

HSF Frameworks WG Meeting

21-Sep-2022

Live notes

Attendees (please add your name)

David Lawrence, Scott Snyder, Charles Leggett, Benedikt Hegner, Dan Riley, Gerardo Ganis, Kolja Kauder, Kyle Knoepfel, Liz Sexton-Kennedy, Patrick Gartung, Pere Mato Vila, Thomas Boettcher, Thomas Madlener, Valentin Volkl, Wen Guan, Matti Kortelainen, Attila Krasznahorkay, David Dagenhart, Markus Diefenthaler,

JANA framework update

- Largest effort that uses JANA is GlueX
- Event sizes are 12-13 kB; with 80k per second
- Arrows (algorithms) and queues (data holders) are the primary concepts
- Uses the factory (*aka* on-demand) model, where data is reconstructed when requested
- Multi-threading is done on an event-by-event basis
- JANA can create a DOT file that shows the call graph of the framework job
- JANA2 uses modern C++(11) features
- Python API available
- Flexible affinity and locality strategies can be specified
- EIC effort involves porting Gaudi code into JANA2
- Product dependencies are specified implicitly in JANA2
- JANA2 uses C++ types as primary key for looking up algorithms; it uses a string for a secondary key
- **Question from Attila:** Is the runtime error encountered at initialization time or during processing
 - **A:** An error can be triggered deep into the processing chain
- **Question from Charles:** How do you deal with base classes if the typeid is the primary key
 - **A:** You can do this by specifying an “enable-as” mechanism
- **Question from Charles:** Looks like you mainly have event level parallelism. Is that true? (**A:** Yes) If you want to use a GPU, does the event-processor have to wait until the event is done being processed by the GPU?
 - **A:** A split arrow is used to keep the CPU busy. Using pthreads underneath.
- **Question from Attila:** What do you mean by NUMA awareness if everything is contained by one thread?

- **A:** It's not necessarily only one thread assigned to process an entire event. The system also has the ability to switch from one core to another core.
- **Question from Kyle:** JANA2 seems to have the ability to operate on data that does not necessarily correspond to an event. How does that work with JANA2's event processor?
 - **A:** Not all of a JANA2 framework job needs to use the event processor, especially for streaming data. JANA was definitely event-based, but JANA2 was relaxed a little so non-event data could also be used.
- **Question from Charles:** Why write your own instead of using Gaudi or CMSSW?
 - **A:** There was no MT-aware framework in 2005
- **Question from Thomas M:** Wouldn't it be possible in JANA to choose a secondary key by configuration?
 - **A:** It was a choice that the author specifies the string and that configuration is kept very minimal.