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
  - Completed.
  - Cling v0.9 and ROOT v6.24 released
- Reduced patches from our clang fork
  - D36368 (fix printing array template args) [Pratyush]
  - Removed 2 patches due to D92248 (Inform the consumer on invalid template instantiations)
  - Remove 1 patch from the llvm9 upgrade (replaceStmts in clang) [Jonas Hahnfeld]
- Progress on clang patches:
  - Working on D41416 (lazy pcm template deserialization)
  - D77598 (Integral template argument suffix printing) [Pratyush]
Status

- Proposed a very limited version of clang-repl following the design of cling: [D96033]. Most comments are resolved.
- Started working on new design of the error recovery system based on the suggestions in D96033 which suggests implementing Partial Translation Units which track rigorously the state changes.
- That new design will also likely remove the need for most of our custom patches in CodeGen (around 1/3 of the total).
Ioana will give a talk on CUDA and AD
Plans

- Accelerate upstreaming clang patches
- Release Clad
- Second revision of the interoperability spec
- Investigate crashes in Cling with the thrust library [Ioana]
- Automatically differentiate the CUDA kernel(s) (including computation scheduler) [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:
  - Compile Server Technology, William Moses, MIT, June
  - OrcV2, Lang Hames, Apple, July

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