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 of Cling development

- Release of cling v0.8
  - Last llvm-5 based release
- Currently Cling is being upgraded to LLVM9
  - Complete -- we have 0 failing tests
    - The relevant branches cling, clang, llvm
  - Integration in ROOT — ~5 failing tests (likely correlated)
    - ROOT pull request - PR6385
- Work on GitHub CI Actions [Pratyush Das]
  - Done. Remains adjusting coverity and codecov.
The next llvm blog post was released — https://blog.llvm.org/posts/2020-12-21-interactive-cpp-for-data-science/

Progress on llvm patches:
- Completed https://reviews.llvm.org/D92248,
- Completed https://reviews.llvm.org/D91061 (Relevant ROOT adjustment — PR6770)
- Working on https://reviews.llvm.org/D91524

We have invited Alexandru Militaru at our Feb meeting to talk about D bindings with cppyy/cling
Status

• Initial, very limited, version of Clang-Repl can be found here. It captures the basic cling design and it is intended to go upstream llvm (after rigorous code review).

• Early stage technical specification of the language interoperability layer — here.

• We have not yet made a second revision based on this discussion. Meanwhile, additional comments are welcome.
Next Month Plans

- Propose a patch against clang for libIncremental (aka clang IncrementalAction)
- Prepare a third blog post
- Second revision of the interoperability spec
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]

✦ Infrastructure
   ✦ GitHub PR Code Coverage — see this example.
   ✦ Automatically upload nightlies to a special release tag — see this example.

✦ Packaging
   ✦ Improve cpt -- fix deb package creation; use python instead of calls to mv, wget, etc.
Next Meetings

- Monthly Meeting — 4th Feb, 1700 CET/0800 PST

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