

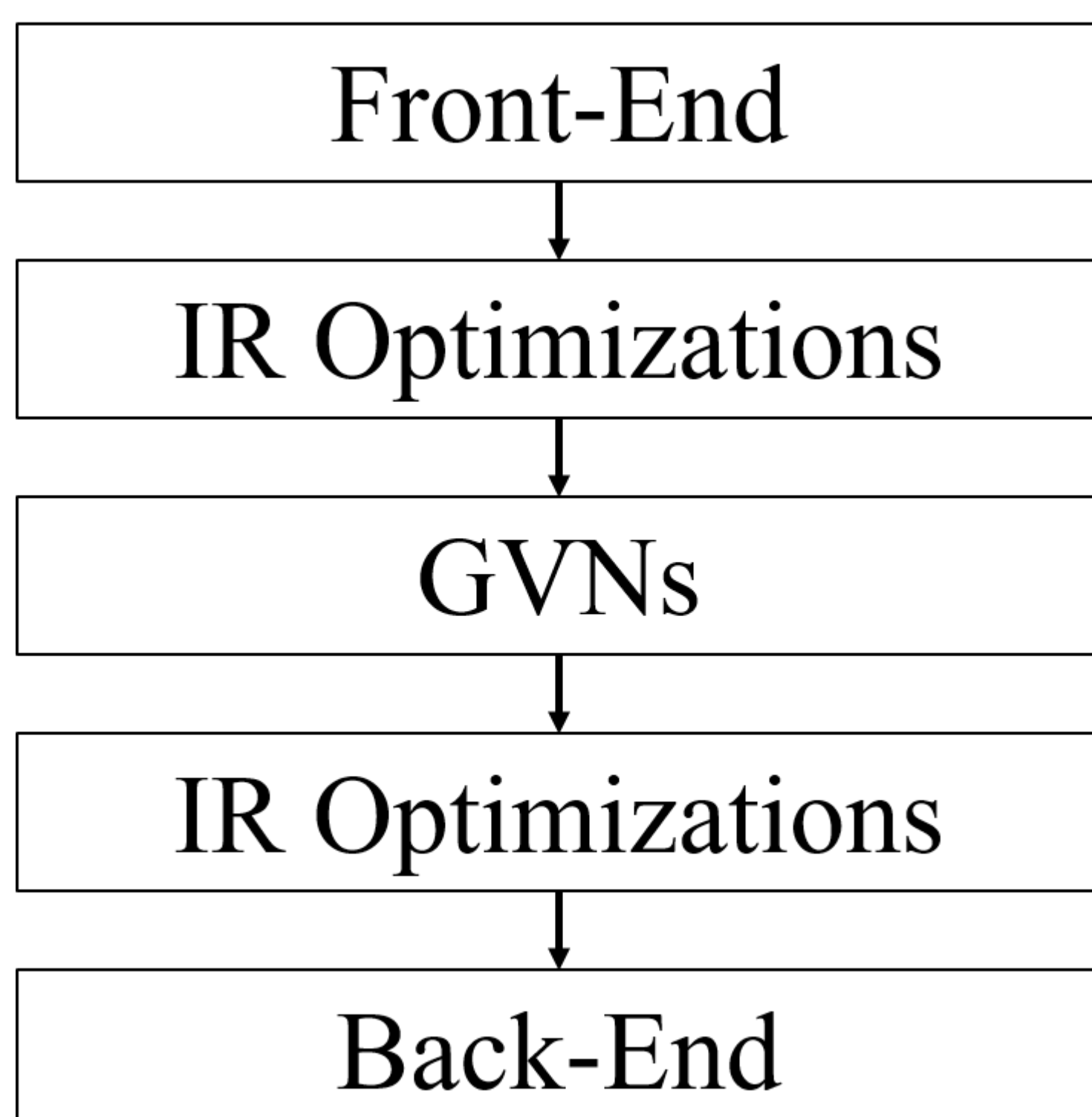
Splendid GVN: Partial Redundancy Elimination for Algebraic Simplification

