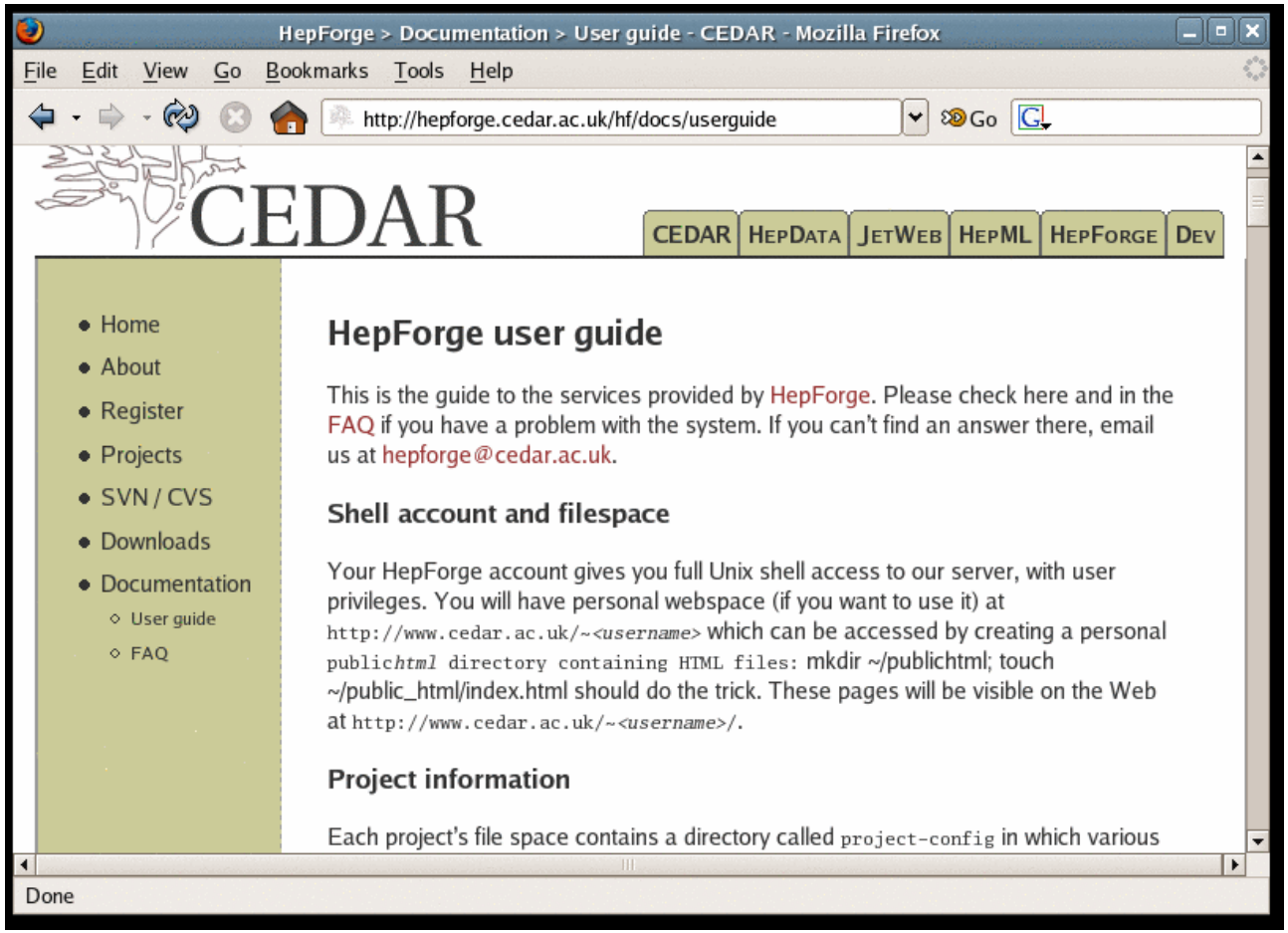
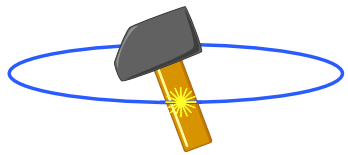
Documentation: user guide (note scrollbar!)





