

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. Clang-Repl

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- ❖ The initial version of the partial translation unit approach to error recovery was accepted! [[D104918](#)]

# Status. Cling

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- ❖ Reduced patches from our clang fork
  - ❖ D103040 (Print default template argument if manually specified in typedef declaration.) [Pratyush]
- ❖ Started rebasing cling on top of llvm13
- ❖ Investigated how to enable clad in xeus-cling

# Status. InterOp

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- ❖ Started working on a python reference example provided by Wim

# Status. Clad

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- ❖ Improvements in documentation, bug fixes, forward mode differentiation of functor objects
- ❖ [Baidyanath] Working on proper tapenade-style array support in clad and implementing the changes in the `clad::hessian` matrix.
- ❖ [Garima] Advances the user-extensible error estimation framework. Will work on preparing a generic clad tutorial. Working on adding a numerical differentiation fallback
- ❖ [Parth] Prepares a tutorial on clad troubleshooting for developers. Improved functor support for reverse mode.

# Plans

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- ❖ Speed up the interoperability work
- ❖ Submit abstracts on automatic differentiation and interactive C++ for CppCon.
- ❖ Prepare a paper about the work we've completed.
- ❖ Enable error recovery for advanced C++ code (eg template instantiation)
- ❖ Accelerate upstreaming clang patches
- ❖ Automatically differentiate the CUDA kernels (including computation scheduler)
- ❖ Enable Clad in xeus-cling by default

# CaaS Open Projects

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- ❖ 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

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- ❖ Monthly Meeting — 5th August, 1700 CET / 0800 PDT
- ❖ Tentative talk schedule:
  - ❖ Language Interop Progress, Vassil, Princeton, Aug
  - ❖ Cppyy — how to bridge dynamically python and C++, Wim Lavrijsen, LBL, Sep

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



Thank you!