

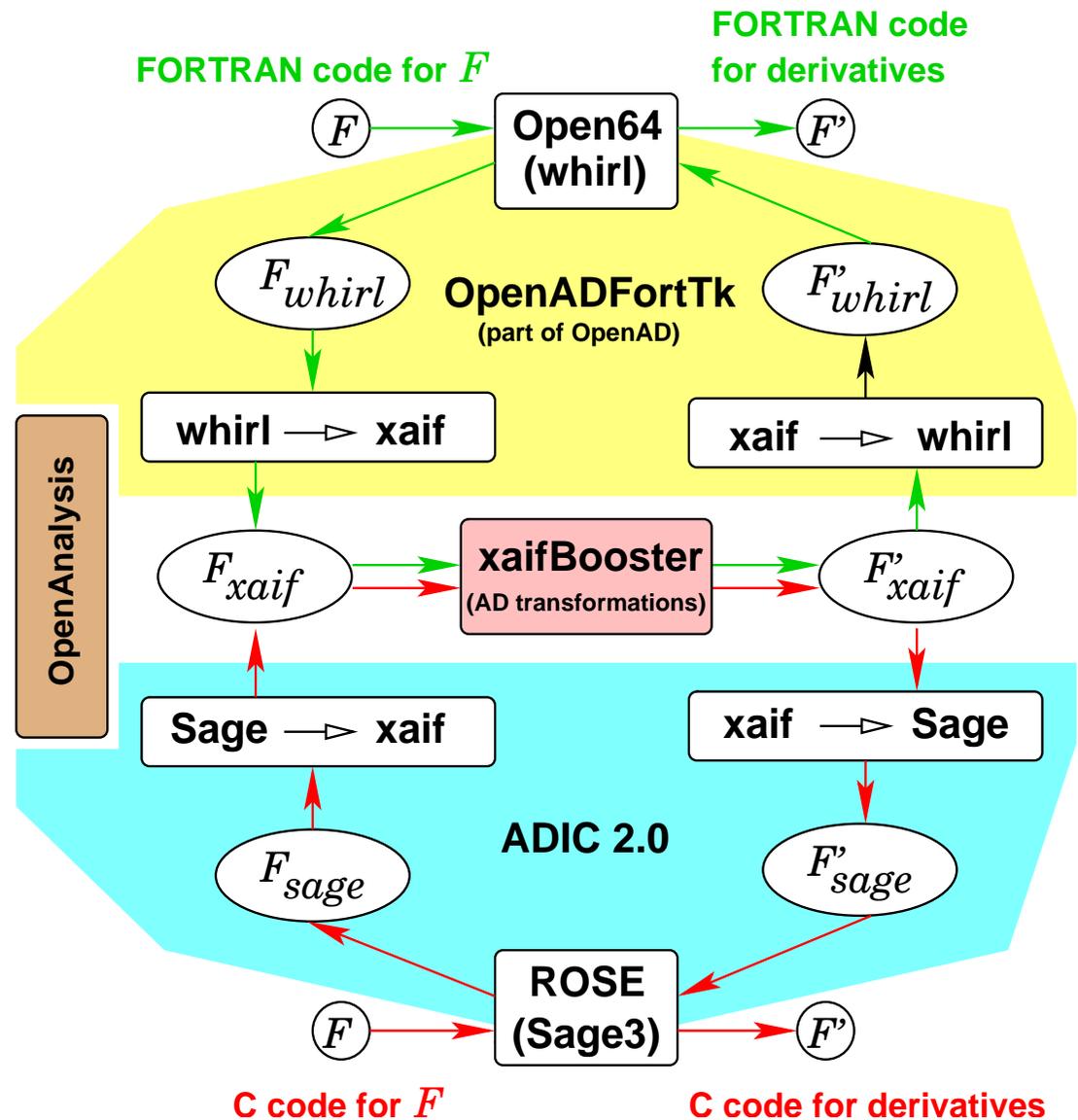
OpenAD update and plans

- short !
- update after 3 years of development (Have we learned anything?)
- Where do this go from here?
- We are looking for somebody to join the “fun”.

