Does Training Input Selection Matter for Feedback-Directed Optimizations?

Paul Berube

berube@cs.ualberta.ca

University of Alberta

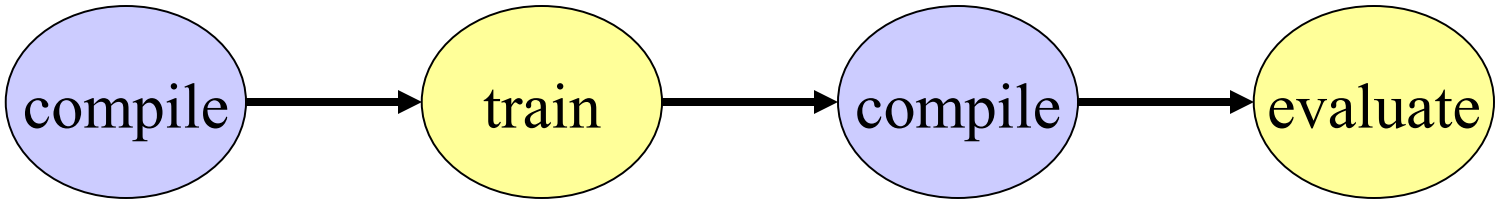
CDP05, October 17, 2005

Outline

- Background and motivation
- *Aestimo*: an FDO evaluation tool
- Workload Selection
- Results

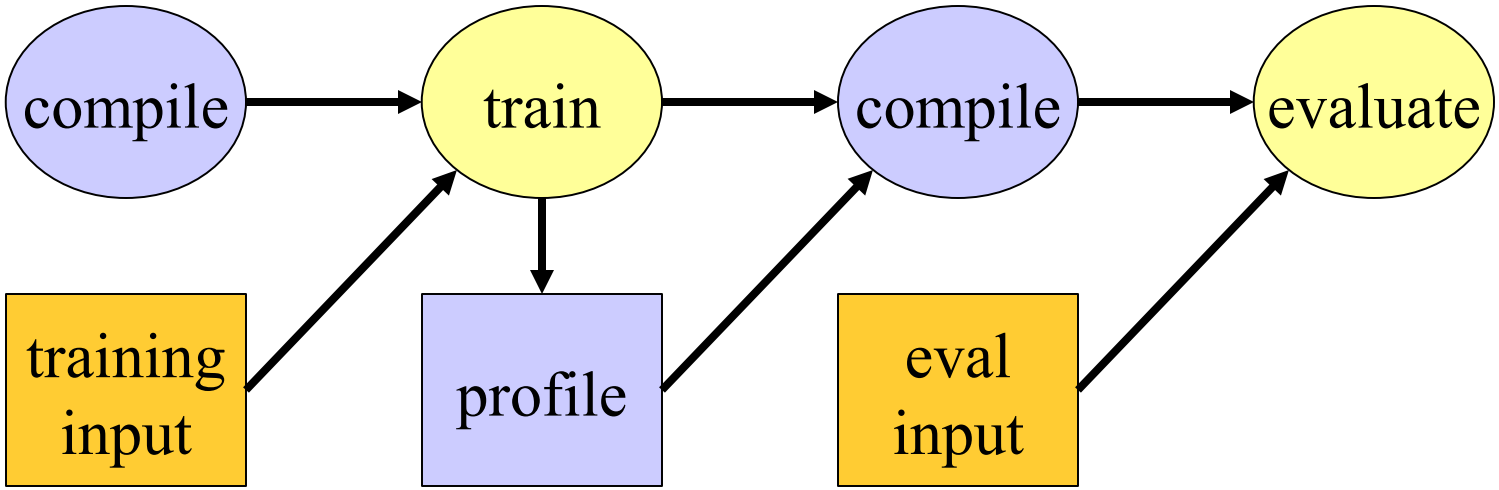
What Is FDO?

Feedback-Directed Optimization:

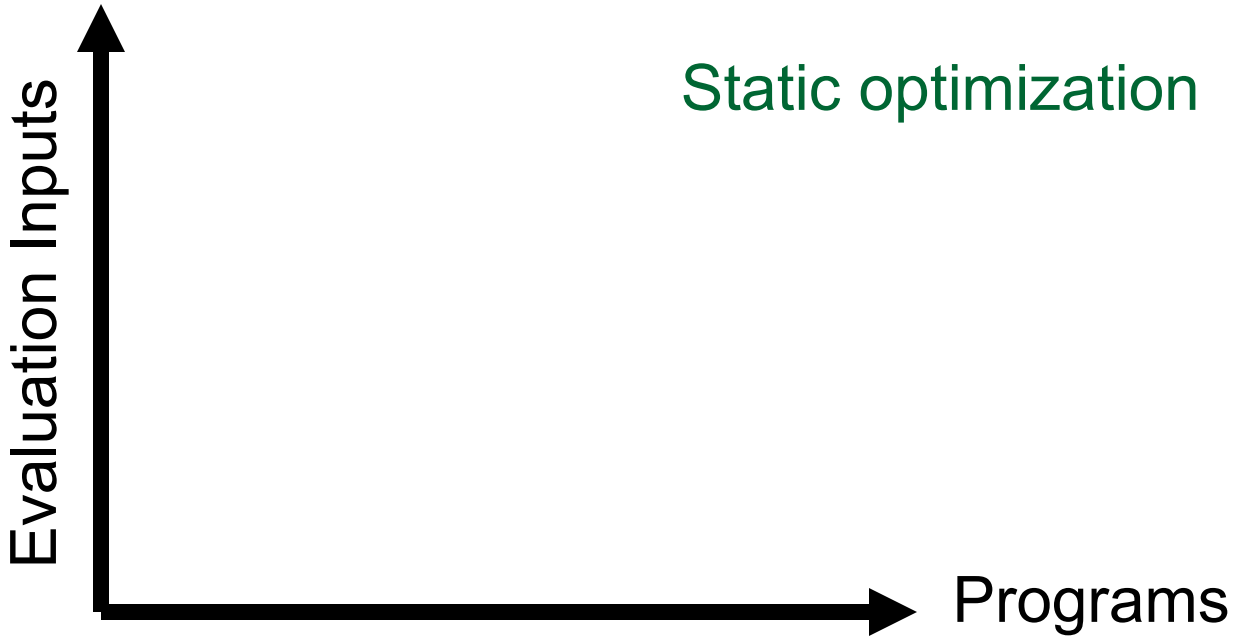


What Is FDO?

