An LLVM Refinement Checker and its Applications

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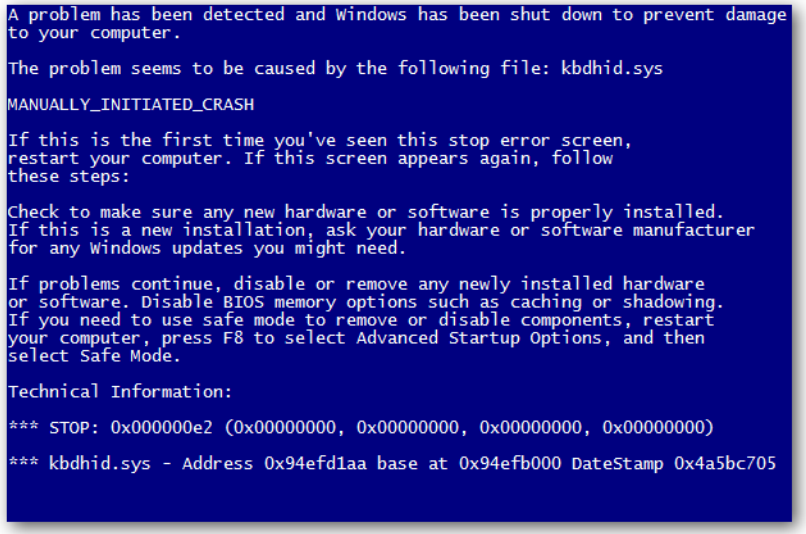
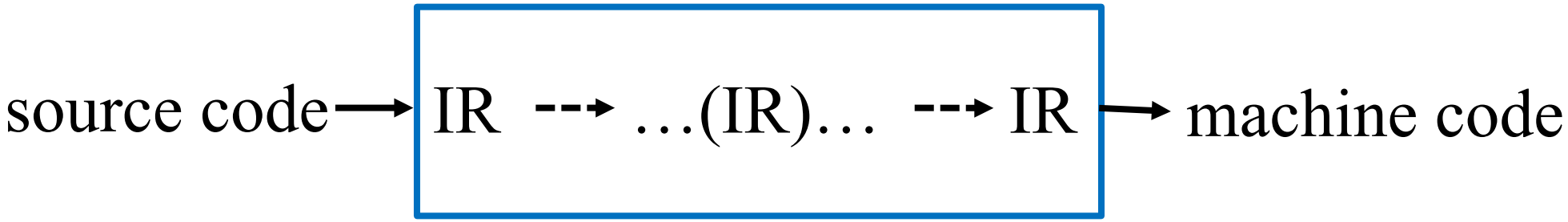
Compilers should not miscompile!



What could go wrong?

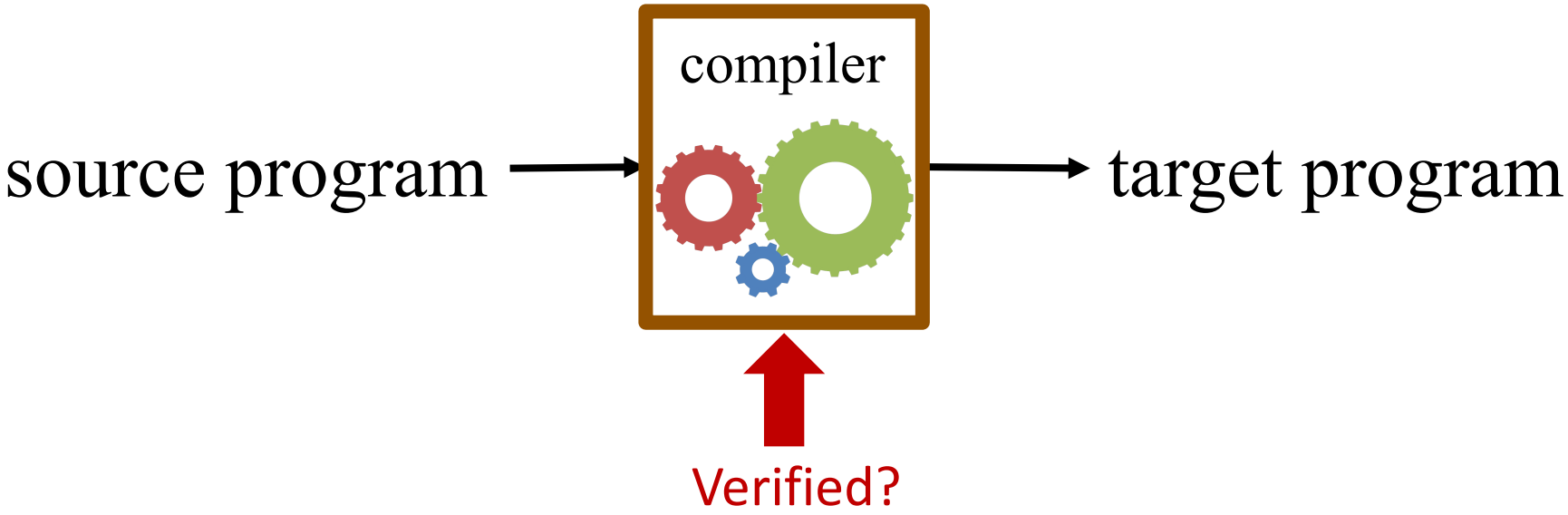
Compilation: sequence of transformations