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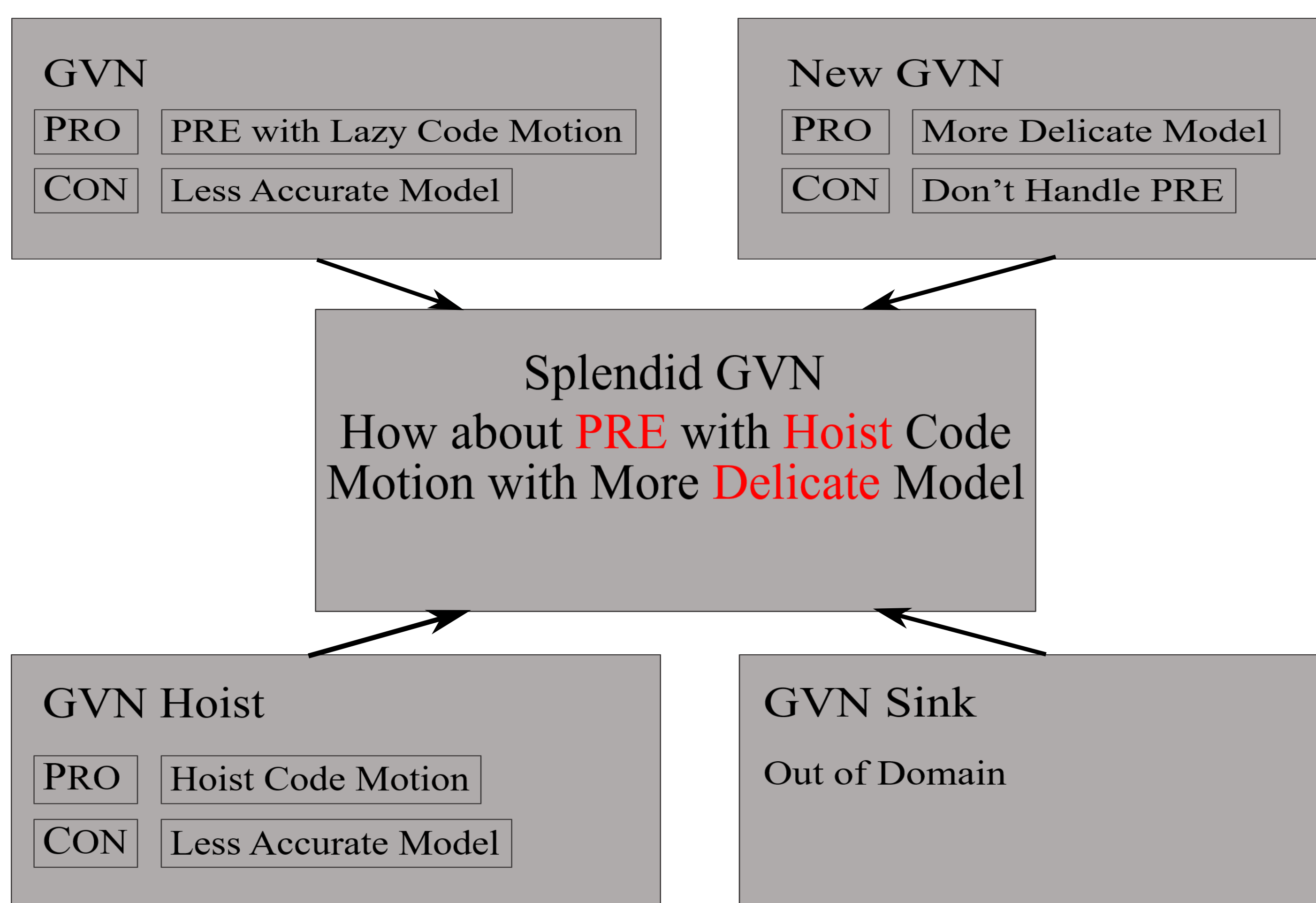
I. Modern Application Heavily Utilize Linear Algebra Operations