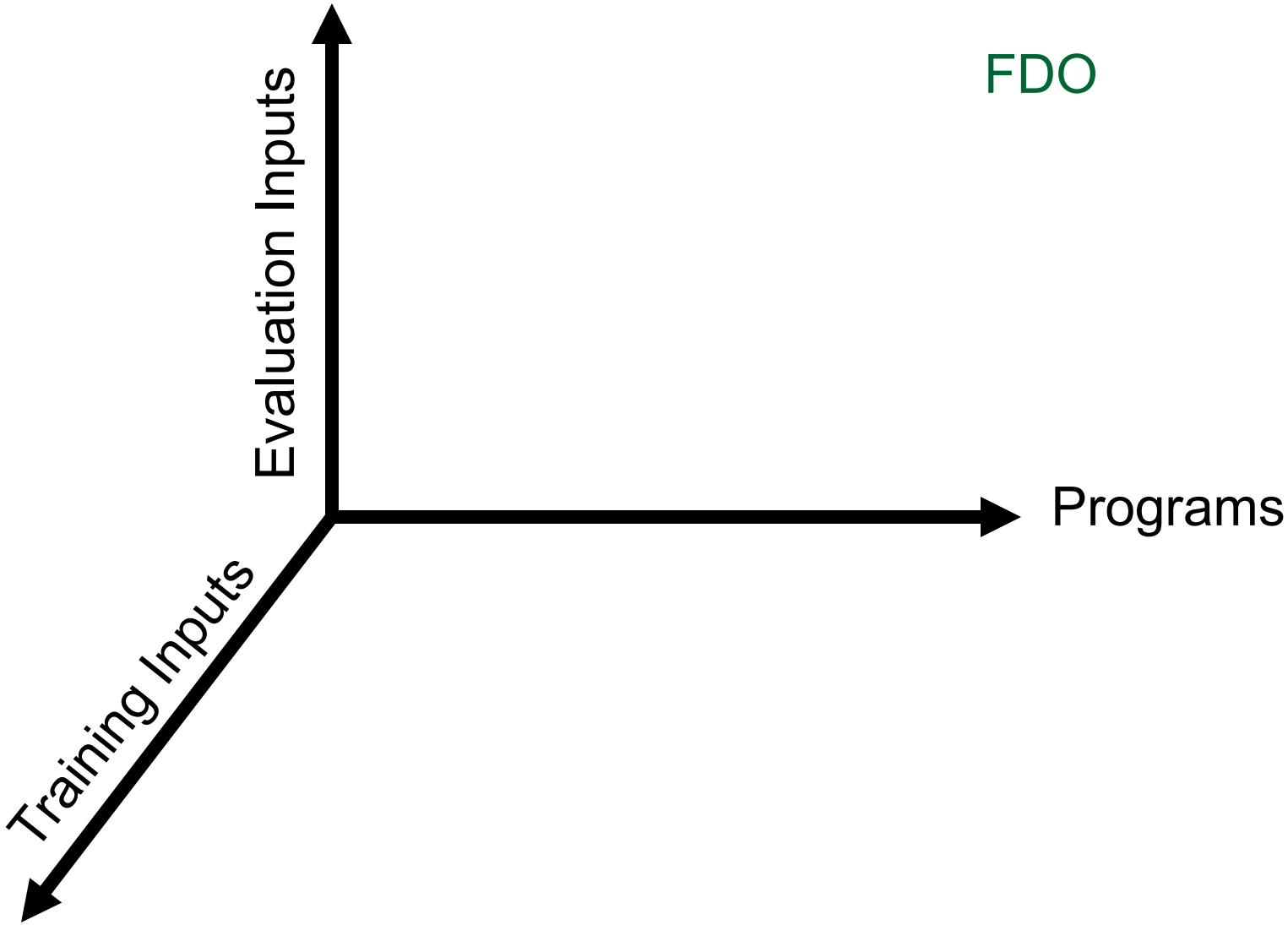
Feedback-Directed Optimization:



