

- Analysis tools
- Calibration and alignment
- Collaborative tools and projects
- Commercial
- Concurrency
- Concurrent I/O
- CPU and co-processor architectures
- Data mining and analytics
- Data preservation
- Data storage and access
- Data structures and algorithms
- Databases
- Detector geometry description
- Detector simulation
- Development and integration
 - Build management
 - Code management
 - Development environment tools
 - Packaging and distribution
 - Testing tools and frameworks
- Distributed software
 - Data management systems
 - Grid middleware
 - Networking
 - Workload management systems

Building a HEP software knowledge base

Torre Wenaus (BNL)
Brett Viren (BNL)

Jan 21, 2015
HSF Workshop, SLAC

- Documentation
- Event generators
- Graphics
 - Event display
 - Geometry Visualization
- High performance computing
- Infrastructure and operating systems
- Languages
- Monitoring
- Open source
- Processing frameworks
- Reconstruction
- Software design
- Software performance and validation
- Software sustainability
- Statistical tools
- Trigger/DAQ
 - !Chaos
- User
 - Environment Management
- Virtualization and clouds
- Web
 - Web based tools and services
 - Web app frameworks 1

HEP S&C Knowledge Base

- Proposition: HEP S&C should have a **grass roots information gathering and exchange hub**
 - Facilitate collaboration by increasing **awareness** of resources, projects, activities
 - Provide a place to look for **solutions**, learn from the **choices made by others**
 - Promote awareness of software and tools from **outside our community, e.g. open source**
- The HSF process agreed: Number one on the task list was: “**provide a system for facilitating information exchange**”
 - Also “Animate discussions between all stakeholders” (and here we are)
 - There are other important elements also, like expert consultants
- Must be grass roots to succeed – **built and maintained by the community**
- **HSF website hepsoftwarefoundation.org** hosts the beginnings of such a system (two, even)

hepsoftware.org (TW 7/2014)
Django, xml, mysql



Welcome to HEPsoftware.org

The HEP Software Foundation
Advancing high energy physics community software

Home Documents Events Organization Plan Needs Startup team Site development Google

HEPsoftware.org aspires to become a grass roots software and computing community. (The scope is also!)

Goals

- Facilitate collaboration by increasing awareness
- Make this site a honey pot for contributions and technical experts directly in creating an open source
- Add a grass roots element to the more formal wide HEP Software Foundation seeded by CERN and created by the DOE in the US.
- Promote awareness and use of open source computing community.

Home

Search

View Edit

High intensity, neutrino

T2K
Submitted by [costas.andreopoulos](#) on Wed, 2015-01-07 07:12
Tokai to Kamioka (T2K) long-baseline neutrino oscillation experiment

Science field: High intensity, neutrino

- HSF website
- Content summary
 - Recently added
 - Adding/editing content
 - Discuss
 - Wiki

- HSF what's new
- 1/7 guidelines & questions
 - 1/7 HSF IFB meeting
 - 1/7 Startup document 1.1
 - 11/28 How to add content
 - Jan 2015 SLAC workshop
 - Join the HEP S&C list!

- Software catalog
- Software list
 - Software by category

GENIE
Submitted by [costas.andreopoulos](#) on Wed, 2015-01-07 06:37
GENIE is a popular neutrino Monte Carlo event generator used by almost all accelerator experiments.

It provides a bridge between theory and experiment and it plays an important role throughout every experiment, from design and optimization till the final physics publication.

artdaq
Submitted by [jbkwalkowski](#) on Mon, 2015-01-05 16:14
artdaq is a *data acquisition toolkit* for particle physics experiments. It provides core functions commonly used in DAQ systems, and it provides a framework for experimenters to build components that are unique to their experiment.

LArSoft
Submitted by [wenaus](#) on Thu, 2014-10-23 18:36
Historical Context

LArIAT
Submitted by [wenaus](#) on Thu, 2014-10-23 18:25
LArTPC in a testbeam; develop particle ID & reconstruction.

wiki.hepsoftwarefoundation.org/wiki/Category:Software



- Main page
- Recent changes
- Random page
- Help
- Categories
 - Software
 - Experiments
 - Programming languages
- Tools
 - What links here
 - Related changes
 - Special pages
 - Printable version
 - Permanent link
 - Page information
 - Browse properties

Category Discussion

Category:Software

This category uses the form [Software](#).

Subcategories

This category has the following 6 subcategories, out of 6 total.

- A
 - Analysis tools
- D
 - Detector simulation
- E
 - HSF wiki (BV 12/2014)
- R
 - Semantic MediaWiki
- S
 - In development

- Software Framework
- Software Toolkit

HSF website (TW 10/2014)

Drupal

The one in production that we ask you to contribute to!