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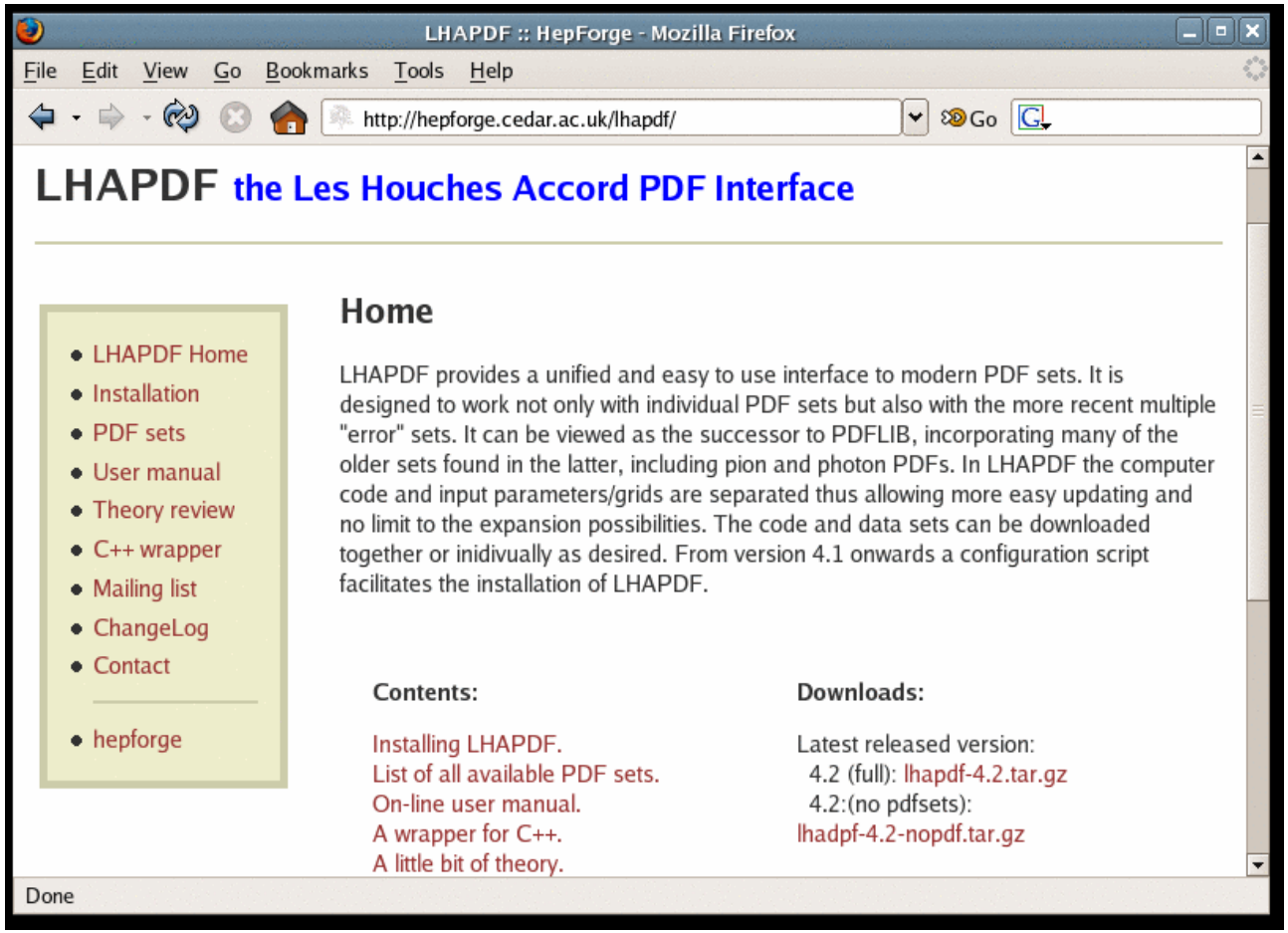
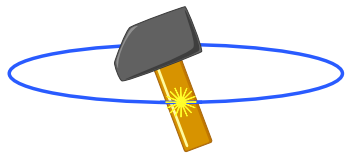
Project Web page: LHAPDF





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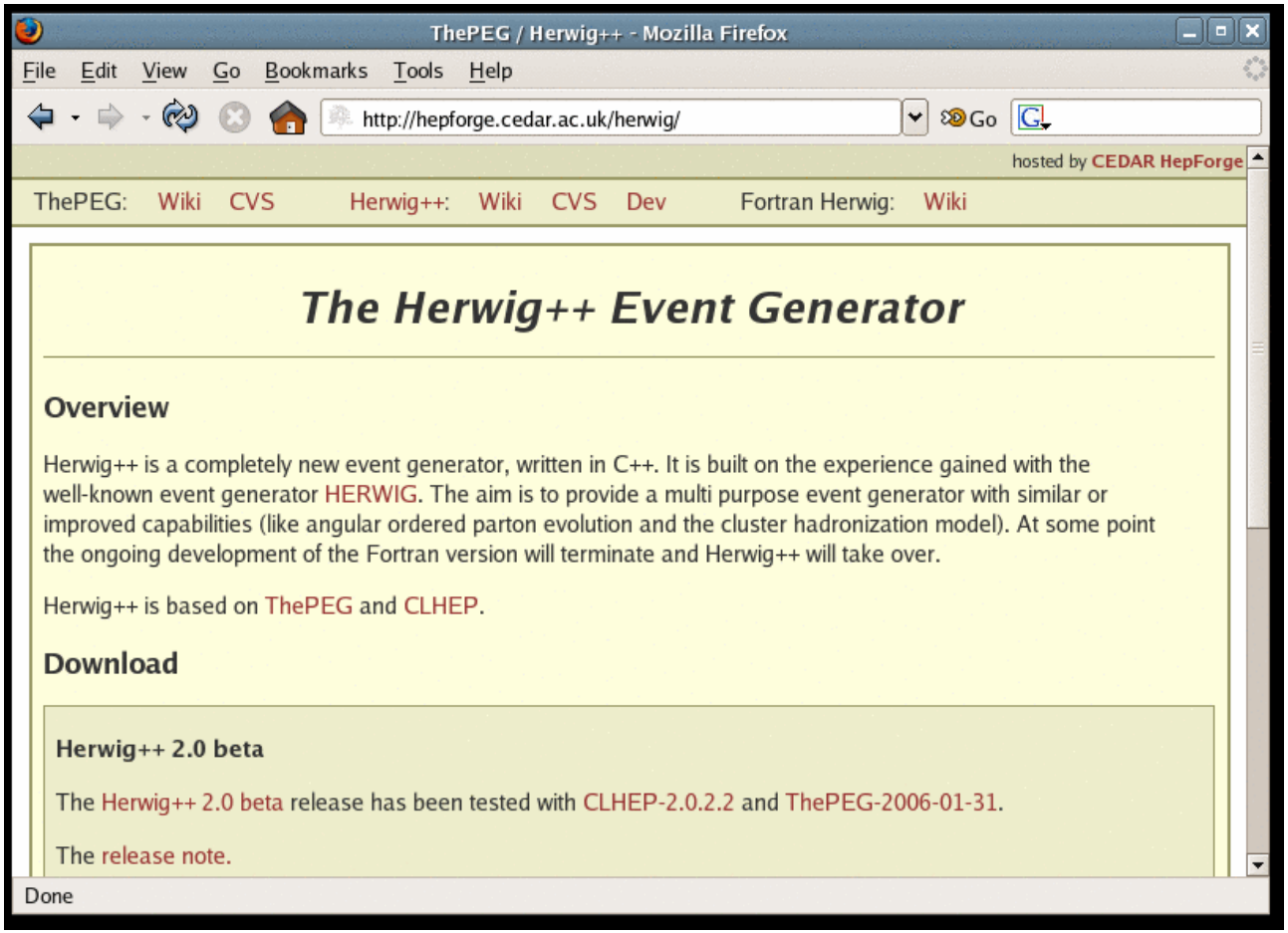
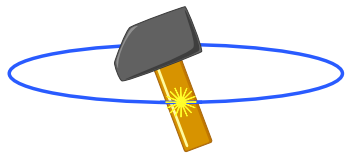
Project Web page: Herwig++