- Neural Network Models
- Image Process
- Signal Process
- GPS
- More

II. LLVM IR Applies GVNs to Simplify Linear Algebra Operations

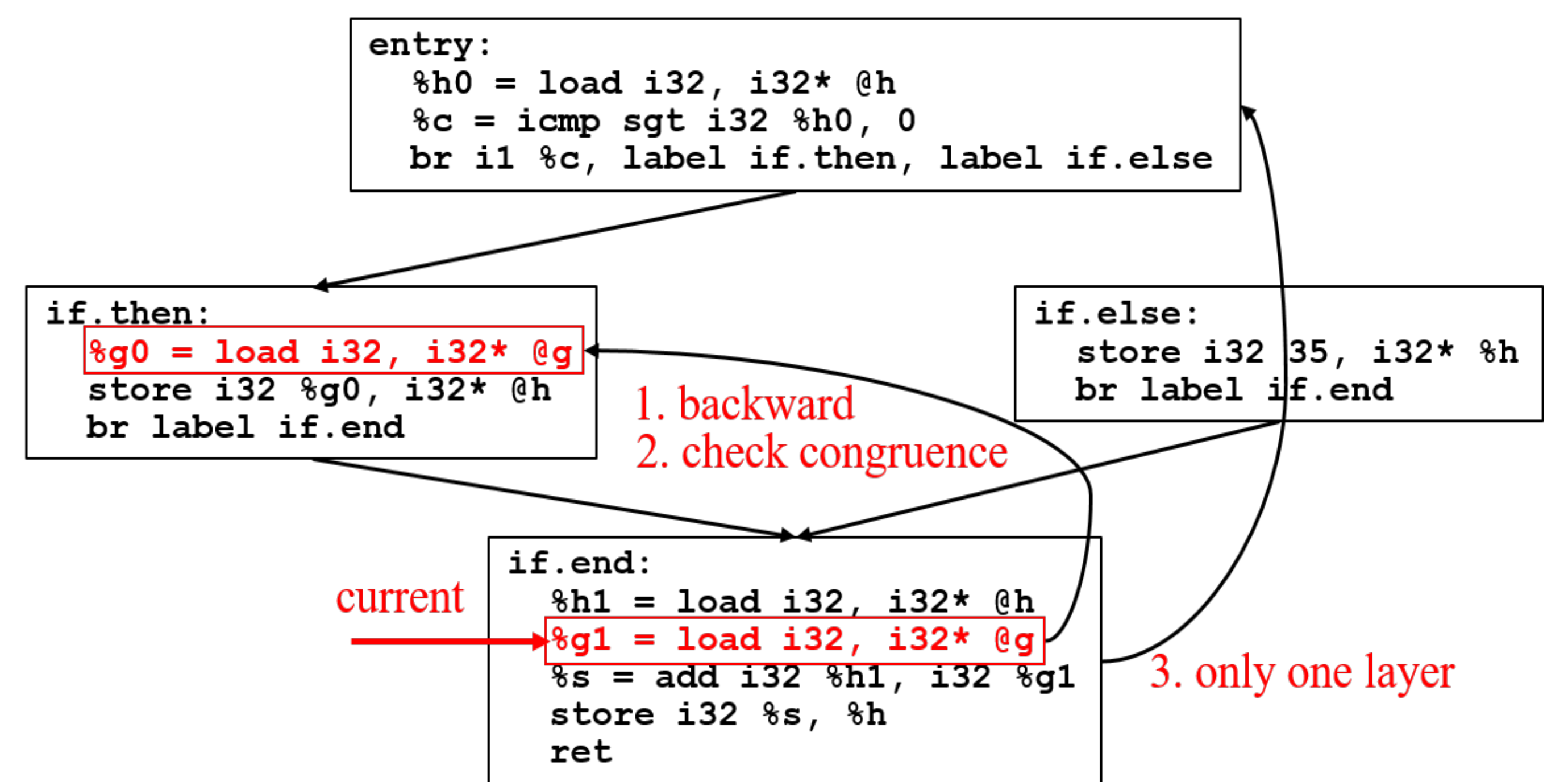


III. New GVN Lacks Mechanism on PRE with Hoist Code Motion

