

C++ as a service — rapid software development and dynamic interoperability with Python and beyond

Interactive C++: cling and clang-repl

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Status

- ❖ LLVM9 Upgrade
 - ❖ ROOT works well (still a few unrelated blockers)
 - ❖ CMSSW Modules IB is almost green [David]
- ❖ Landed patches
 - ❖ <https://reviews.llvm.org/D91524> (safe lookup on deserialization)
- ❖ Progress on clang patches:
 - ❖ Working on <https://reviews.llvm.org/D41416> (lazy pcm template deserialization)

Status

- ❖ Cling Release
 - ❖ Green light from ROOT
 - ❖ Green light from cling's test suite
 - ❖ Green light from the CUDA backend (Thanks Simeon)
 - ❖ Still need to hear from xeus-cling
 - ❖ A remaining issue in cpt.py
- ❖ Cling now builds its plugins by default (eg. clad is available).

Status

- ❖ Proposed a very limited version of clang-repl following the design of cling: [\[D96033\]](#). There are more comments in the area of ABI and CodeGen.
- ❖ Preparing for the Google Summer of Code 2021
 - ❖ Several very promising candidates
- ❖ Early stage technical specification of the language interoperability layer — [here](#).
 - ❖ Started looking into [boost::describe](#) which may be the way to go. Meanwhile, additional comments are welcome.

Status

- ❖ Finished a CUDA - Clad integration script which takes a user defined function and calls Clad to compute the derivative with respect to some chosen variable and passes the resulted function on the GPU [Ioana]
- ❖ Included the changes required for this script in Clad, i.e. cloning the function attributes with respect to the CUDA context (`__device__ __host__`) [Ioana]
- ❖ Our blog post PR is submitted (Many thanks everybody who contributed and in particular to Wim Lavrijsen and Alexandru Militaru)

Plans

- ❖ Accelerate upstreaming clang patches
- ❖ Release Cling and Clad
- ❖ Second revision of the interoperability spec
- ❖ Understand CUDA failed to copy a symbol to device only within Cling (works in Clang9) [Ioana]
- ❖ Resolve issues with Clad argument passing (“-fdump-derived-fn” combined with “fdump-source-fn-ast”) [Ioana]

CaaS Open Projects

- ❖ Patches against clang.git
 - ❖ Implement FileManager uncaching
 - ❖ Adapt the user of invalidateCache to its new signature
 - ❖ Mark the file entry invalid, until reread
 - ❖ Propagate cache flags from LookupFile() to FileManager::getFile()
 - ❖ Pass the OpenFile flag also to DirectoryLookup
 - ❖ Do not load the source file just to get an irrelevant SourceLoc (ROOT-7111)
 - ❖ Allow interfaces to operate on in-memory buffers with no source location info [Pratyush Das]
- ❖ Open projects are tracked in out open projects page.

Next Meetings

- ❖ Monthly Meeting — 6th May, 1700 CET / 0800 PDT
- ❖ Tentative talk schedule:
 - ❖ cppy, Wim Lavrijsen, LBL, May
 - ❖ Clad / CUDA, Ioana Ifrim, Princeton, May
 - ❖ OrcV2, Lang Hames, Apple, June

If you want to share your knowledge / experience with interactive C++ we can include presentations at an upcoming next meeting

Thank you!