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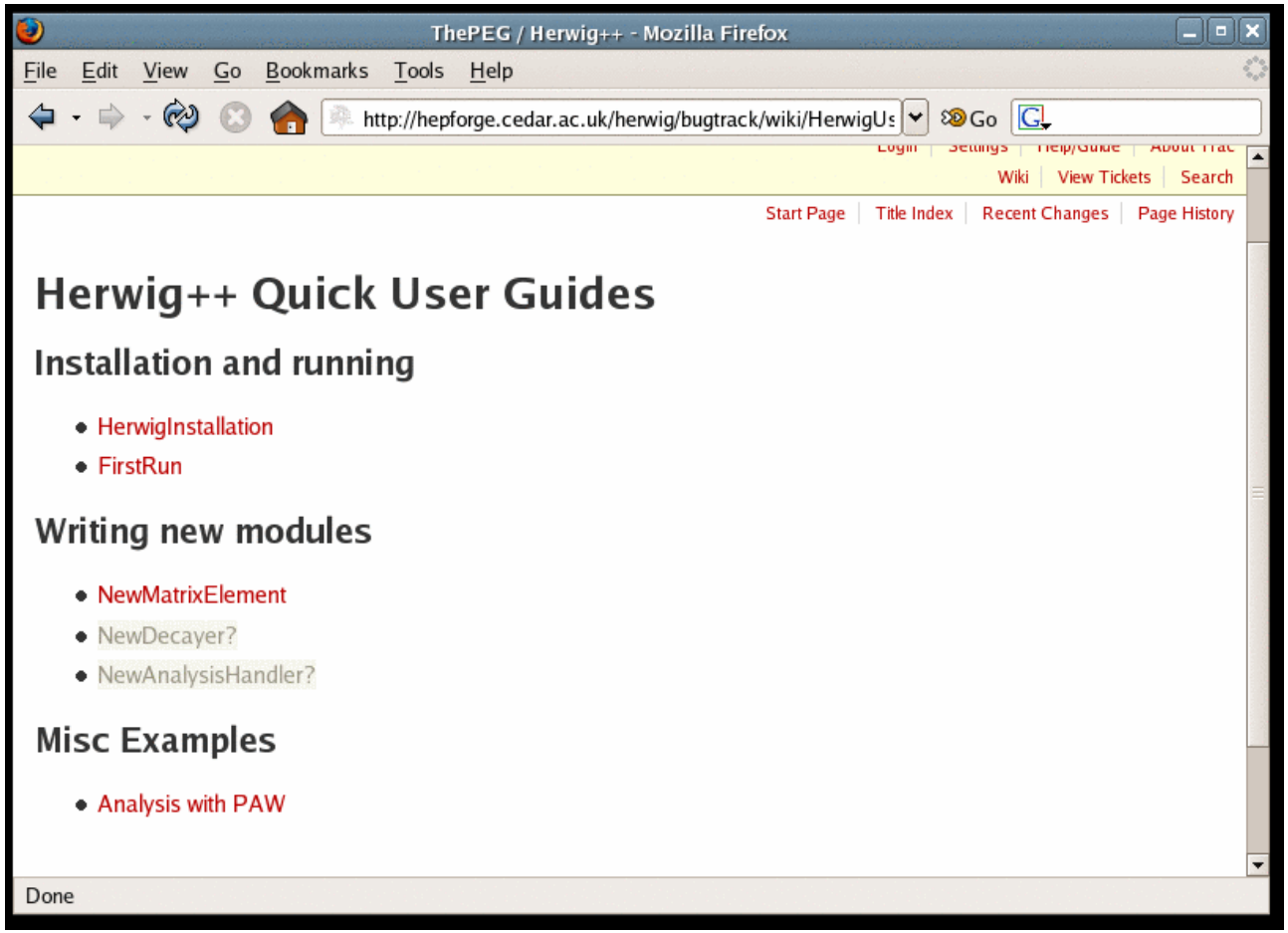
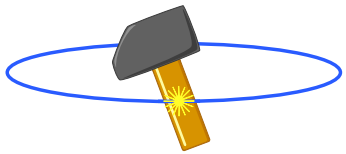
Project wiki