If we migrate to a new version, we'll migrate the data as well

Experiments

Science field

- ✓ - Any -
- Accelerator science
- Astrophysics and astroparticle physics
- b physics
- Health physics
- High intensity, neutrino
- LHC, collider physics
- Linear collider
- Nuclear physics
- Photon physics, light source
- Space physics
- Theory

Apply

Alpha Magnetic Spectrometer (AMS)

Submitted by [wenaus](#) on Thu, 2014-10-23 18:07

The Alpha Magnetic Spectrometer (AMS) is a state-of-the-art payload instrument on the International Space Station. It uses the universe and its origin by searching for antimatter and dark matter of cosmic ray composition and flux. The AMS observations will help answer "What makes up the universe's invisible mass?" and "What happens at the beginning of time?"

Science field: [Astrophysics and astroparticle physics](#)

ATLAS

Submitted by [wenaus](#) on Mon, 2014-10-20 17:31

Science field: [LHC, collider physics](#)

Software this experiment uses:

[GaudiHive](#) [AthenaHive](#) [Geant4](#) [Gooda](#) [HepMC](#) [PanDA](#) [Jvarkit](#)

Belle II

Submitted by [wenaus](#) on Thu, 2014-10-23 18:19

The Belle II detector is a general purpose spectrometer for the study of the physics of charm and bottom quarks. The Belle II efficiently collects data of e^+e^- collisions made by two electron-positron beams.

Research focus: Heavy flavor physics, CP asymmetries, new matter

Science field: [b physics](#)

BES III

Submitted by [wenaus](#) on Thu, 2014-10-23 18:20

Research focus: Precision measurements charm, charmonium, tau matter.

IHEP, Beijing, China.

Science field: [High intensity, neutrino](#)

Software entries

This is the list of entries describing software that are submitted with a rather random collection of software entries that people take over and improve existing entries, and

Science field

- Any -

Apply

[AAA - Any data, Anytime, Anywhere](#)

Categories: [Data management systems](#)

[Art event processing framework](#)

Categories: [Processing frameworks](#) Science fields: [High intensity](#),

[artdaq](#)

Categories: [Trigger/DAQ](#) Science fields: [High intensity, neutrino](#)

[AthenaHive](#)

Categories: [Concurrency](#), [Processing frameworks](#)

[Automated Workflow Engine \(Pipeline\)](#)

Categories: [Workload management systems](#) Science fields: [Astrop](#)

[CernVM](#)

Categories: [Virtualization and clouds](#)

[CernVM-FS / cvmfs](#)

Categories: [Packaging and distribution](#), [Grid middleware](#), [Virtualization](#)

[CLHEP](#)

Categories: [Analysis tools](#), [Statistical tools](#)

[Cloud Scheduler](#)

Categories: [Virtualization and clouds](#)

[CUDA](#)

Categories: [Concurrency](#), [CPU and co-processor architectures](#), [OpenCL](#)

[Fabric For Frontier Experiments \(FIFE\)](#)

Categories: [Processing frameworks](#) Science fields: [High intensity](#),

[FAX](#)

Categories: [Data management systems](#)

[Gaudi](#)

Categories: [Processing frameworks](#)

[GaudiHive](#)

Categories: [Concurrency](#), [Processing frameworks](#)

[Geant4](#)

Categories: [Detector simulation](#) Science fields: [Accelerator science physics](#), [Health physics](#), [High intensity, neutrino](#), [LHC, collider physics](#), [Photon physics, light source](#), [Space physics](#)

[GeGeDe](#)

Categories: [Detector geometry description](#)

Organizations

ATLAS Future Software Technology Forum (FSTF)

Submitted by [wenaus](#) on Mon, 2014-10-20 21:33

Goals of the ATLAS Future Software Technology Forum (FSTF):

- Collect and exchange experience from various groups within ATLAS who are investigating new software technologies.
- Create a knowledge pool.
- Improve communication within developer communities.
- Improve exchange with other experiments.

[Read more](#)

Concurrency Forum

Submitted by [wenaus](#) on Mon, 2014-10-20 22:18

Software engineering is moving towards a paradigm shift in order to accommodate new CPU architectures with many cores, in which concurrency will play a more fundamental role in programming languages and libraries.

HEP software will also need to accommodate the new hardware architectures by introducing parallelism whenever possible in order to make efficient use of all the available cores.

[Read more](#)

Distributed ROOT I/O working group

Submitted by [wenaus](#) on Tue, 2014-10-21 10:43

Cross-domain working group to improve ROOT I/O performance in deployed, distributed environments, with particular but not exclusive attention to analysis use cases.

