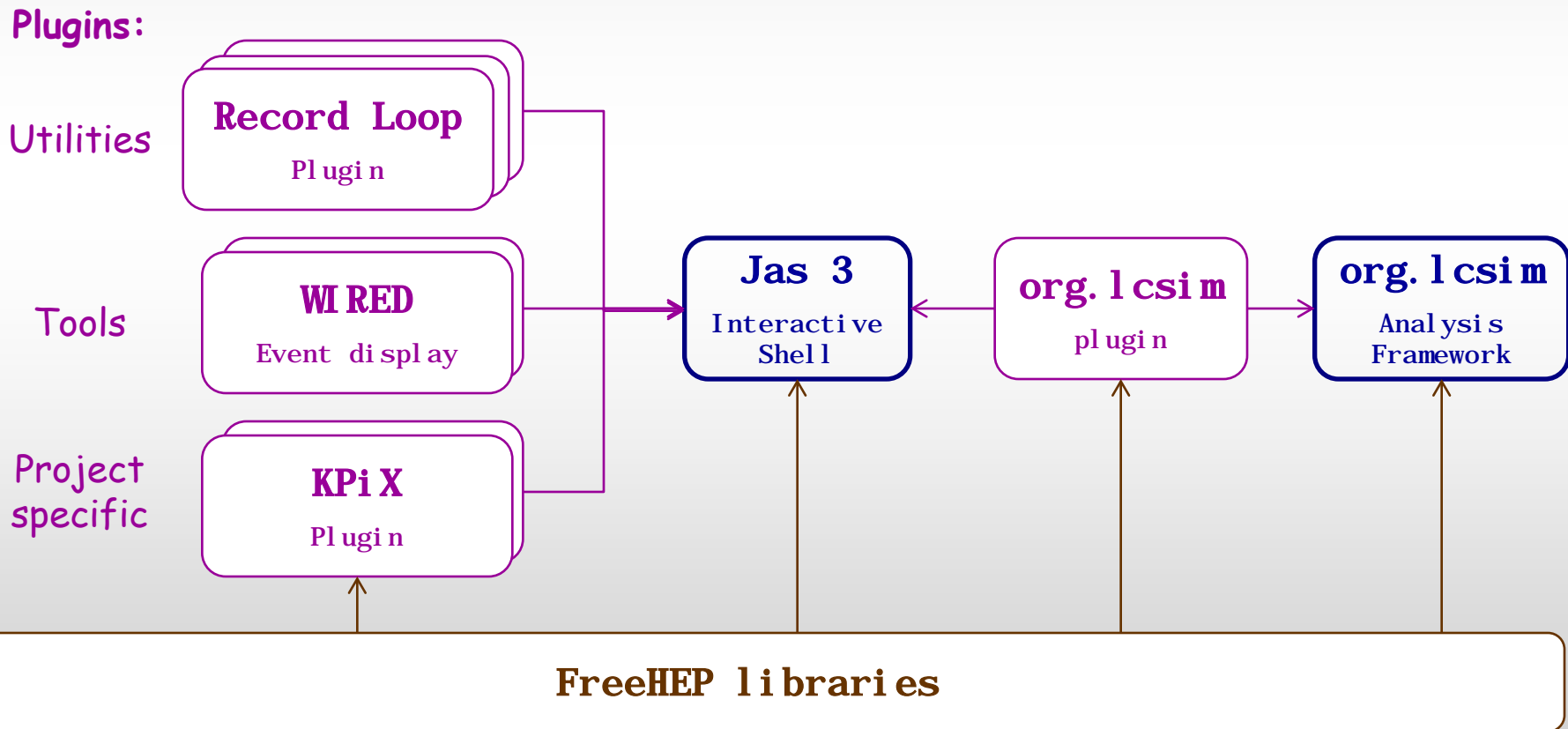


FreeHEP based software status: Jas 3, WIRED, and others

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SLAC, October 2013

- Significant changes in several FreeHEP libraries.
- Change in Jas 3 distribution approach and plugin management.
- New capabilities in Jas 3 and WIRED.
- New issues with recent Java releases.
- Short/long term outlook and possibilities.