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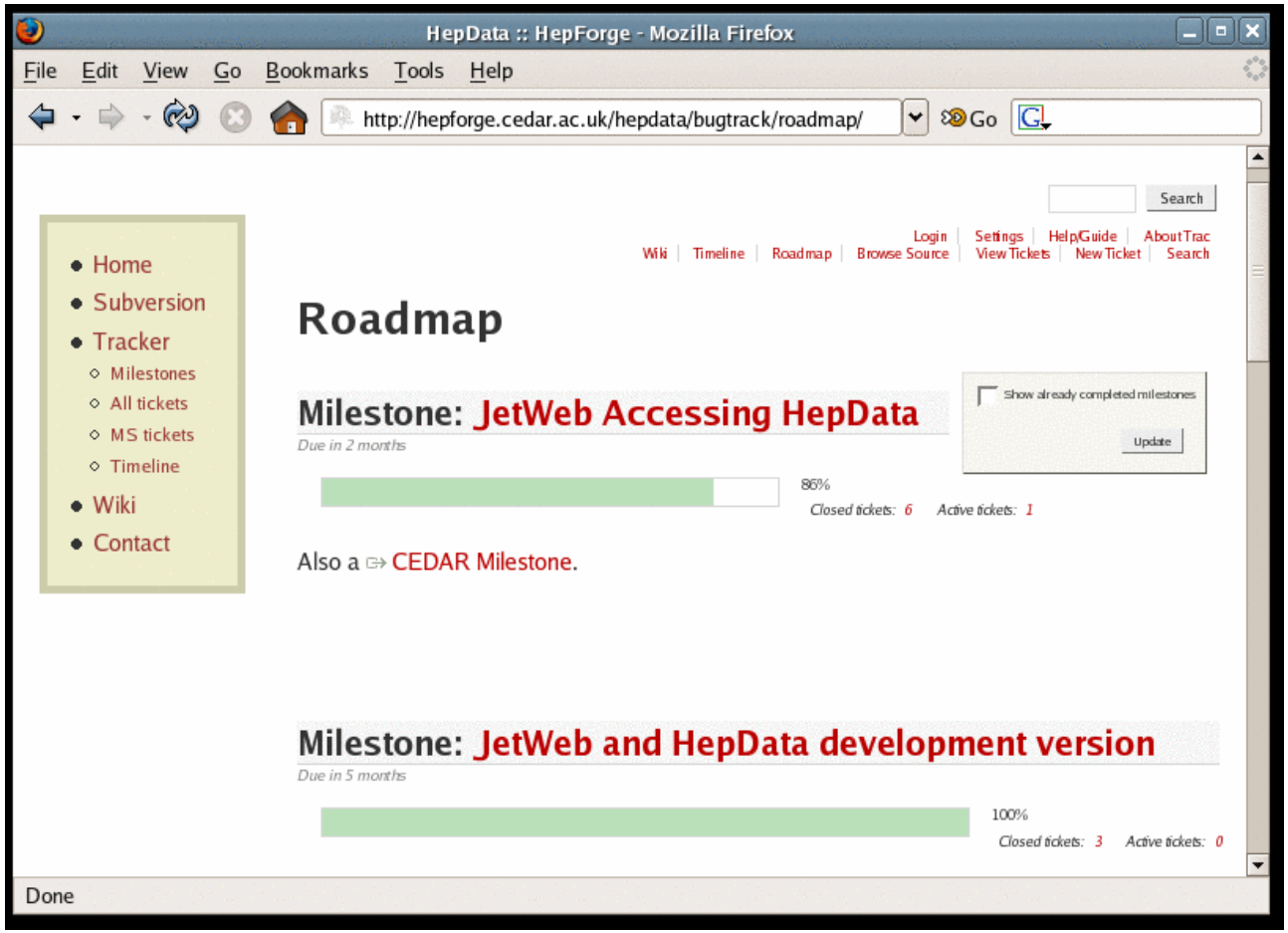
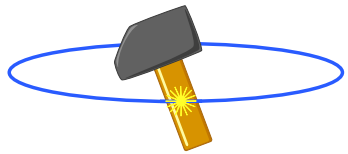
HepForge tour

