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Status of AIDA and JAS 3

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1. AIDA

AIDA (Abstract Interfaces for Data Analysis) project [1] is relatively new. It was conceived during HepVis-99 workshop in Orsay (http://www.lal.in2p3.fr/HEPVis99). The goals of the AIDA project are to define abstract interfaces for common physics analysis objects, such as histograms, ntuples, fitters, IO etc. The adoption of these interfaces should make it easier for physicists to use different tools without having to learn new interfaces or change all of their code. Additional benefits will be interoperability of AIDA compliant applications (for example by making it possible for applications to exchange analysis objects via XML).

Also by bringing together the authors of a number of different applications we expect to gain deeper insight into the strengths and weaknesses of different applications, and to improve collaboration between different authors.

Currently AIDA is distributed with bindings for C++ and Java. Since AIDA defines only abstract interfaces, a concrete implementation is needed to use AIDA. The following tools are currently available with support for AIDA: Anaphe [2] and OpenScientist [3] are written in C++, JAIDA/JAS [4] [5] written in Java.

JAIDA is a Java implementation of AIDA, it can be used as a stand-alone package or together with some analysis tool (like JAS). JAIDA is also distributed with AIDA-JNI package that allows any C++ program written using the C++ AIDA interfaces to be linked to any Java implementation of AIDA. This way C++ programs can take advantage of the multi-threaded, cross-platform graphical capabilities of Java, and of the JAIDA implementation of AIDA in particular.

1.1. AIDA 3.0

After the first public release of AIDA in December 2001 (AIDA 2.2), the work began on improvement of existing interfaces and expanding their functionality. As a result of this effort a new, 3.0, release is now available. It can be downloaded from the AIDA web site [1].

Main improvements in AIDA 3.0 release are in areas of data collection, fitting and graphical representation. Features of the new release allow the user to do:

Data manipulation - Create, chain, filter and project N-Tuples. Operate with binned and unbinned histograms, vectors and collections of measurements.

Fitting - Binned and unbinned fits with a variety of fitting methods and ability to change minimizers. User can select between standard fitting functions, functions created from script at runtime, or write its own specific functions.

Plotting - System-independent way for graphical representation of data collections (histograms, vectors, sets of measurements) and functions with a variety of plotting styles.

2. JAS

Java Analysis Studio (JAS) [5] is a multipurpose interactive data-independent analysis application, featuring rich GUI, built-in editor and compiler. The application can be used either as a stand-alone application, or as a client for a remote

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Java Data Server. The client-server mechanism is targeted particularly at allowing remote users to access large data samples stored on a central data center in a natural and efficient way. JAS is written entirely in Java, that makes it platform-independent, and it is extendible through a plugin mechanism.

2.1. JAS 3.0

JAS 3 represents a major rewrite of many components of JAS. The main aim is to make JAS a modular application framework, into which various analysis components or "services" can be plugged.

All of the base JAS functionality will be implemented using "plugins" which will enable users to add/remove/replace components as needed. The component architecture will make it easy to customize JAS for use in different experiments, and in fields beyond HEP. In general, plugins will communicate with each other only via stable service API's, which will make it much easier to update individual plugin components without having to wait for an entire JAS release cycle.

Major plugins for HEP work will eventually include:

JAIDA - The Java implementation of AIDA. This will provide basic histograming and fitting functionality of JAS3. The optimizers used by JAIDA will themselves be plugins, and will initially include Minuit and Uncmin.

WIRED4 - The next release of the HepRep based Java event display.

Scripting - JAS3 will be scriptable using a variety of OO scripting languages. Initial plugins will include support for scripting using Pnuts and Jython.

Java compiler and dynamic loader - For compiling and loading Java programs.

Editor - A general purpose text editor for editing Java programs and scripts.

TupleExplorer - Will provide the ability to dynamically create plots from N-Tuple data. Functionality will include the ability to create cuts and immediately see the effects on the related plots.

Plotter - An improved plotter based on the existing JAS2 plotter. The plotter will become a separate component of the FreeHEP library, making sure it continues to be easy to use the plotter in other applications. The plotter will itself use the plugin mechanism internally, making it easy for users to extend the plotter to support specialized plot types.

Physics - Basic physics utilities including 3-vector and 4-vector libraries, jet finders, event shape analysis etc.

Data Access Plugins – Various data access plugins will be available, making it possible to read a variety of data formats including PAW and Root files. These files will be presented to the user as AIDA objects, making it possible to operate on Ntuples, Histograms etc without having to worry about what format the are stored in.

Job Control - The Job control plugin will provide functionality similar to the existing JAS2 functionality, making it possible to use JAS to read generic "event" data, either locally or remotely.

GRID Data Access - The GRID Data Access plugin will allow JAS to seamlessly access data and compute resources from the HEP Data Grid.

The preliminary "beta" version of JAS 3 will be released in November 2002, and we expect the first production release to be available by the end of 2002.

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