Jas 3 Distribution

Was:

- Standard distribution includes a wide set of plugins and libraries.
- Built-in plugins are loaded in a special way
- Most additional plugins are single-file.
- No formal notion of dependency between plugins. De-facto dependencies are common.

Now:

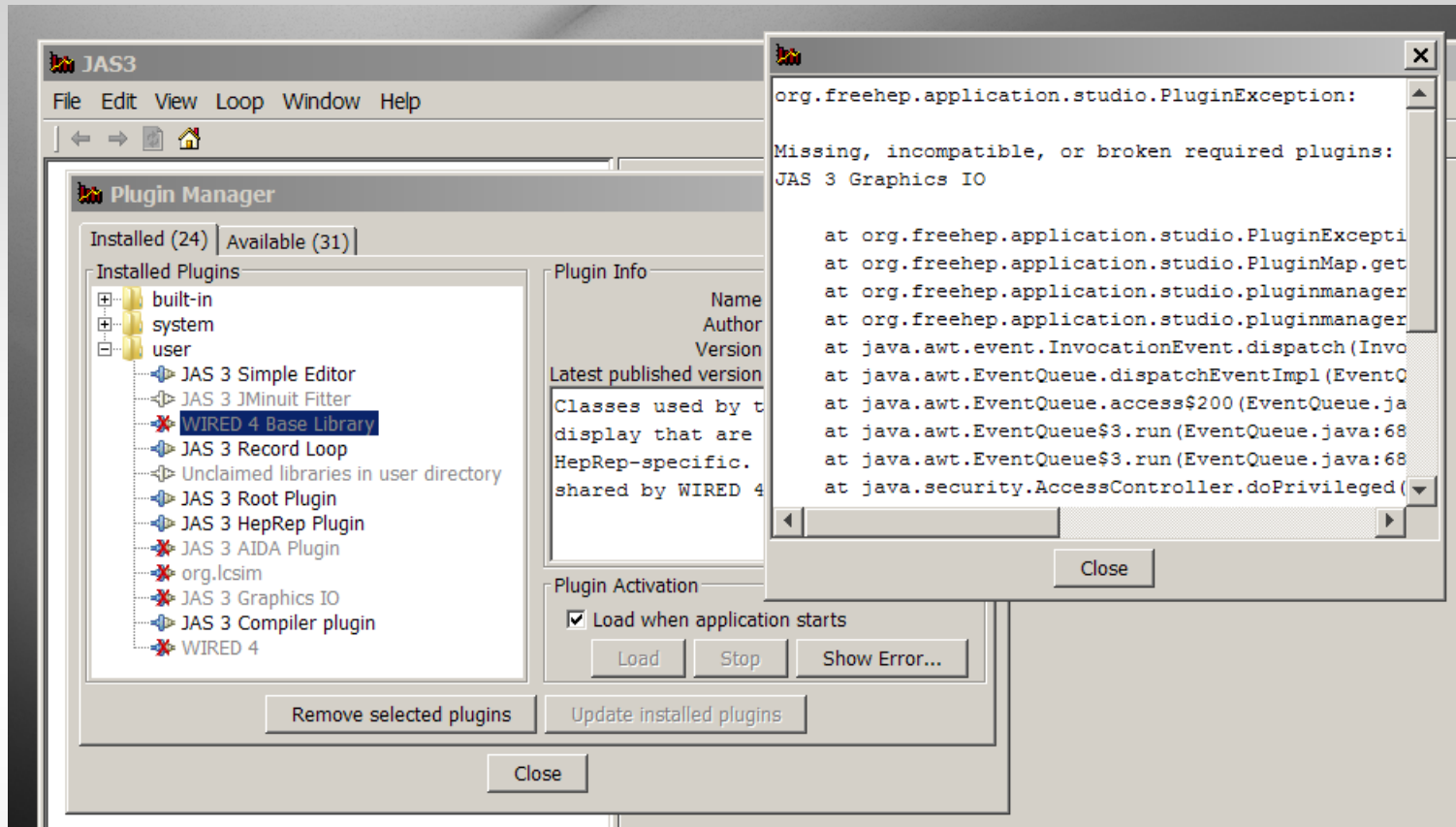
- Minimal standard distribution includes a few libraries and built-in plugins.
- All plugins are loaded the same way
- Many additional plugins consist of multiple jar files.
- Dependencies are explicitly declared, managed by Jas 3 plugin manager.