Project bug tracker: milestones





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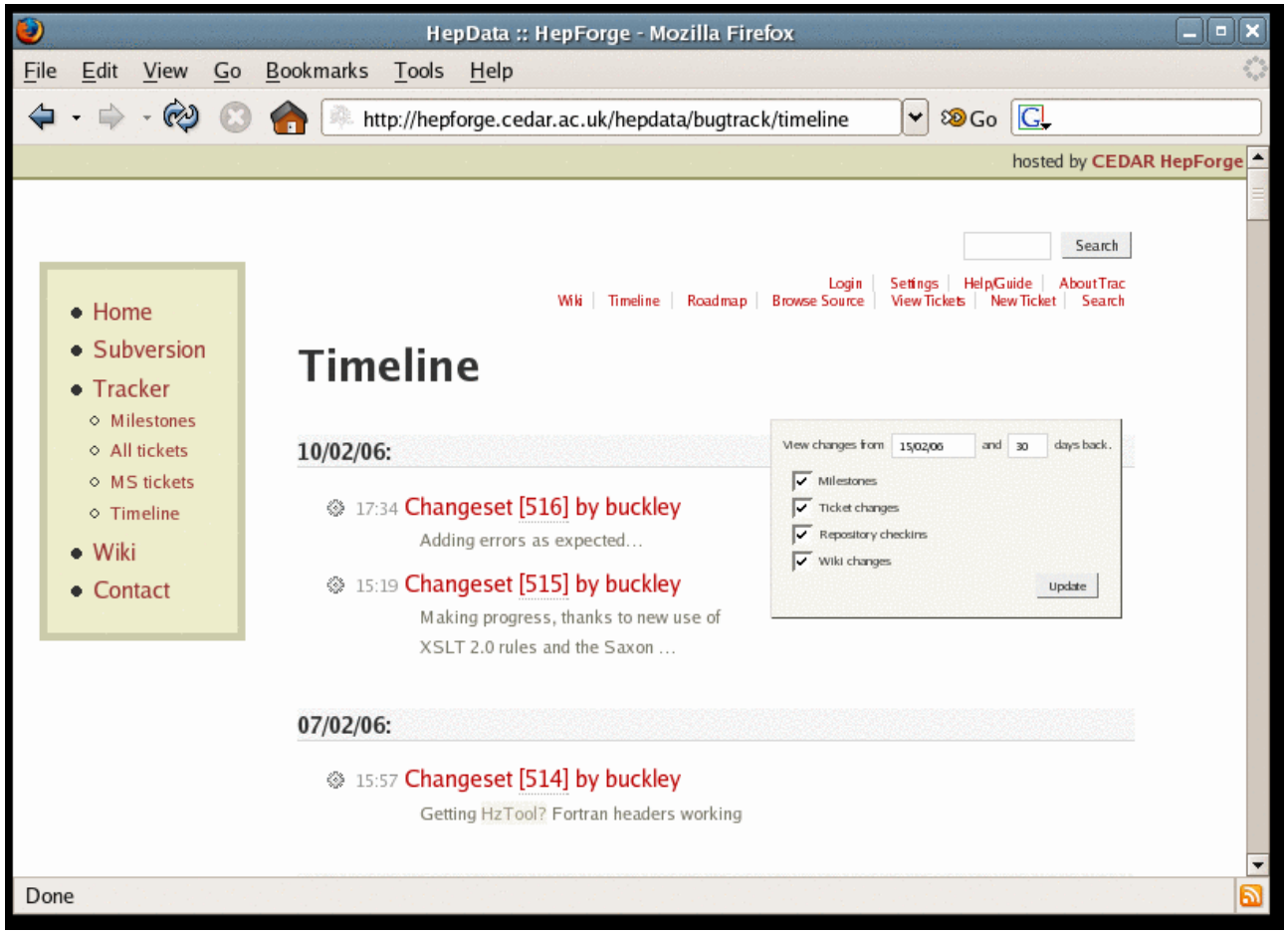
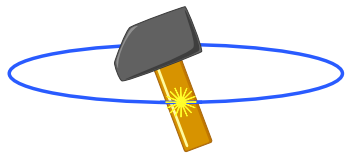
Project timeline (integrated with SVN)