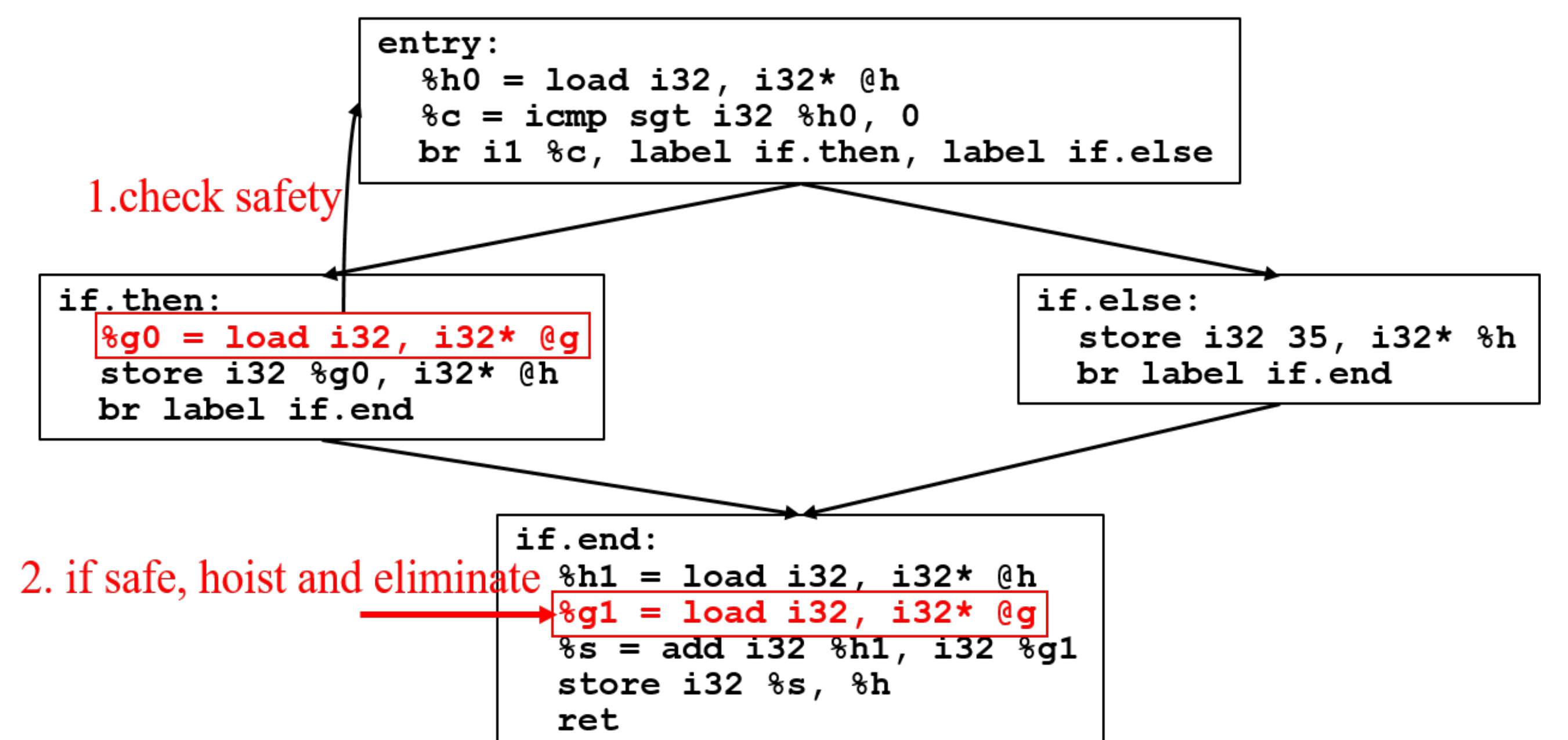


IV. Design for Splendid GVN

Splendid GVN traces instructions in RPO order. For each instruction, it detects PRE/FRE pattern with the following three steps.