- Jas 3 is used by multiple experiments with very different sets of "standard" plugins.
- Many user plugins have grown to require multiple libraries.
- Many different workflows and installation scenarios are used - need to support all.
- Dynamic loading.
- Error reporting.

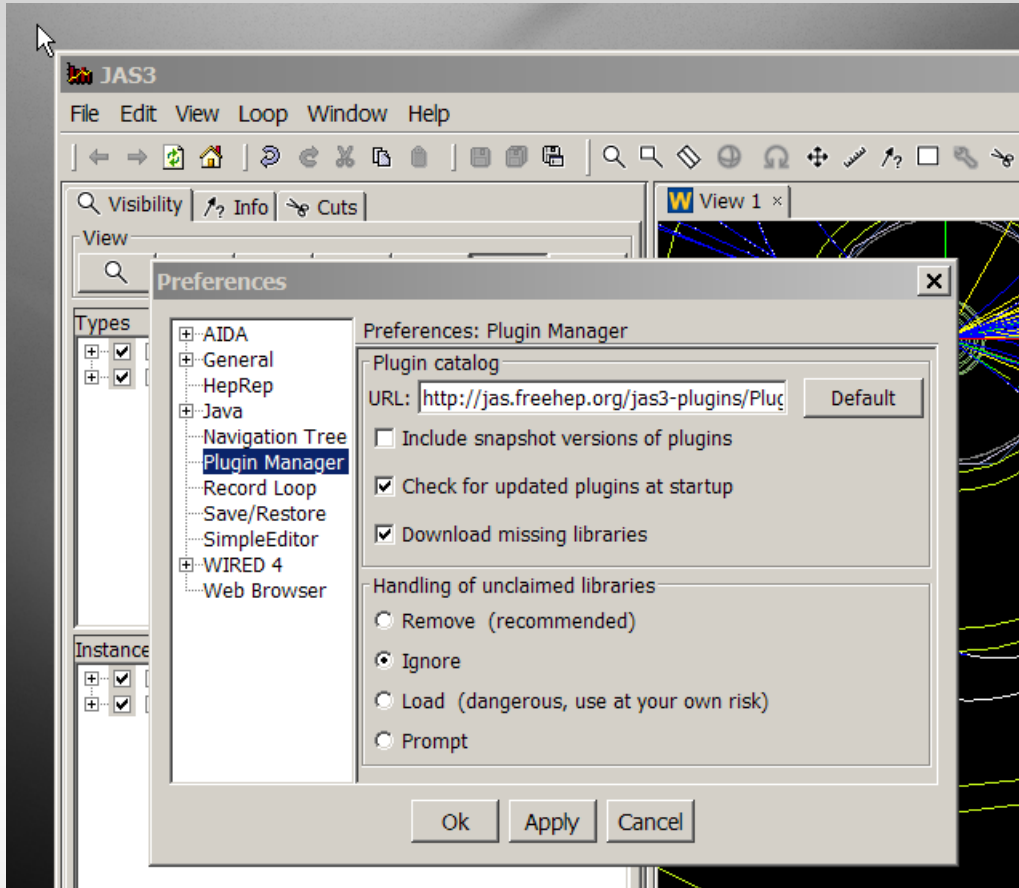
Requires a new plugin manager...