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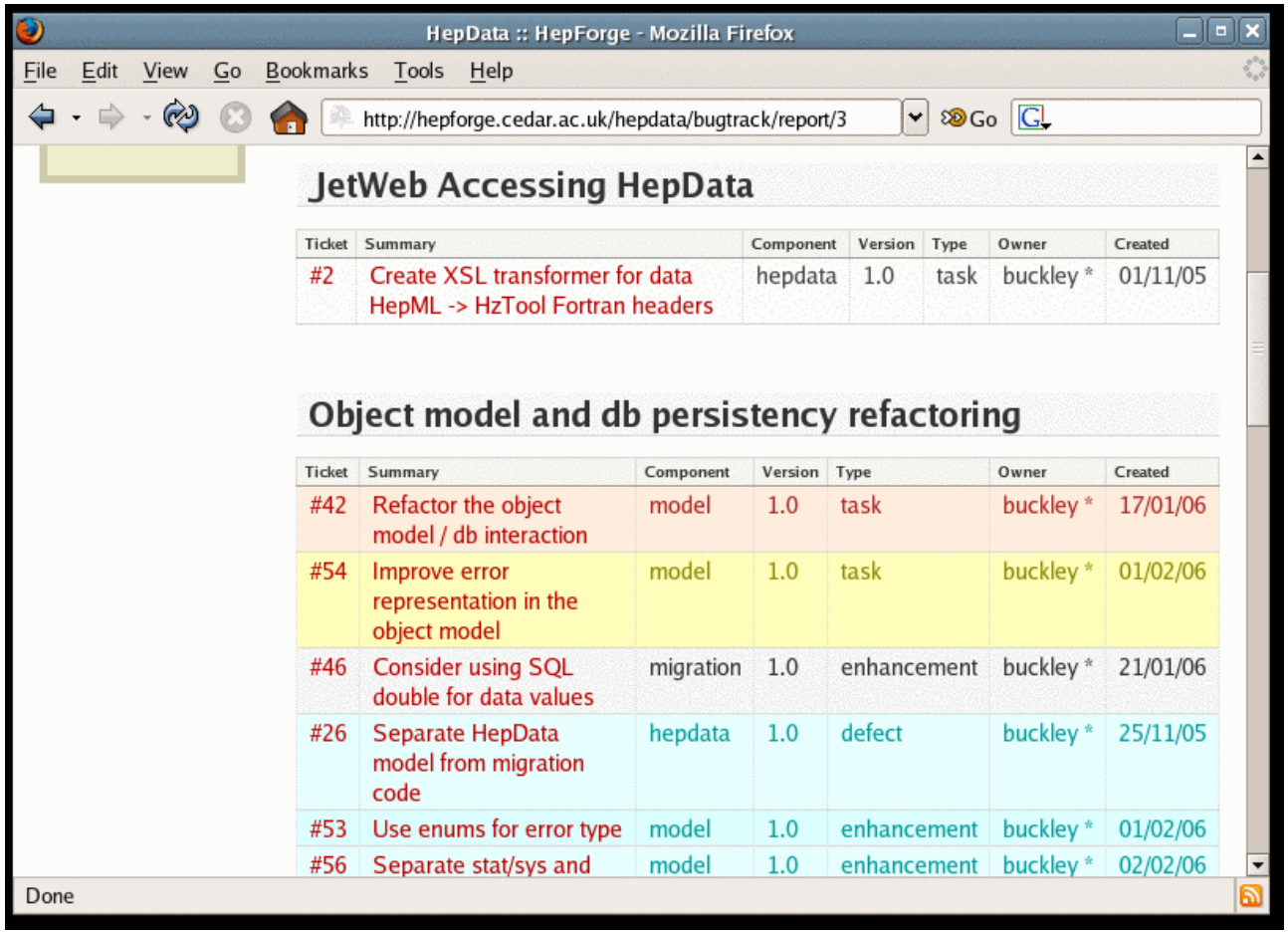
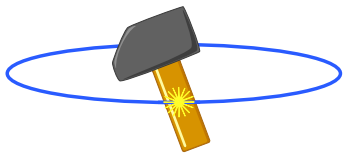
Project bug listing





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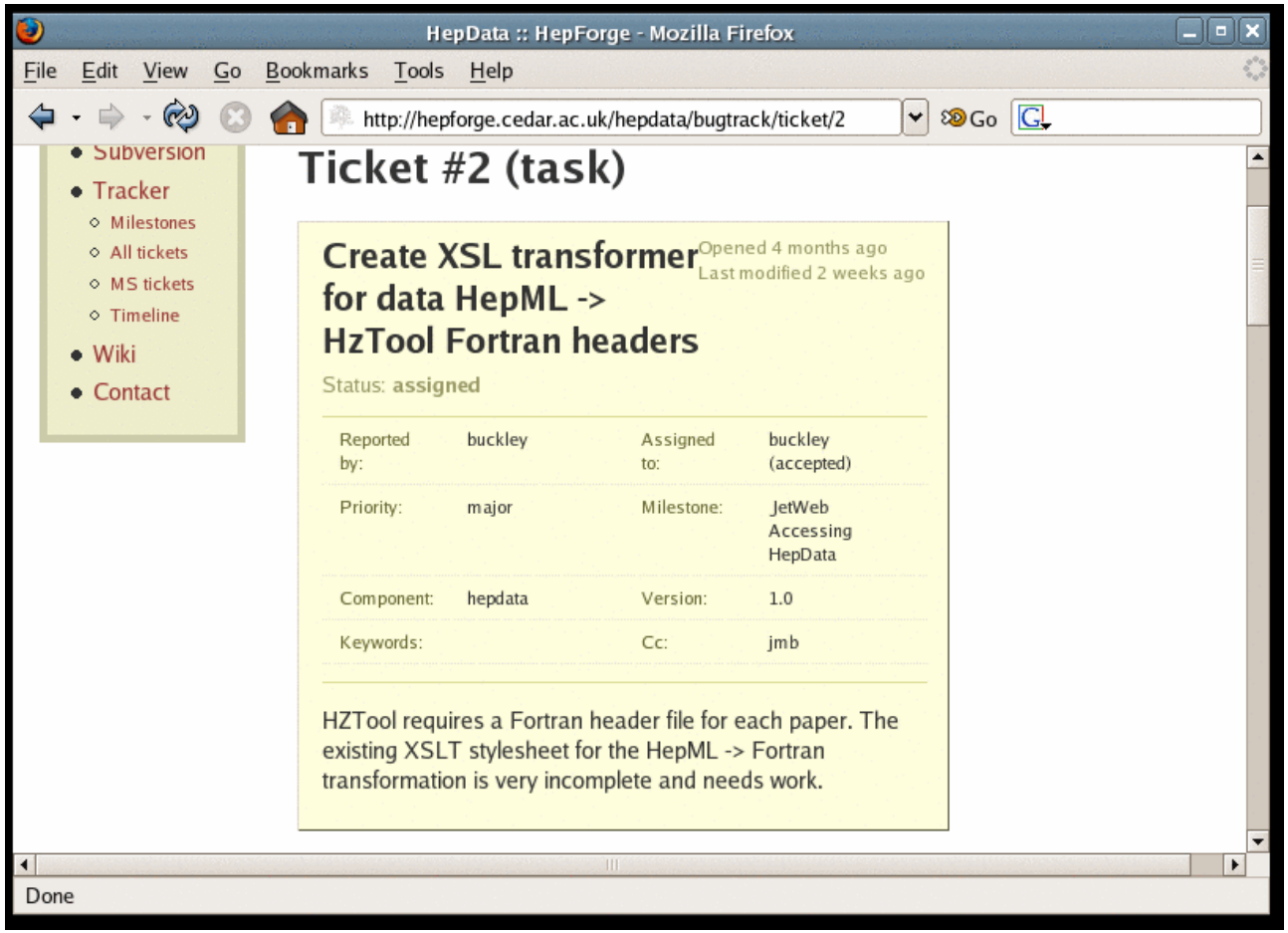
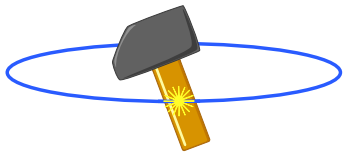
Project bug details (1)