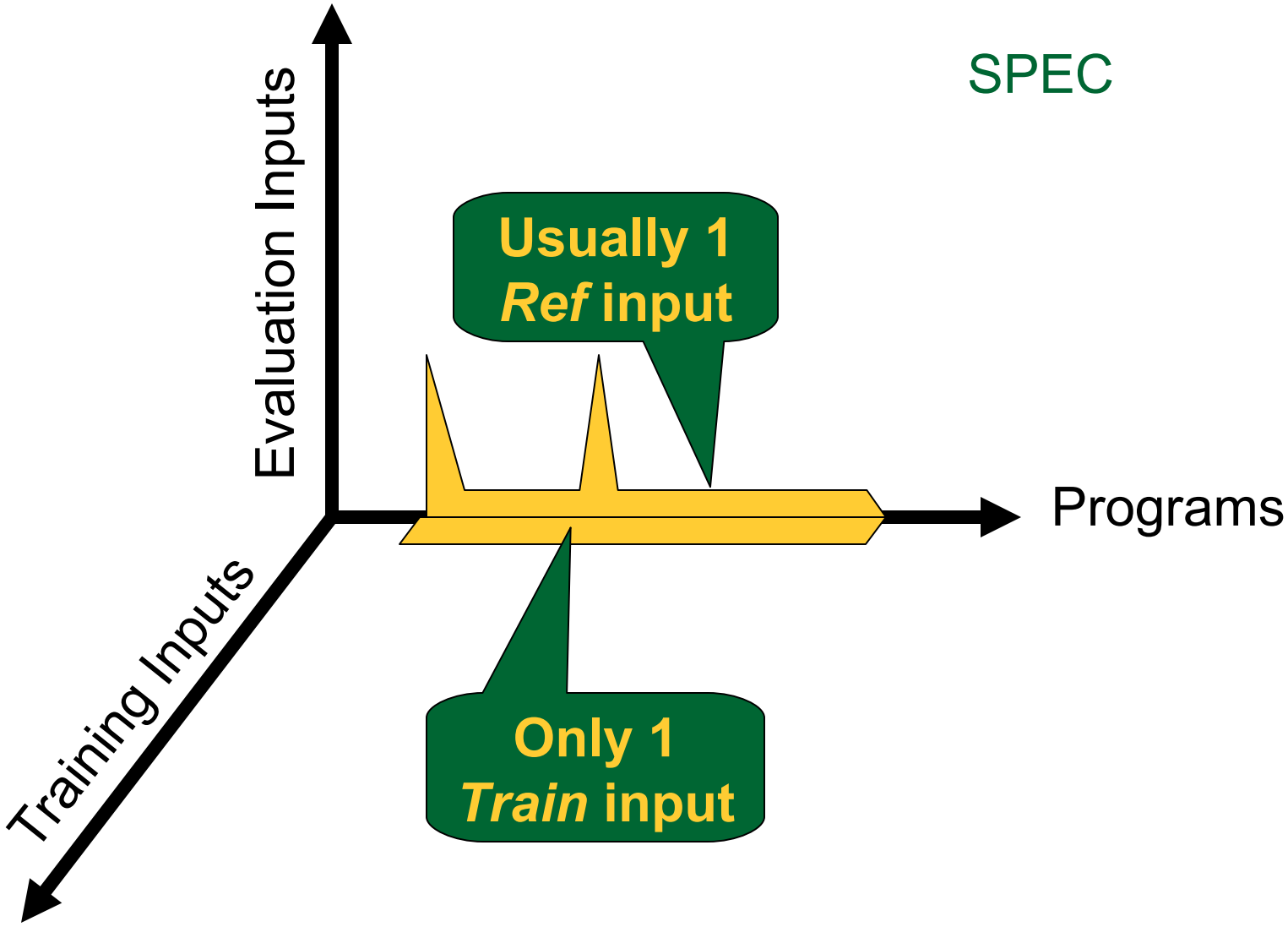
Performance Evaluation Space



Performance Evaluation Space



Performance Evaluation Space



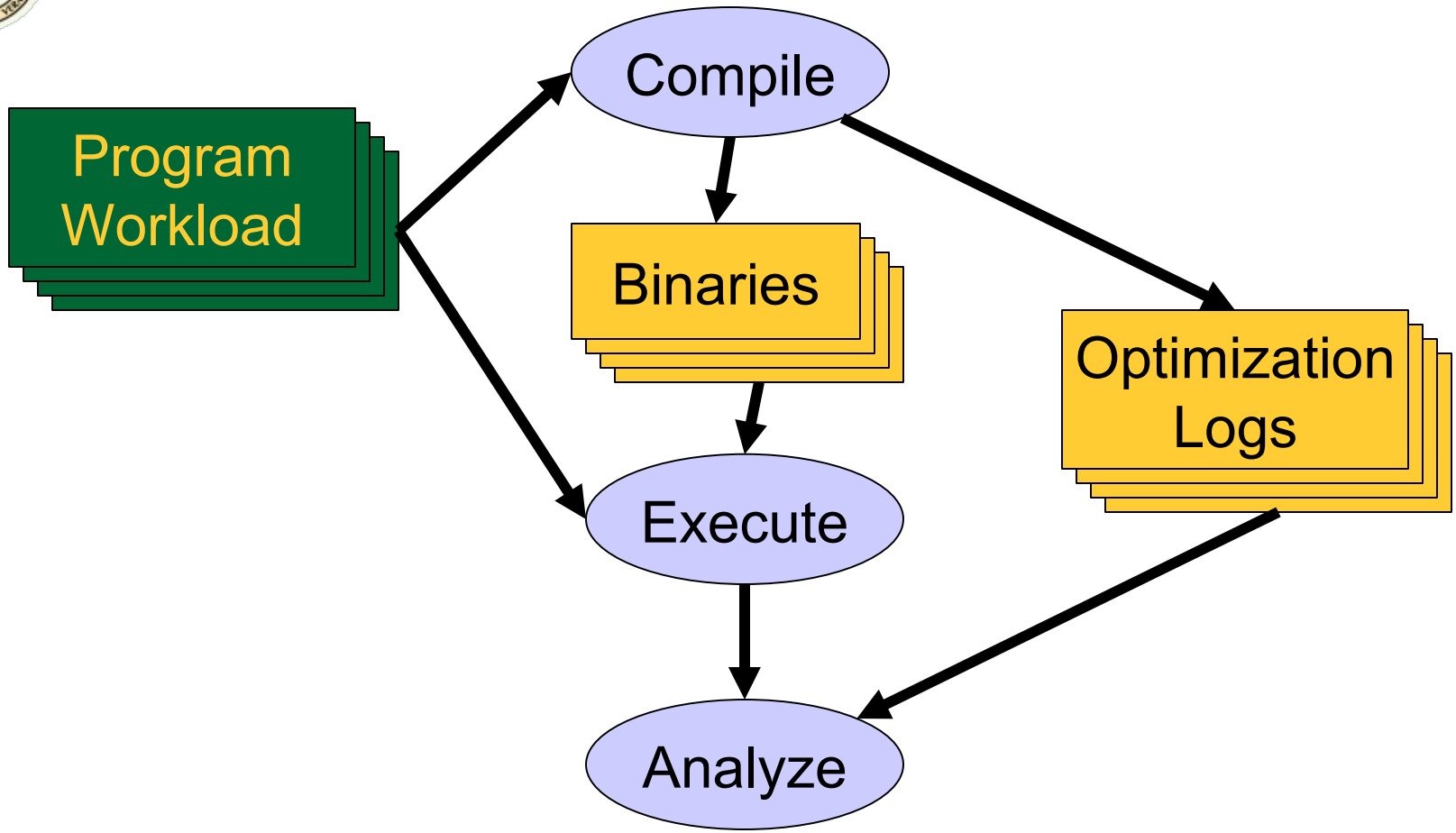
The Big Question

- Does the selection of training inputs matter for feedback-directed optimization?
  - Different transformation decisions?
  - Different performance?