our focus: optimizations

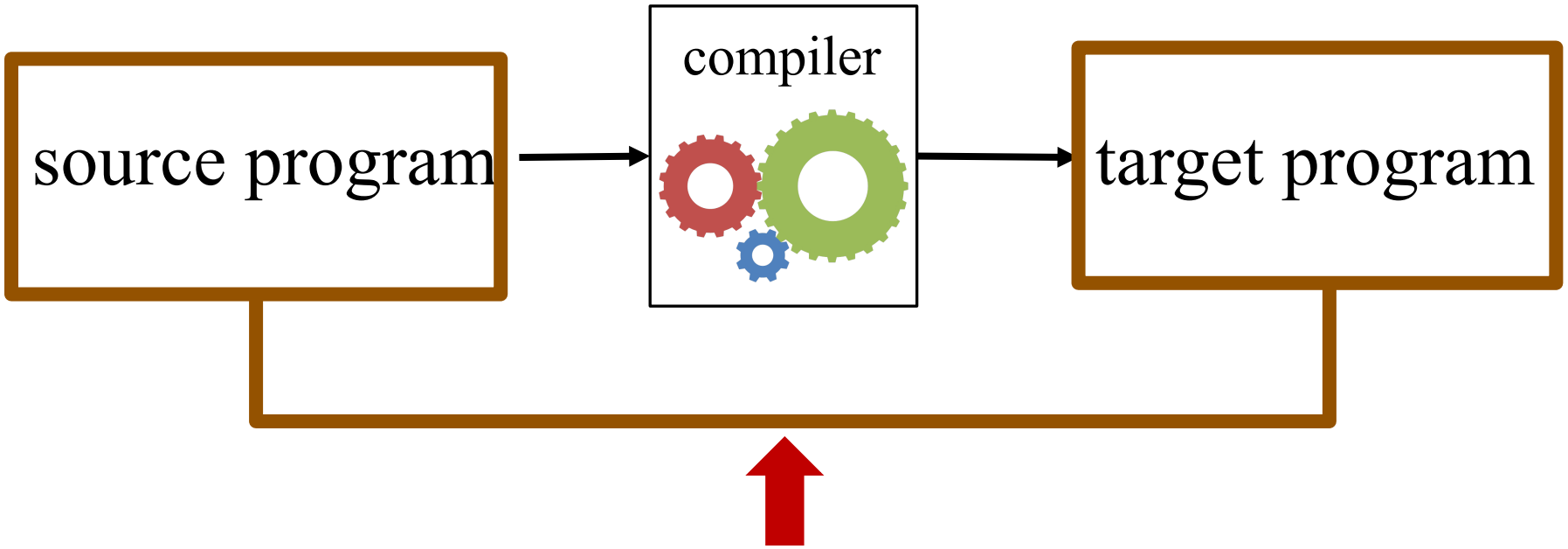
*IR: Intermediate Representation