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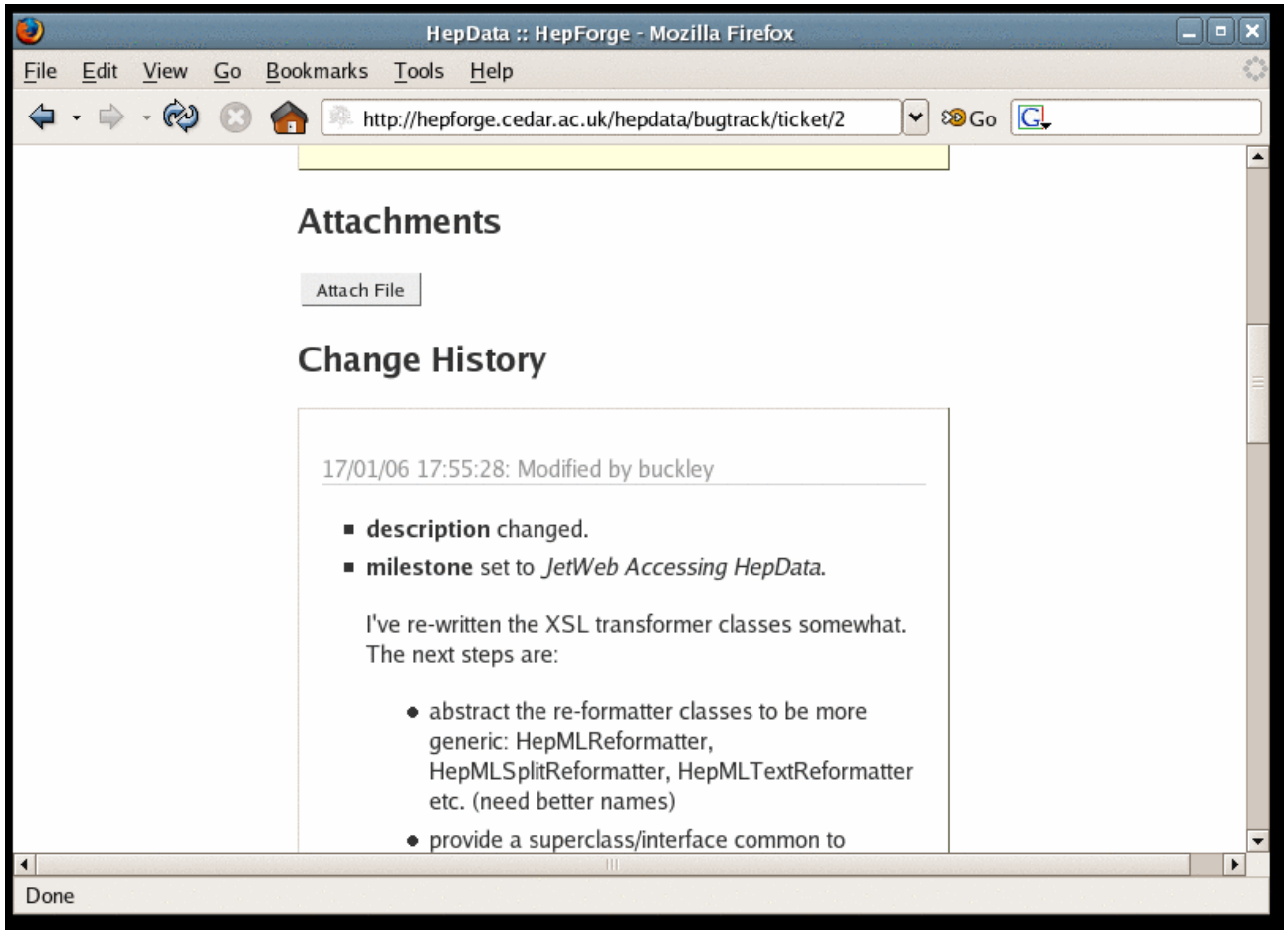
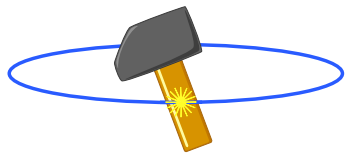
Project bug details (2)