Jas 3 Plugin Manager



- Plugin life cycle: Installed - Loaded - Started
- Automated handling of dependencies
- Installation errors reported
- Multiple installation directories supported

Jas 3 Plugin Manager



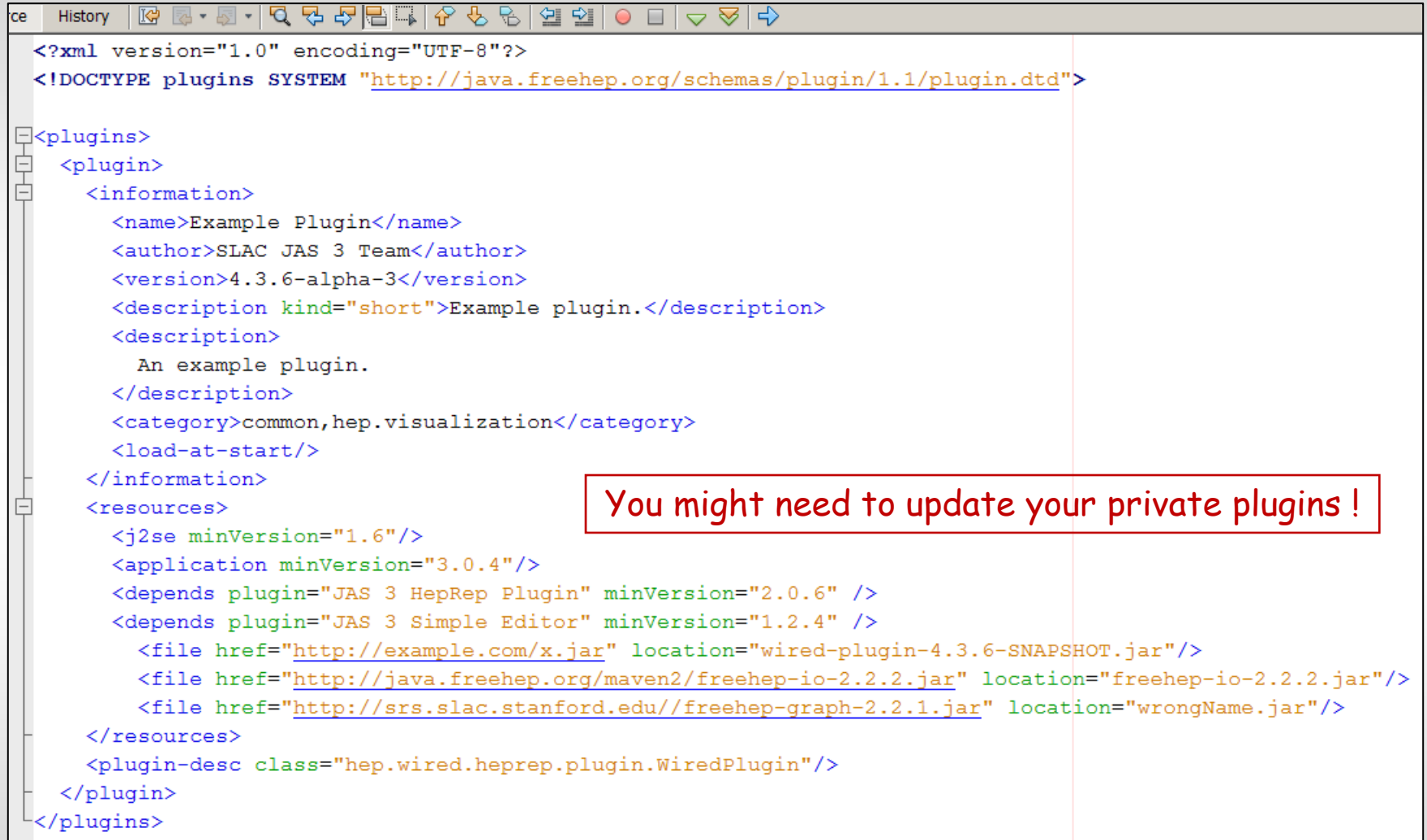
- Automated updates
- Automated downloading of missing libraries and plugins
- Tolerant to incorrectly named files and location parameters
- Flexible handling of unclaimed libraries