Verifying compiler



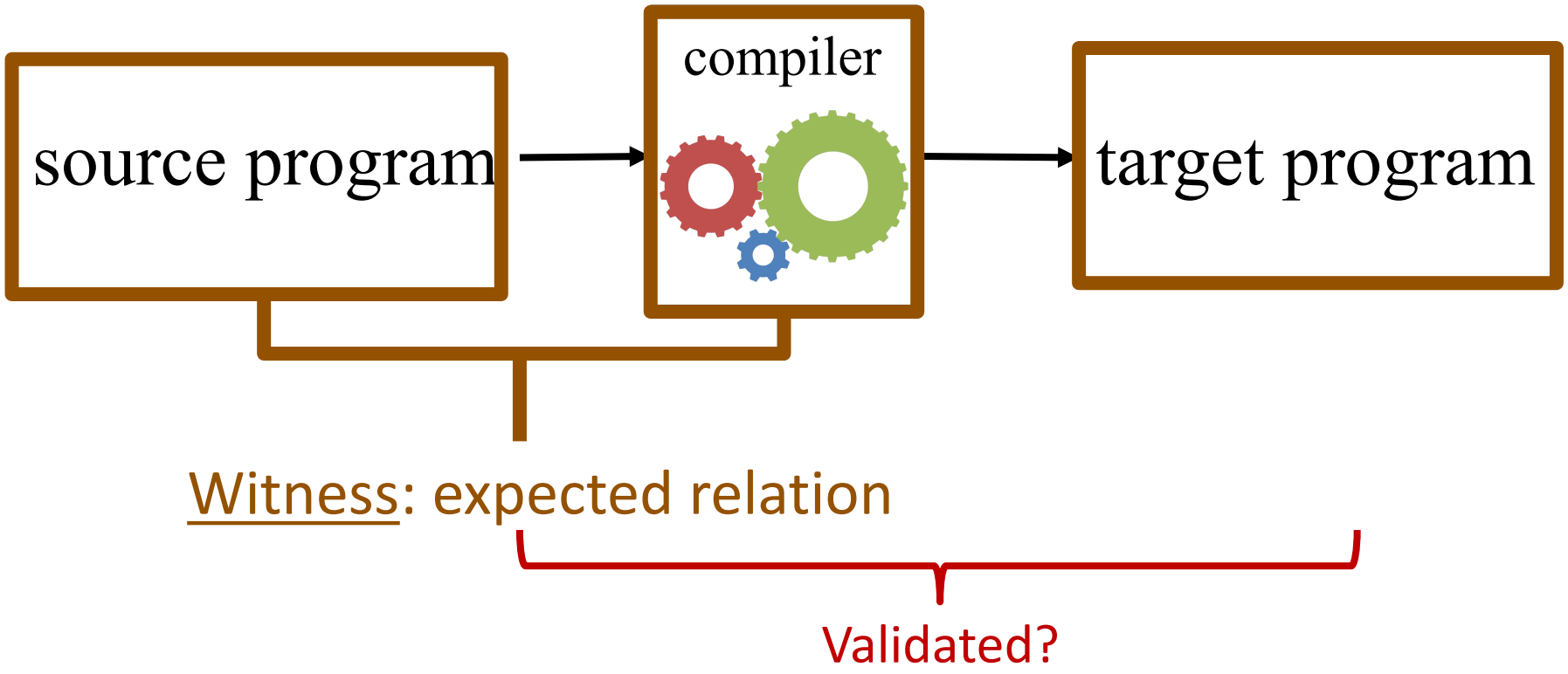
Examples: CompCert, Vellvm etc.