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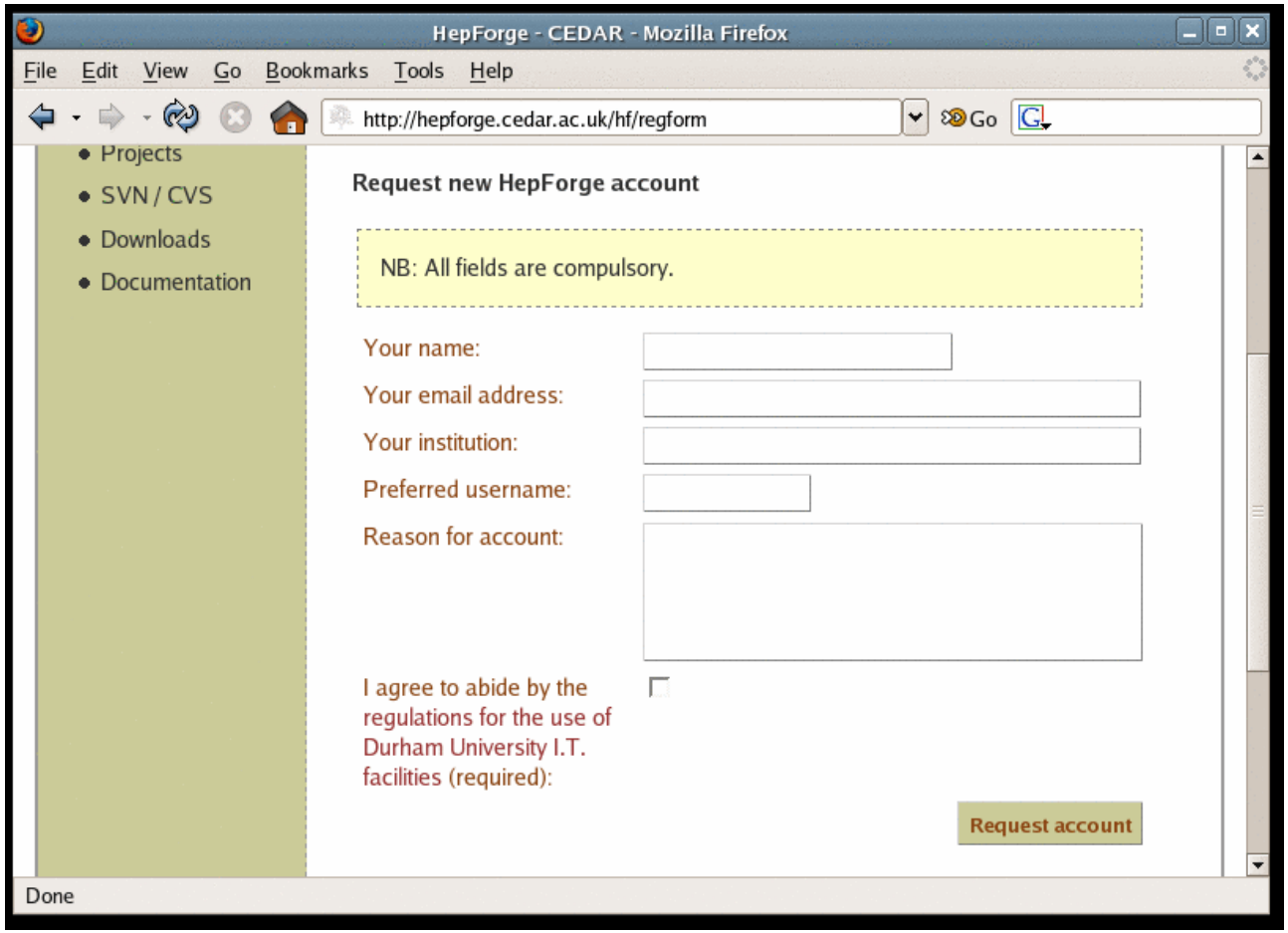
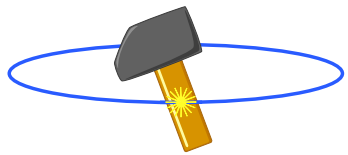
The HepForge registration form! Think about it. . .





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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, news, LaTeX . . . filters
- SSL-encryption of protected project areas
- And many others (see HepForge’s own HF project!)

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Registration

Please think about using HepForge!

- 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 proceduresetc.
    We can and will help with this!

Visit **`http://hepforge.cedar.ac.uk`** to register

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HepForge summary

- Designed to be easy to use, pick those features useful to you and ignore the rest
- Designed to encourage modular, reuseable, well-documented HEP software
- If you have a project which fits those descriptions, think about using HepForge, it could save you a lot of hassle
- Herwig, Pythia, ThePEG, SoftSusy, LHAPDF, Hoppet, FastNLO, ExHuME. . . already do!
- (Plus all the CEDAR sub-projects, of course)

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Summary

Summary

- CEDAR is primarily a generator tuning system, combining JetWeb and HepData
- HepData in its new incarnation will use HepML and other standard interfaces
- We need user (expt) input about what you want us to be do for LHC data!

- HepForge is available for HEP software development now!
- Eventually will be used to implement the HepCode repository
- Feedback has been very positive: system is powerful but very easy to use
- Consider HepForge for *your* re-useable HEP code!

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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 compatability
  - 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

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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
  - code highlighting, Markdown...
- Download manager (personalisable)

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