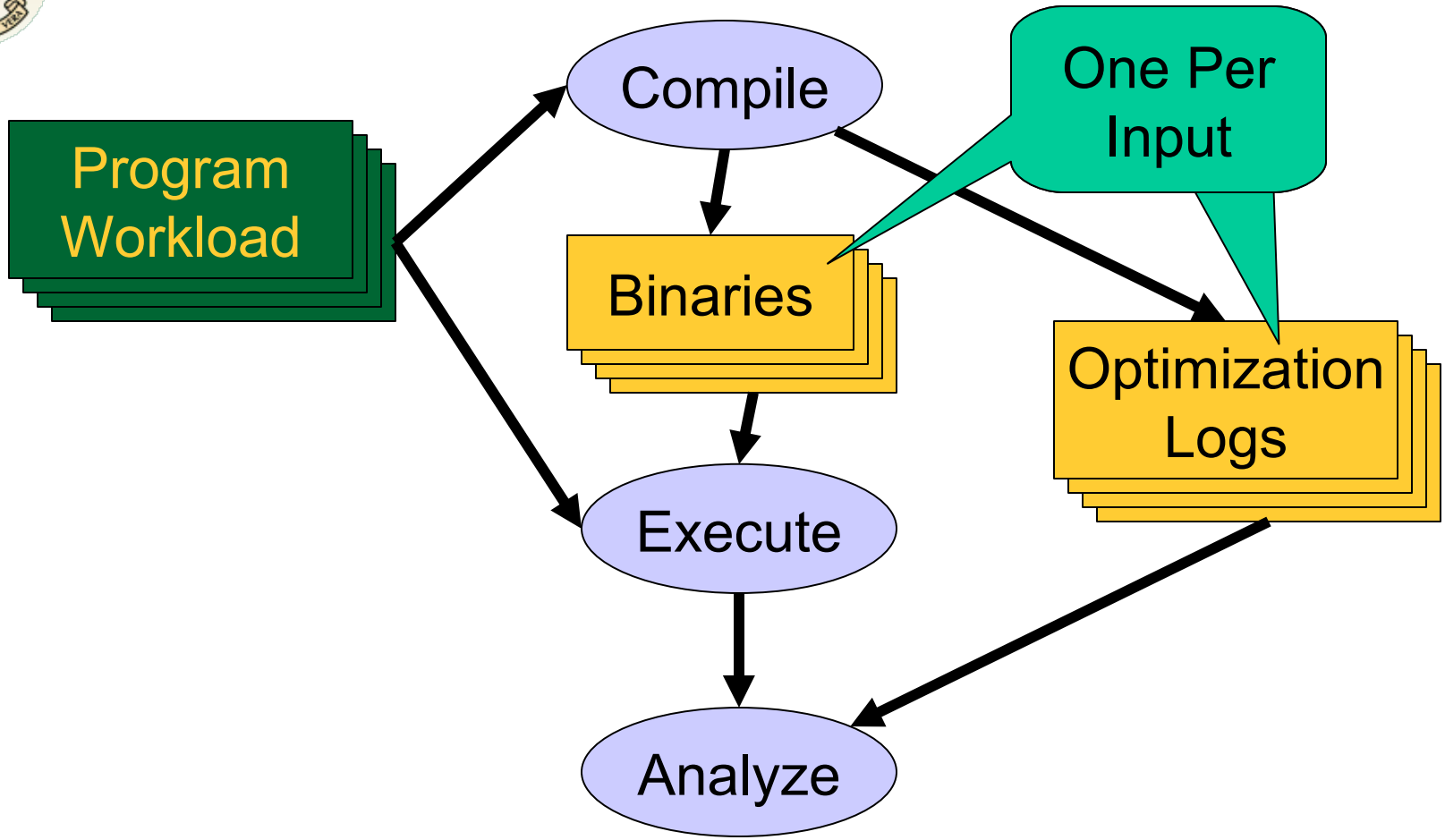
Aestimo

- An FDO evaluation tool
- Automates training and evaluating on a large number of inputs
- Isolates individual transformations
  - Fewer experiment variables
  - Results vary by transformation
- Measures:
  - Differences in transformation decisions
  - Performance differences