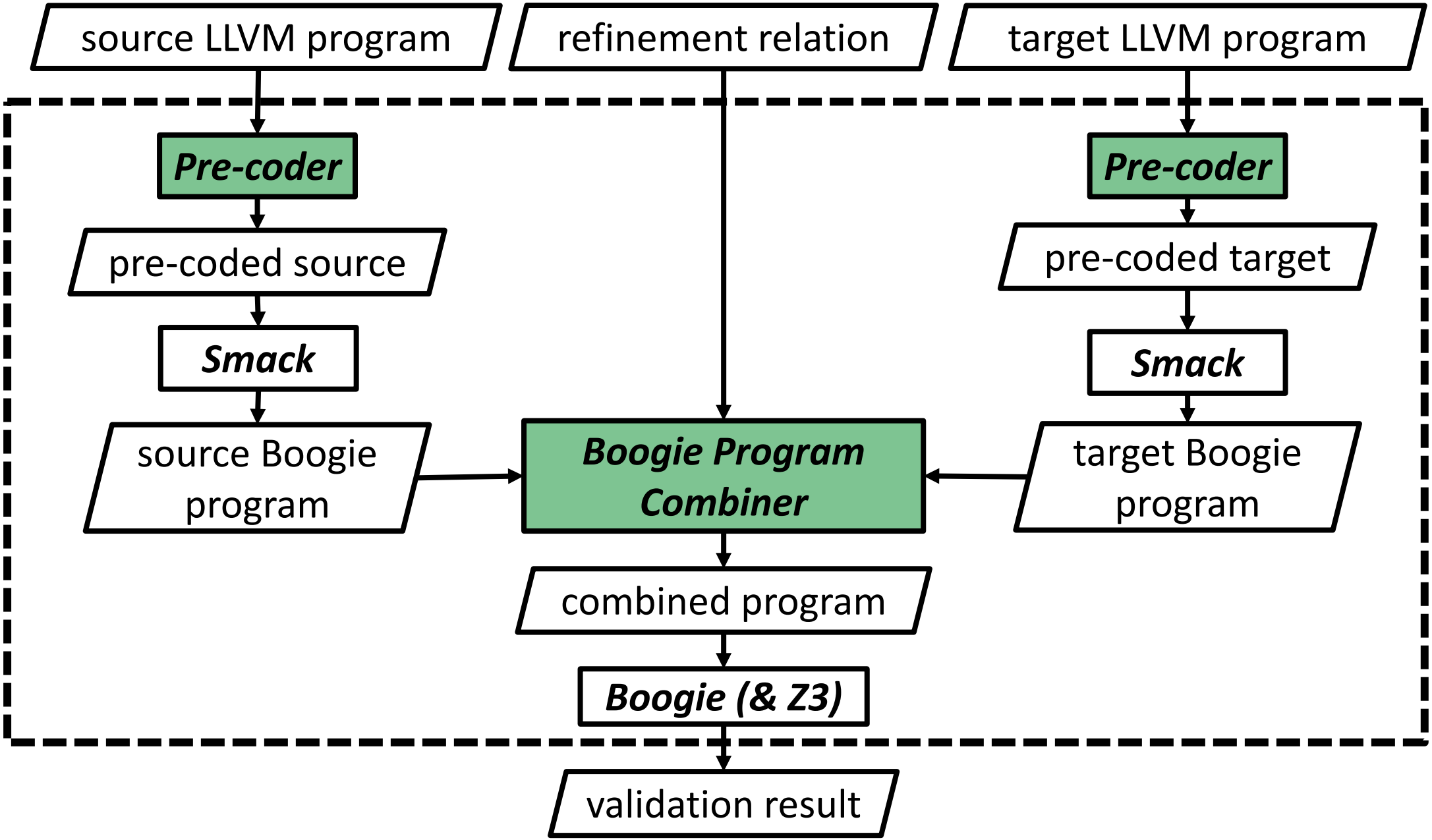
Validating each translation



Examples: TVI, TVOC etc.

Translation validation by witnessing




source LLVM program
refinement relation
target LLVM program
Pre-coder
pre-coded source
Smack
source Boogie program
Boogie Program Combiner
Pre-coder
pre-coded target
Smack
target Boogie program
combined program
Boogie (& Z3)
validation result

Thank you!

Any questions

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("Sorry that I could not be there due to Visa issues ☹. -- Yiji")