[Read more](#)

HEPIX - The High Energy Physics Unix Information Exchange

Submitted by [wenaus](#) on Thu, 2014-10-23 18:30

The HEPiX forum brings together worldwide Information Technology staff, including system administrators, system engineers, and managers from the High Energy Physics and Nuclear Physics laboratories and institutes, to foster a learning and sharing experience between sites facing scientific computing and data challenges. Participating sites include BNL, CERN, DESY, FNAL, IHEP, INFN, JLAB, NIKHEF, RAL, SLAC, TRIUMF and many others.

[Read more](#)

Open Science Grid (OSG)

Submitted by [wenaus](#) on Mon, 2014-10-20 18:04

A community of scientists, researchers, and experts in high throughput computing, based in the US and extending around the world. The OSG represents US LHC and the US LHC cyberinfrastructure in WLCG.

Production services for operation of access to heterogeneous resources across the US - 5 US labs and over 100 universities:

[Read more](#)

US DOE HEP Forum for Computational Excellence (FCE)

Submitted by [wenaus](#) on Thu, 2014-10-23 18:32

What's in it?

Software

- By science field
- By category
- Experiments using it
- Other software using it
- Related software

Experiments

- By science field
- The software they use

Organizations

- Involved in HEP S&C
- Common projects

Institutions, facilities

- Scoped to S&C, initial emphasis on software

To come

Project proposals

- New collaborative opportunities

Job listings

Licensing info, guidance

... your ideas

Add software, add its relationships

Science fields

- Accelerator science
- Astrophysics and astroparticle physics
- b physics
- Health physics
- High intensity, neutrino
- LHC, collider physics
- Linear collider
- Nuclear physics
- Photon physics, light source
- Space physics
- Theory

Software category tags

- Analysis tools
- Calibration and alignment
- Collaborative tools and projects
- Commercial
- Concurrency
- Concurrent I/O
- CPU and co-processor architectures
- Data mining and analytics
- Data preservation
- Data storage and access
- Data structures and algorithms
- Databases
- Detector geometry description
- Detector simulation
- Development and integration

Related software

- Automated Workflow Engine (Pipeline)
- CernVM

Other software packages this is used by

- Automated Workflow Engine (Pipeline)
- CernVM

Software packages that this uses

- Automated Workflow Engine (Pipeline)
- CernVM
 - CernVM-FS / cvmfs
- Cloud Scheduler
- Vac
 - CernVM-FS / cvmfs
 - Vcycle
 - CernVM-FS / cvmfs
 - OpenStack
- Cloud Scheduler
- Vcycle
 - CernVM-FS / cvmfs
 - OpenStack
- Cloud Scheduler
- CLHEP
- CUDA
- Fabric For Frontier Experiments (FIFE)
- Gaudi
- GaudiHive
- AthenaHive

Organizations that use this

- ATLAS Future Software Technology Forum (FSTF)
- Concurrency Forum
- Distributed ROOT I/O working group
- HEP Software Foundation (HSF)
- HEPiX – The High Energy Physics Unix Information Exchange
- Open Science Grid (OSG)
- US DOE HEP Forum for Computational Excellence (FCE)
- Worldwide LHC Computing Grid (WLCG)

Experiments that use this

- ALICE
- Alpha Magnetic Spectrometer (AMS)
- ATLAS
- Belle II
- BES III
- CAPTAIN
- CDF
- CMS
- COMPASS
- D0
- Dark Energy
- Daya Bay
- Fermi Gam
- HARP (PS21)
- Heavy phot
- KOTO
- Large Syno
- LArIAT

ATTACHED DOCUMENTS

Add a new file

Files must be less than 10 MB.
Allowed file types: txt pdf jpg.

CONTACT

CREDITS FOR CONTENT

Search

Content Users

Enter your keywords

atlas

Advanced search

Search results

ATLAS Future Software Technology Forum (FSTF)

Goals of the ATLAS Future Software Technology Forum (FSTF): Collect and exchange experience from various groups within ATLAS who are investigating new software technologies. Create a knowledge ...

HSF - Organization - [wenaus](#) - 2014-10-20 21:35 - 0 comments

ATLAS

Science field: LHC, collider physics Software this experiment uses: GaudiHive AthenaHive Geant4 Gooda HepMC PanDA Jenkins ROOT XRootD FAX Links: ...

HSF - Experiment - [wenaus](#) - 2014-10-23 17:44 - 0 comments

AthenaHive

ATLAS Athena variant of GaudiHive Software category tags: ... GaudiHive Experiments that use this: ATLAS Contact: Paolo Calafiura (LBNL) ...

HSF - Software - [wenaus](#) - 2014-10-20 21:46 - 0 comments

ROOT

... building (CERNLIB on steroids) * For example, the ATLAS (and probably others) event data model is built on top of ROOT * ... Twitter Experiments that use this: ATLAS CMS Contact: Pere Mato (CERN), ROOT team leader ...