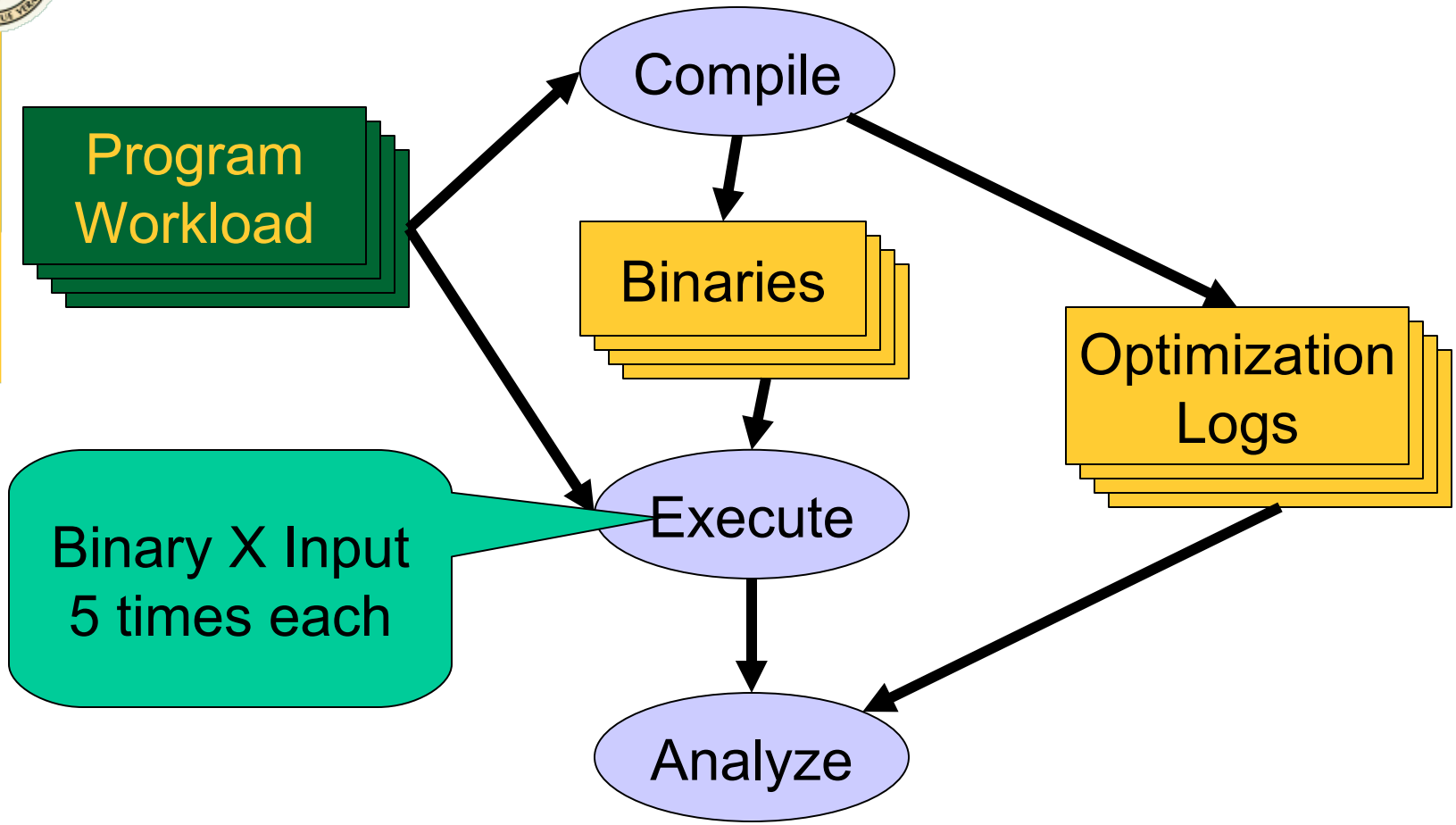
An Overview of *Aestimo*



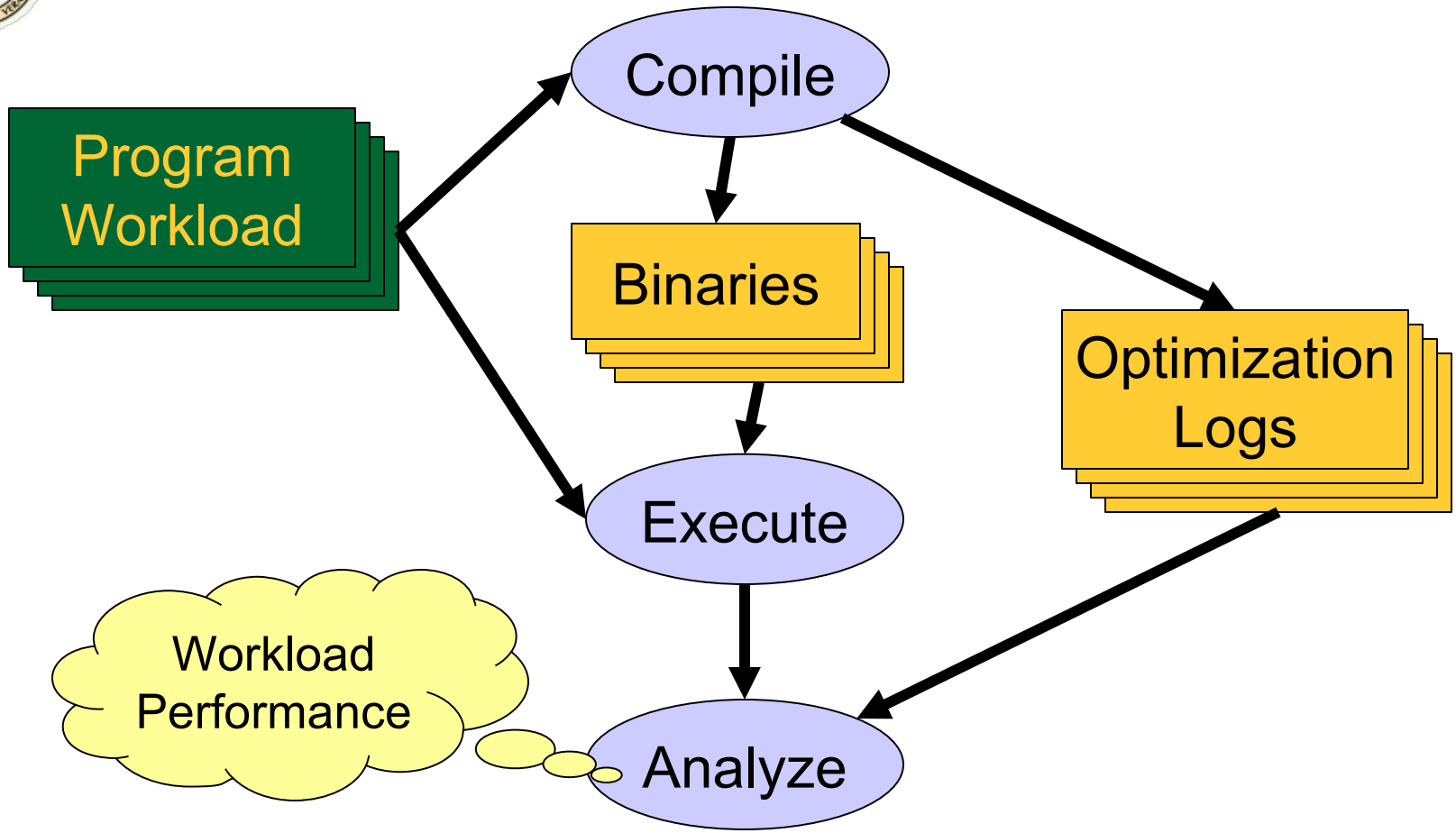
An Overview of *Aestimo*