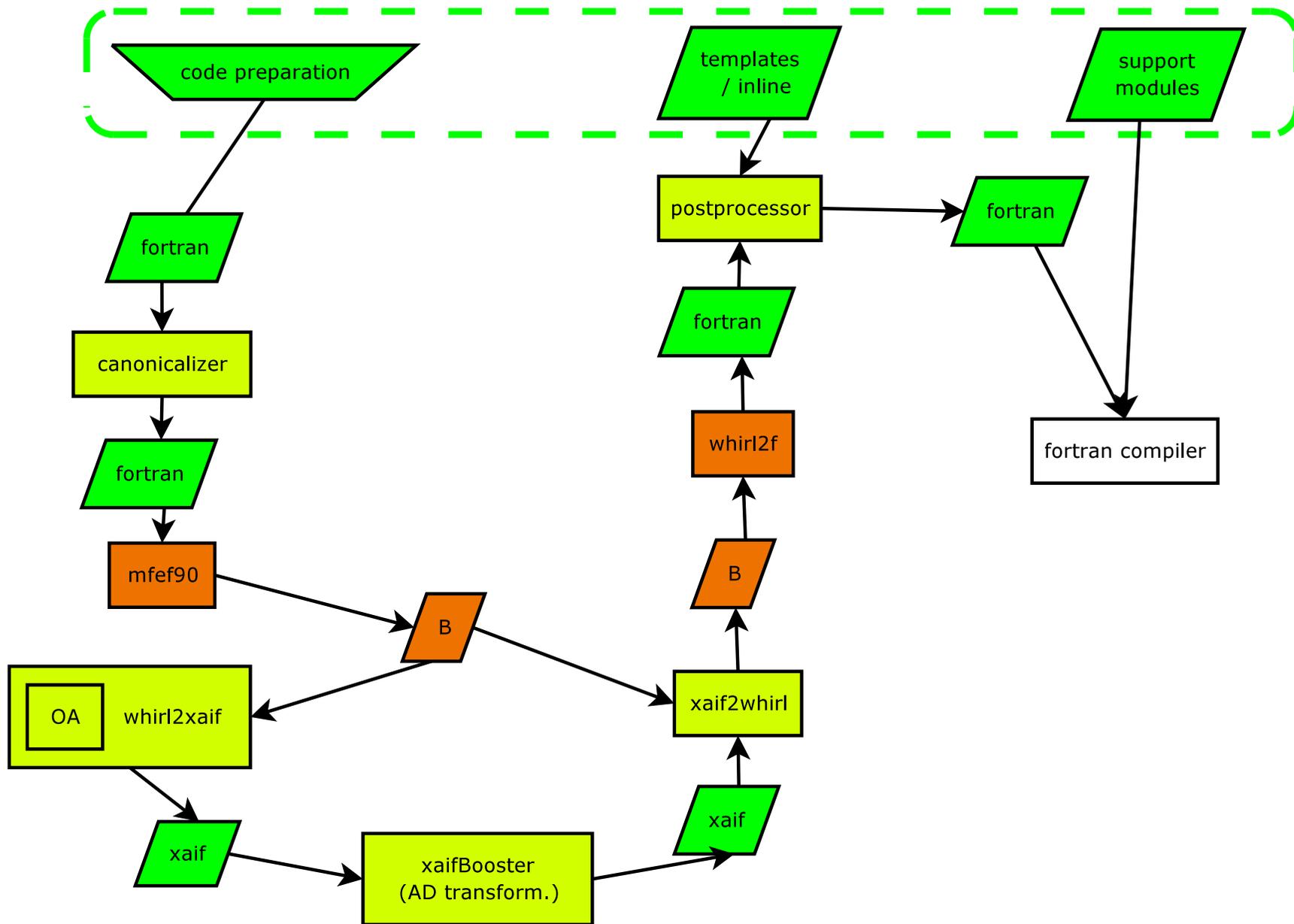
Overview

recap some goals:

- language independence
- modular design
- reusing existing components
- open source
- flexibility (!)
- new AD algorithms
- application to GCM code
- second order derivatives



tool chain



while the advantages are overwhelming ...

there are some drawbacks

- complex tool chain → usage issues
- Open64 front-end was not built for source transformation (very high level whirl is still developing)
- several xaif/B/Fortran parsing steps
 - different levels of complexity of subsequent transformations
 - different levels of parser capabilities (language coverage)
 - rebuilding information
- the chain of separate processes does not promote shortcuts (e.g. cannot easily reuse OA capabilities directly in AD transformation)

...there are some contentious features

- complex tool chain → difficult usage
- Open64 front-end was not built for source transformation (very high level whirl is still developing)
- several xaif/B/Fortran parsing steps
 - different levels of complexity of subsequent transformations
 - different levels of parser capabilities (language coverage)
 - rebuilding information
- the chain of separate processes does not promote shortcuts (e.g. cannot easily reuse OA capabilities directly in AD transformation)

future OpenAD work

- robustness and usability
 - language coverage in general
 - parsing capabilities (outside of Open64)
 - automatically choose preaccumulation by accumulating/comparing static measures
- second order
 - parsing capabilities (again !)
 - vector ops
 - symmetry exploitation
- non-smooth models
 - qualitative analysis of non-smooth constructs in the code
 - modified optimization algorithms

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- efficiency
 - control flow reversal
 - new eliminations (scarcity)
 - more code analysis (extend OA and use in xaifBooster)
 - dynamic reversal schemes

2 new projects with funding for OpenAD recently started -

looking for somebody (compiler / AD-oriented) to share the load.

please see also: <http://www.mcs.anl.gov/openad>