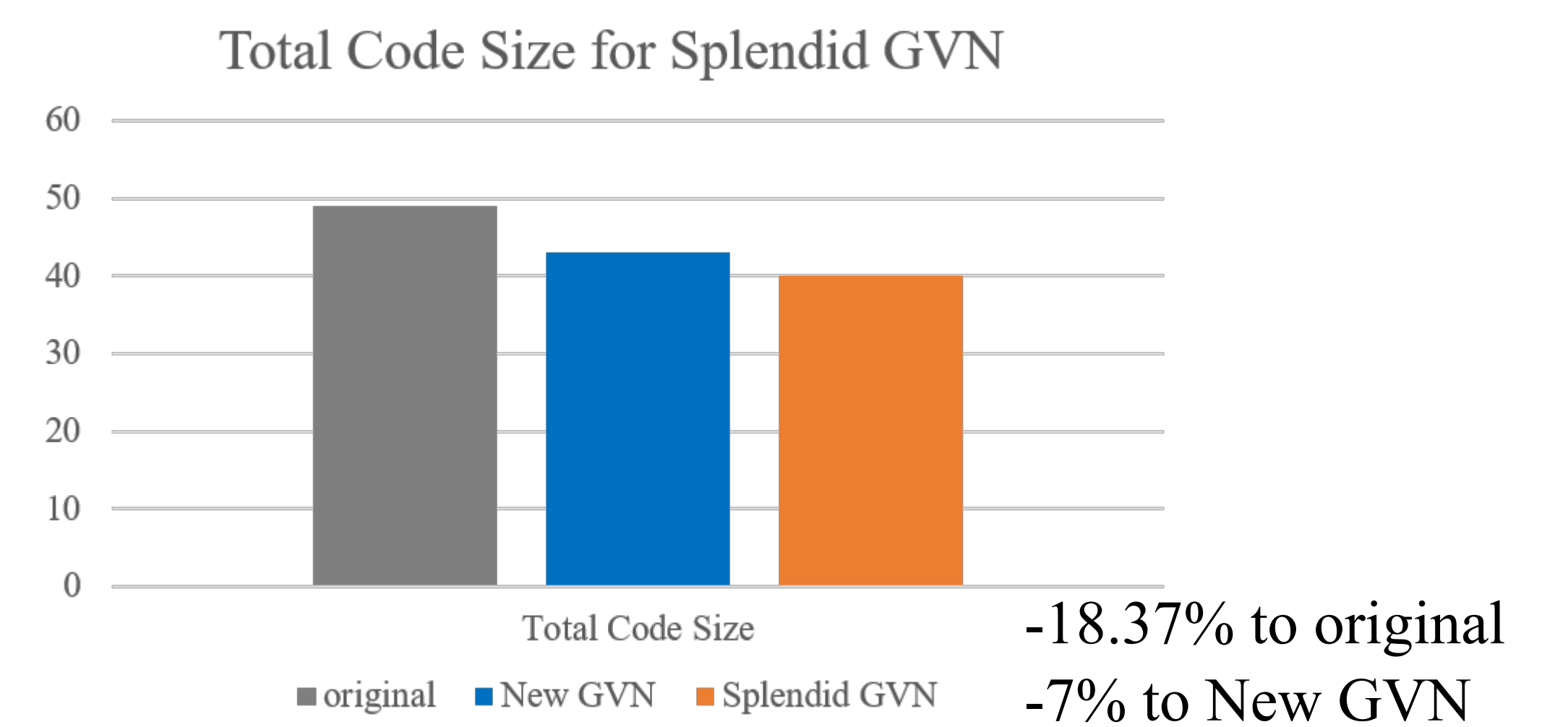


If PRE/FRE happens, Splendid GVN checks Safety for hoist code motion. Once it can be, Splendid GVN hoists it up and eliminates PRE/FRE case.



V. Experimental Results: Two BitCode Programs

local-pre.ll and pre-no-cost-phi.ll
from llvm/test/Transforms/GVN/PRE



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