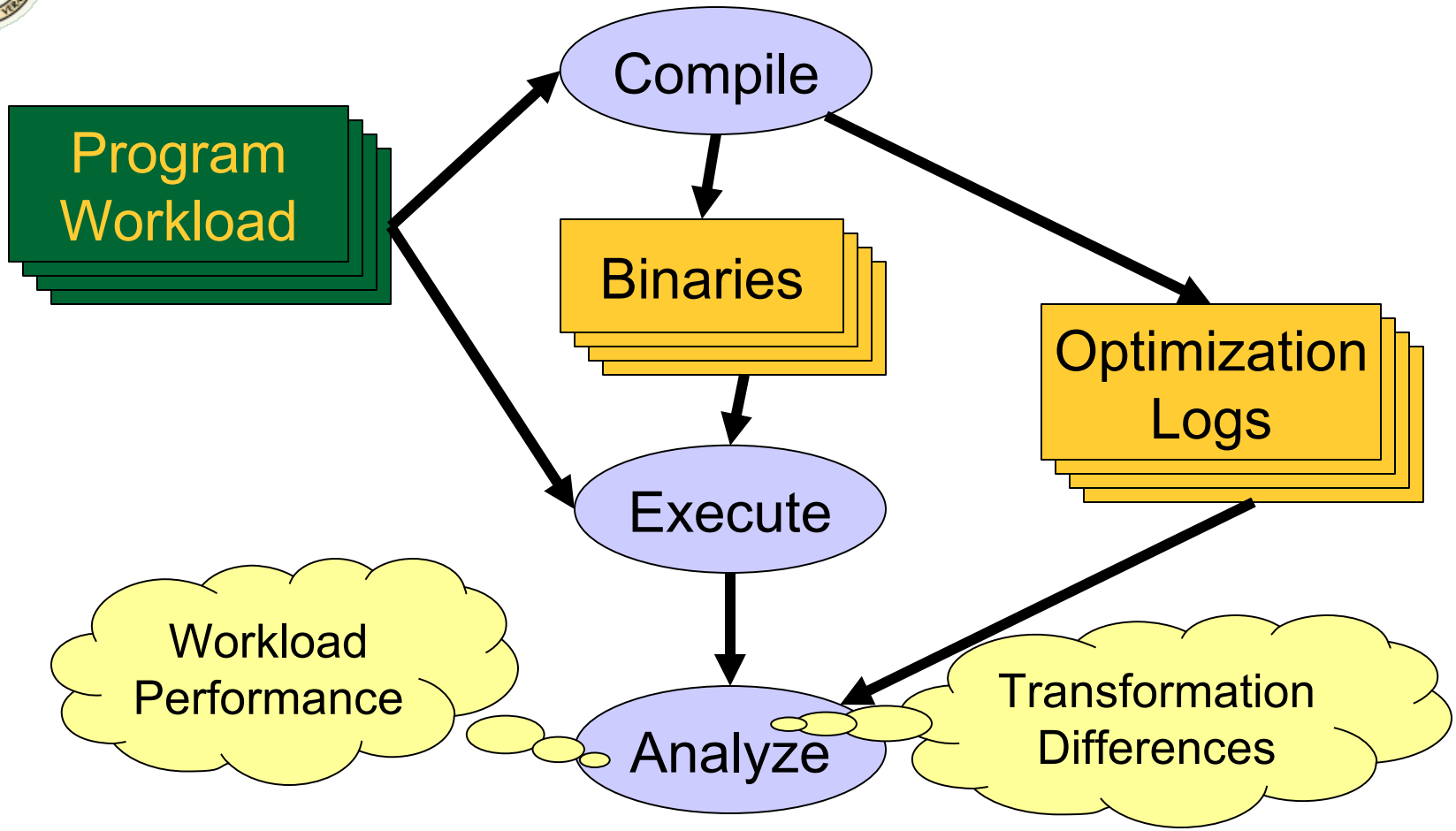
An Overview of *Aestimo*



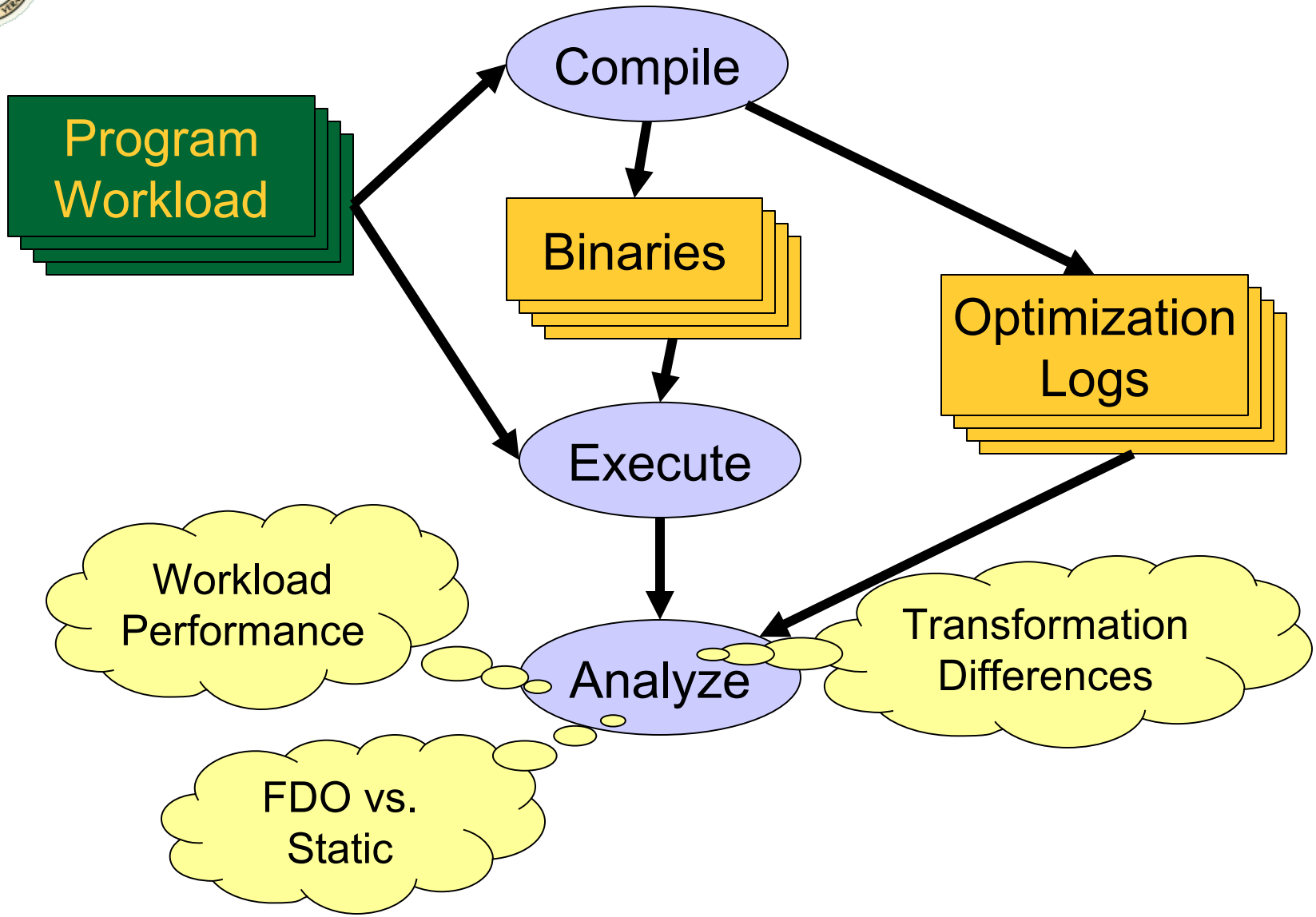
An Overview of *Aestimo*



