HDF Java

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What is HDF-Java?

High-level architecture:

- Java Application
- Java Object Layer API
- Format-specific / Java Native Interface (JNI) implementations
- HDFView
An HDF-Java Timeline

- **Jan 1996**: Java 1.0 Proposal
- **Fall 1997**: JHV & JHI

- **Summer 2002**: HDF5 Object Layer Spring 1999
- **Summer 2003**: Abstract Interfaces & plug-in framework Spring 2003

- **Summer 2009**: JPSS: region references & bitfields Summer 2009
- **Summer 2013**: CF Conventions
Support:

• Prebuilt-binaries:
  • Windows 32- and 64-bit (Visual Basic 2012)
  • Mac OS X Darwin
  • Linux CentOS 5 and CentOS 6
  • Solaris

• Source distribution with CMake builds
The Good:

- JNI layer is moderately complete (limited callbacks)
- HDFView application most popular HDF download
- HDFView plug-in architecture for customization

The Bad:

- JNI data type implementation is incomplete and insufficiently documented (compound types)
- HDFView and Object Model memory usage is very inefficient
- Java staffing has dwindled

The Ugly:

- The HDFView “look and feel” is outdated
Current Work

• Separate JNI layer from Pure Java code
  • Include HDF4 and HDF5 JNI layers with the appropriate library release (from HDF5 v1.10)
  • Release HDFView separately as complete standalone application (plus source)
  • Use Ant to build native Java components

• Prototyping an SWT GUI implementation
  • More modern and platform-native look and feel
  • Anticipates the deprecation of the Swing GUI

• Prepare for HDF version 1.10
  • API changes and new features
  • All new Java development will target v1.10

• Memory Model
  • Study issue and make plan for remedy
Other HDF5-capable Java APIs

• NetCDF Java (Unidata, UCAR)
  • Implements the Common Data Model (CDM)
  • Supports a wide variety of scientific data formats and products
  • Native Java reading / JNI (netCDF C library) writing
  • [http://www.unidata.ucar.edu/software/thredds/current/netcdf-java/](http://www.unidata.ucar.edu/software/thredds/current/netcdf-java/)

• JHDF (Swiss Institute of Bioinformatics)
  • Supports Linux, Windows, Macintosh 10.6 – 10.10
  • High-level API on top of HDF JNI layer
• Do our users need/want....
  • More JPSS-specific tailoring (e.g., plugins)?
  • Additional functionality?
  • Additional platforms or builds?
  • Maintain the status quo?
THANK YOU

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http://www.hdfgroup.org/products/java/
Current Status

Basic capabilities & limitations

HDFView:
- Image & table views, editing, animation, some metadata convention support
- Plug-in architecture for I/O and GUI (netCDF, FITS, HDF-EOS2/5)
- Outdated graphical interface; scope creep

Java Object Layer:
- Abstraction of HDF & generic dataset concepts
- Data type mapping issues from HDF representation to Java
- Memory model: monolithic

HDF4/HDF5 JNI Layer:
- Most HDF functionality and data types supported
- Some missing: e.g., variable length types, compound compound

http://www.hdfgroup.org/products/java/
### Table

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#### General Attributes
- **Name**: aerosol_optical_thickness_550_ocean
- **Type**: HDF5 Scalar Dataset
- **Object Ref**: 1068125
- **Dimension Size**: 380 x 360
- **Max Dimension Size**: 380 x 360

#### Dataset and Datatype
- **Size**: 380 x 360
- **Data Type**: 32-bit floating point

#### Histogram
- **Title**: aerosol_optical_thickness_550_ocean - by pixel index
- **X-axis**: 0.0 - 0.6
- **Y-axis**: 0.0 - 1.0
- **Bins**: 10
- **Compress**: GZIP level 5
- **Fill value**: -999.0
- **Color Scale**: 0.0000 - 3.795

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**9/23/2015**