HSF - Software - [wenaus](#) - 2014-10-20 21:18 - 0 comments

FAX

... system based on xrootd, designed to * Create a common ATLAS namespace across all storage sites, accessible from anywhere * ... XRootD Experiments that use this: ATLAS Contact: Rob Gardner (U Chicago) ...

HSF - Software - [wenaus](#) - 2014-10-20 21:31 - 0 comments

CernVM

... website Experiments that use this: ATLAS CMS LHCB ...

Search by experiment, software package, category; see everything related

The more info in the software and experiment listings, the more useful to search, navigate, discover...

Software this experiment uses:

[GaudiHive](#) [AthenaHive](#) [Geant4](#) [Gooda](#) [HepMC](#)

Science field:

[LHC, collider physics](#)

Software category tags:

[Analysis tools](#) [Detector simulation](#) [Event display](#) [Rec](#)

Links:

[Website](#)

[ROOT Framework meetings, CERN SFT group](#)

[Twitter](#)

Experiments that use this:

[ATLAS](#) [CMS](#)

Contact:

[Pere Mato \(CERN\), ROOT team leader](#)

Search

Content Users

Enter your keywords

root

Advanced search

Search results

ROOT

ROOT is an object-oriented program and library developed primarily at CERN. It ... in other app as astronomy and data mining. ROOT is * An analysis package (replaced PAW) * Used by pret (and probably others) event data model is built on top of ROOT * Example Applications: RooS Analysis Toolkit ...

HSF - Software - [wenaus](#) - 2014-10-20 21:18 - 0 comments

Distributed ROOT I/O working group

Cross-domain working group to improve ROOT I/O performance in deployed, distributed enviro particular but ...

HSF - Organization - [wenaus](#) - 2014-10-21 10:43 - 0 comments

Art event processing framework

... Software packages that this uses: ROOT Other software packages this is used by: LArSoft ...

HSF - Software - [wenaus](#) - 2014-12-01 11:09 - 0 comments

ALICE

... physics Software this experiment uses: ROOT Links: Website ...

HSF - Experiment - [wenaus](#) - 2014-10-23 17:54 - 0 comments

ATLAS

... Gooda HepMC PanDA Jenkins ROOT XRootD FAX Links: Collaboration website ...

HSF - Experiment - [wenaus](#) - 2014-10-23 17:44 - 0 comments

LHCb

... this experiment uses: GaudiHive Geant4 ROOT Links: Website ...

HSF - Experiment - [wenaus](#) - 2014-10-23 17:51 - 0 comments

GENIE

- Analysis tools
- Calibration and alignment
- Collaborative tools and projects
- Commercial
- Concurrency
- Concurrent I/O
- CPU and co-processor architectures
- Data mining and analytics
- Data preservation
- Data storage and access
- Data structures and algorithms
- Databases
- Detector geometry description
- Detector simulation
- Development and integration
 - Build management
 - Code management
 - Development environment tools
 - Packaging and distribution
 - Testing tools and frameworks
- Distributed software
 - Data management systems
 - Grid middleware
 - Networking
 - Workload management systems
- Documentation
- Event generators
- Graphics
 - Event display
 - Geometry Visualization
- High performance computing
- Infrastructure and operating systems
- Languages
- Monitoring
- Open source
- Processing frameworks
- Reconstruction
- Software design
- Software performance and validation
- Software sustainability
- Statistical tools
- Trigger/DAQ
 - !Chaos
- User
 - Environment Management
- Virtualization and clouds
- Web
 - Web based tools and services
 - Web app frameworks

Look interesting?

Ways you can help

- Add, correct, extend info at hepsoftwarefoundation.org
 - All hepsoftwarefoundation.org account holders have edit rights
 - Add your favorite software, add links to info and docs, show who uses it, what other software does it use, who to contact...
 - Add your favorite experiment, improve its entry, declare what software it uses, who to contact...
 - Add HEP S&C events of interest
- Give us your ideas
- Help us develop it!

⚙

HEP Software and Computing Events

Conferences, workshops, meetings, schools, tutorials etc. Feel free to add events of community interest, past or future. All events appear in the [calendar](#).

Event type	Meeting series
<input checked="" type="checkbox"/> - Any - <input type="checkbox"/> Conference <input type="checkbox"/> Meeting <input type="checkbox"/> School <input type="checkbox"/> Seminar <input type="checkbox"/> Tutorial <input type="checkbox"/> Workshop	<input type="text" value="- Any -"/>

... at CHEP 2015, Fri Apr 17 2015

Submitted by [wenaus](#) on Tue, 2015-01-06 20:41

Date: Fri, 2015-04-17

The CHEP 2015 organizers have kindly agreed to include in the Conference planning a HEP Software Foundation meeting early Friday afternoon Apr 17, just after the conclusion of the Conference. Time and details are to be determined, but with very many flights to Tokyo available in the late Friday afternoon and evening we