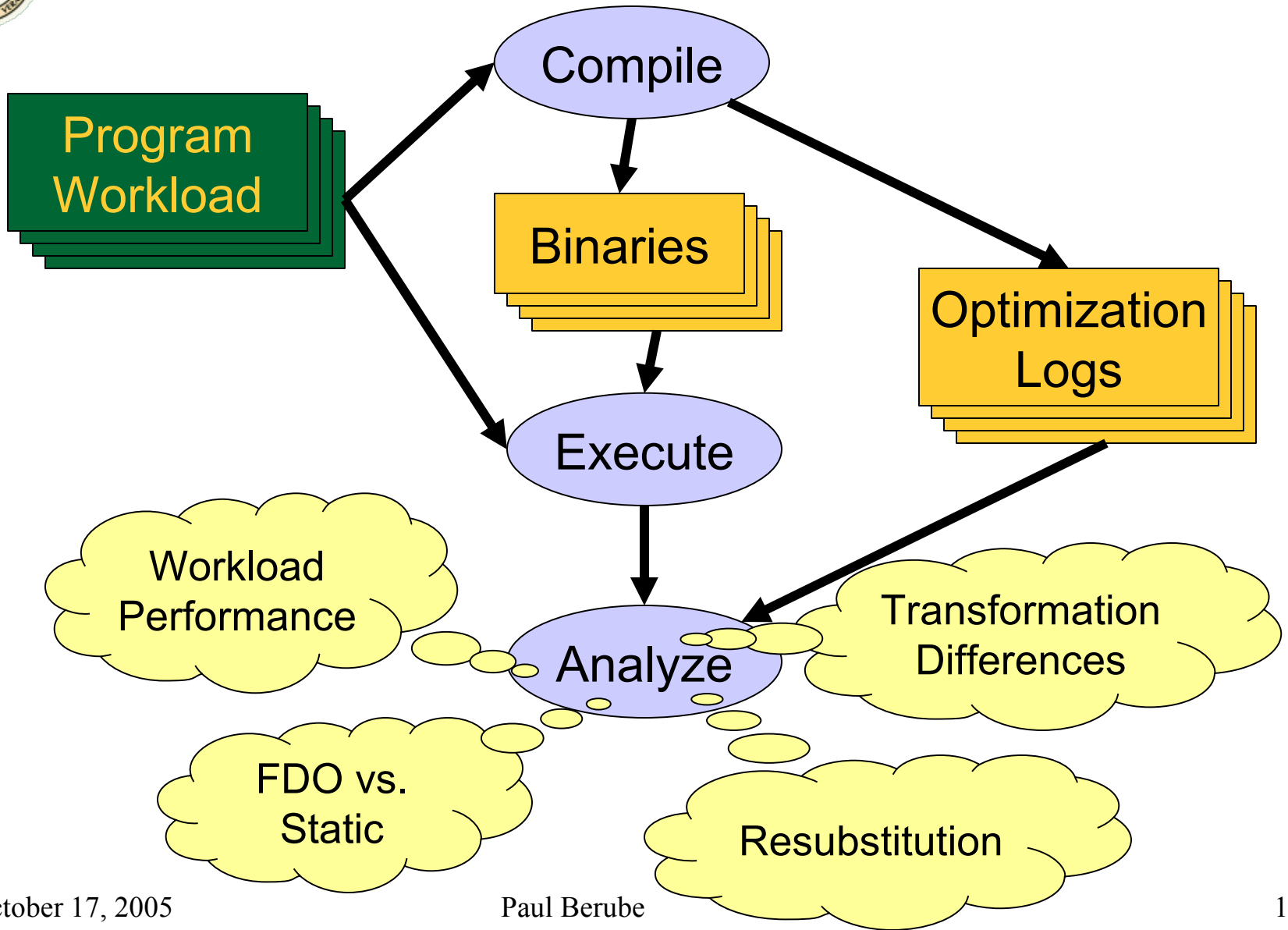
An Overview of *Aestimo*



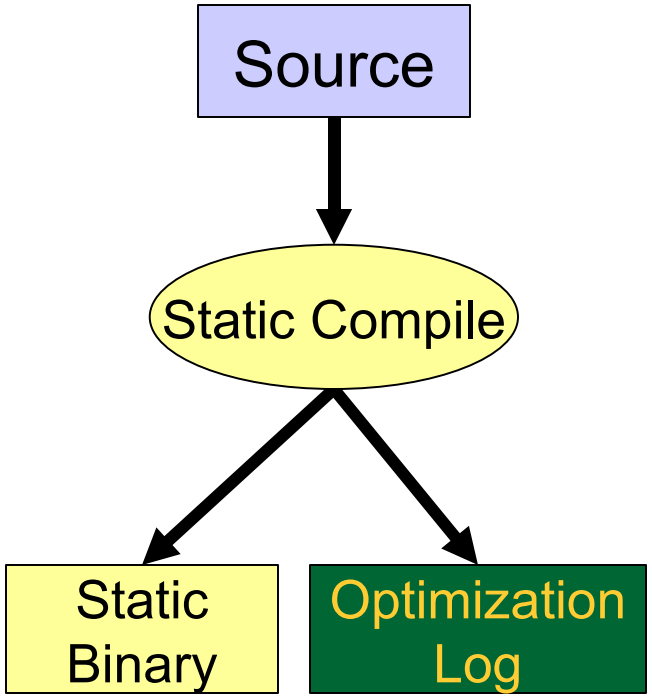
An Overview of *Aestimo*