Limitations :

- Same class loader used for all plugins
- Limited version conflict resolution capabilities - latest requested version is loaded if the same library is required by several plugins
- No dynamic reloading at the moment

Jas 3 - Writing Plugins

<https://confluence.slac.stanford.edu/display/JAS3/How+to+write+a+JAS3+Plugin>



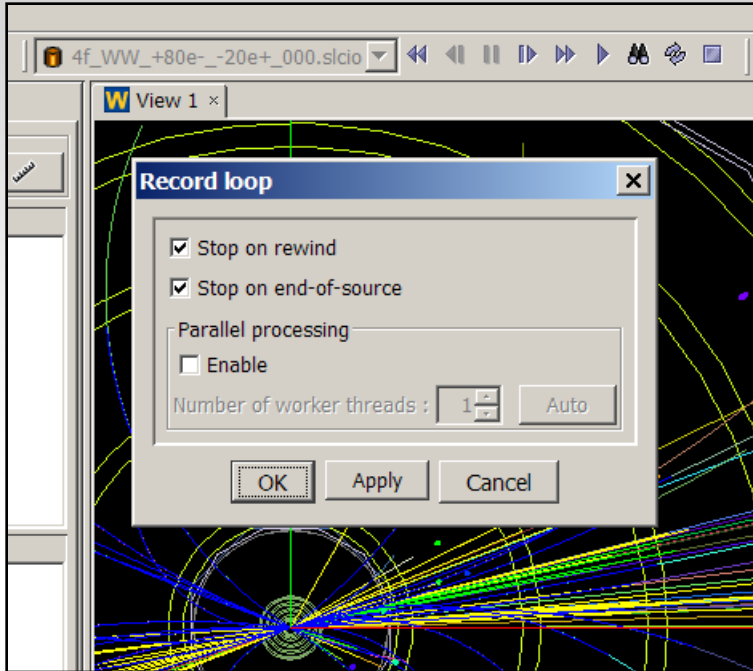
```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plugins SYSTEM "http://java.freehep.org/schemas/plugin/1.1/plugin.dtd">

<plugins>
  <plugin>
    <information>
      <name>Example Plugin</name>
      <author>SLAC JAS 3 Team</author>
      <version>4.3.6-alpha-3</version>
      <description kind="short">Example plugin.</description>
      <description>
        An example plugin.
      </description>
      <category>common,hep.visualization</category>
      <load-at-start/>
    </information>
    <resources>
      <j2se minVersion="1.6"/>
      <application minVersion="3.0.4"/>
      <depends plugin="JAS 3 HepRep Plugin" minVersion="2.0.6" />
      <depends plugin="JAS 3 Simple Editor" minVersion="1.2.4" />
      <file href="http://example.com/x.jar" location="wired-plugin-4.3.6-SNAPSHOT.jar"/>
      <file href="http://java.freehep.org/maven2/freehep-io-2.2.2.jar" location="freehep-io-2.2.2.jar"/>
      <file href="http://srs.slac.stanford.edu//freehep-graph-2.2.1.jar" location="wrongName.jar"/>
    </resources>
    <plugin-desc class="hep.wired.heprep.plugin.WiredPlugin"/>
  </plugin>
</plugins>
```

You might need to update your private plugins !

freehep-jas-plugin can generate list of libraries and submit plugin descriptor to database

Jas 3 - Record Loop Plugin



- Support for random access to records.
- Stop / pause functionality.
- Support for parallel processing.
- Support for multiple record sources.
- User code error handling.

Not backward compatible.

org.lcsim framework and plugin have been updated to work with the new record loop.

WIRED 4 - New Features

The screenshot displays the JAS3 software interface. The main window shows a 3D visualization of particle tracks in a detector, with various colored lines representing different particle paths. The interface includes a menu bar (File, Edit, View, Loop, Window, Help), a toolbar with navigation and editing tools, and a status bar showing the file name "4f_WWV_+80e_-20e+_000.slcio".

On the left side, there are two panels: "Types" and "Instances". The "Types" panel lists various detector components with checkboxes, including DetectorType, Barrel, EcalBarrel, HcalBarrel, MuonBarrel, SiTrackerBarrel, SiVertexBarrel, SolenoidCoilBarrel, Endcap, EventType, and Clusters. The "Instances" panel lists multiple instances of "Charged" particles, with one instance highlighted in blue.

A "Preferences" dialog box is open in the foreground, titled "Preferences: WIRED 4 Graphics". The dialog has a tree view on the left with categories: AIDA, General, HepRep, Java, Navigation Tree, Plugin Manager, Record Loop, Save/Restore, SimpleEditor, WIRED 4, and Web Browser. The "WIRED 4" category is expanded, showing "Graphics" selected. The "Graphics" settings include:

- Honor line style attributes (slow)
- Mark size multiplier: 1.0
- Use layering
- Background color: [Black swatch]
- Selection display:
 - Selected objects: Color [Magenta swatch] Line width factor
 - Not selected objects: [Grey swatch]
- Reset button

At the bottom of the dialog are "Ok", "Apply", and "Cancel" buttons.

WIRED 4 - New Features

- Selection is synchronized between all components.
- Selection and settings can be shared by multiple views.
- Filtering of selectable objects by type and layer.
- User-configurable rendering of current selection.
- Cuts are fully implemented.
- Extended set graphics rendering options (global and plot-specific). Support for line attributes and styles.
- Overriding default color map.
- Show mouse coordinates when in a view where this makes sense.
- Keyboard shortcuts.
- Extended functionality of CORBA server plugin.
- Multiple bug fixes, reliability, performance, and interface improvements.

Most of WIRED codebase has been cleaned up and refactored - excellent starting point for implementing new functionality.

... what functionality ?

- Modifying graphics attributes of selected instances and types.
- Boolean operations on selections.
- Saving/Loading selections.
- Scripting cuts and selections.
- Actions.

- Rendering
- HepRep validation.

Other libraries used by SiD

org.lcsim framework and plugin

- updated to work with minimal Jas 3 distribution and the new record loop

KPiX plugin

- Reader for KPiX binary format.
- HepRep converter for use with WIRED event display
- Event server/client for connection to beam test DAQ

Conditions framework

- Generic database-friendly implementation is coming soon.
- Conditions listener functionality will be fixed.

FreeHEP Libraries

Basis for all libraries and applications discussed earlier.

<http://java.freehep.org/>

- Major fixes, updates, and additions to Application Framework, IO Library, JAIDA, JMinuit, Record Manipulation Library, SWING Extensions, Utilities Library, Utilities for Web Applications, HepRep Library.
- All builds are mavenized.
- Library for conversion of AIDA objects to ROOT.

Major issues

Vectorgraphics:

- Use of undocumented API
- Compatibility with various JDK versions
- Maintenance arrangements

AIDA:

- Bugs and incomplete implementation.

FreeHEP

<http://java.freehep.org/>

Jas 3

<http://jas.freehep.org/jas3/>

<https://confluence.slac.stanford.edu/display/JAS3/Home>

WIRED

<http://wired.freehep.org/>

Known issues (JIRA): [FreeHEP](#) - [Jas 3](#) - [WIRED](#)

expect frequent releases in the coming weeks