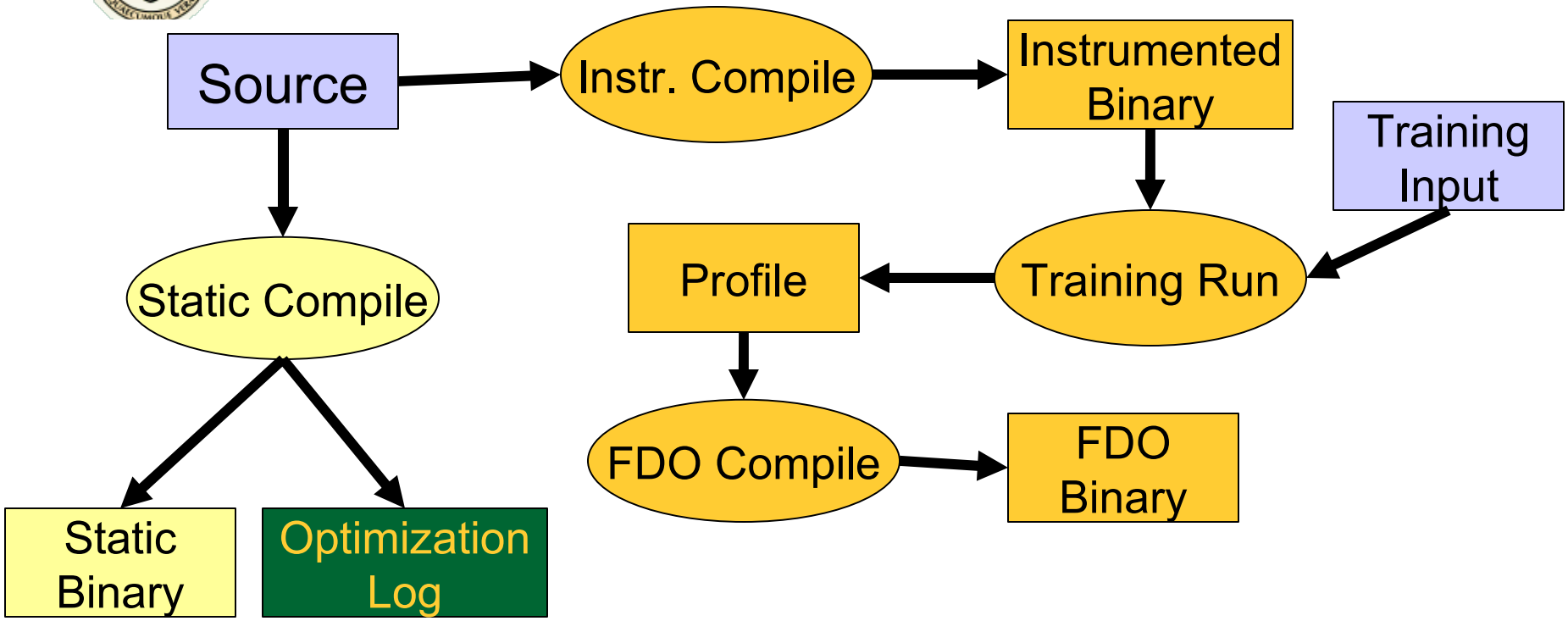
An Overview of *Aestimo*



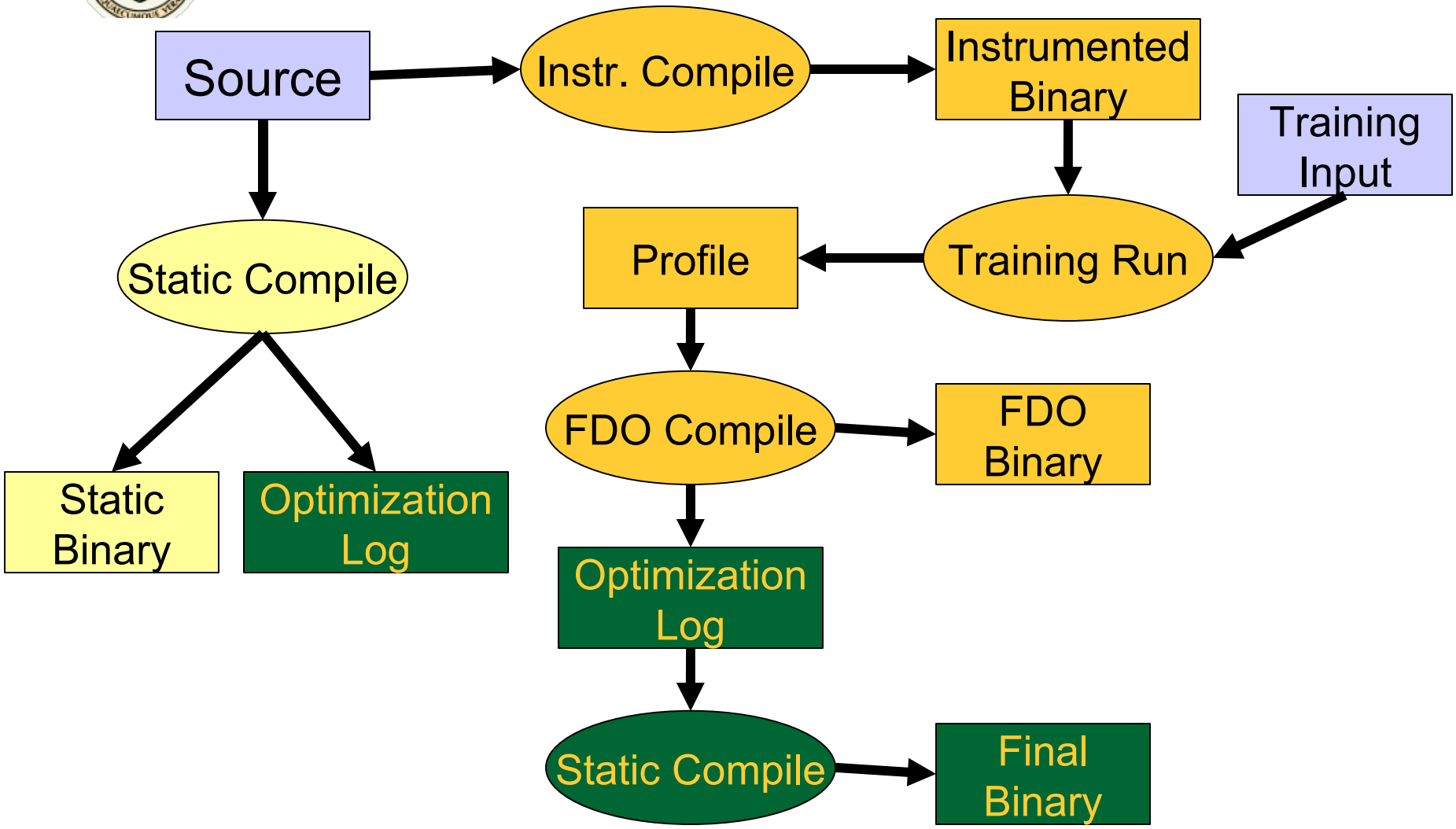
Compilation Process



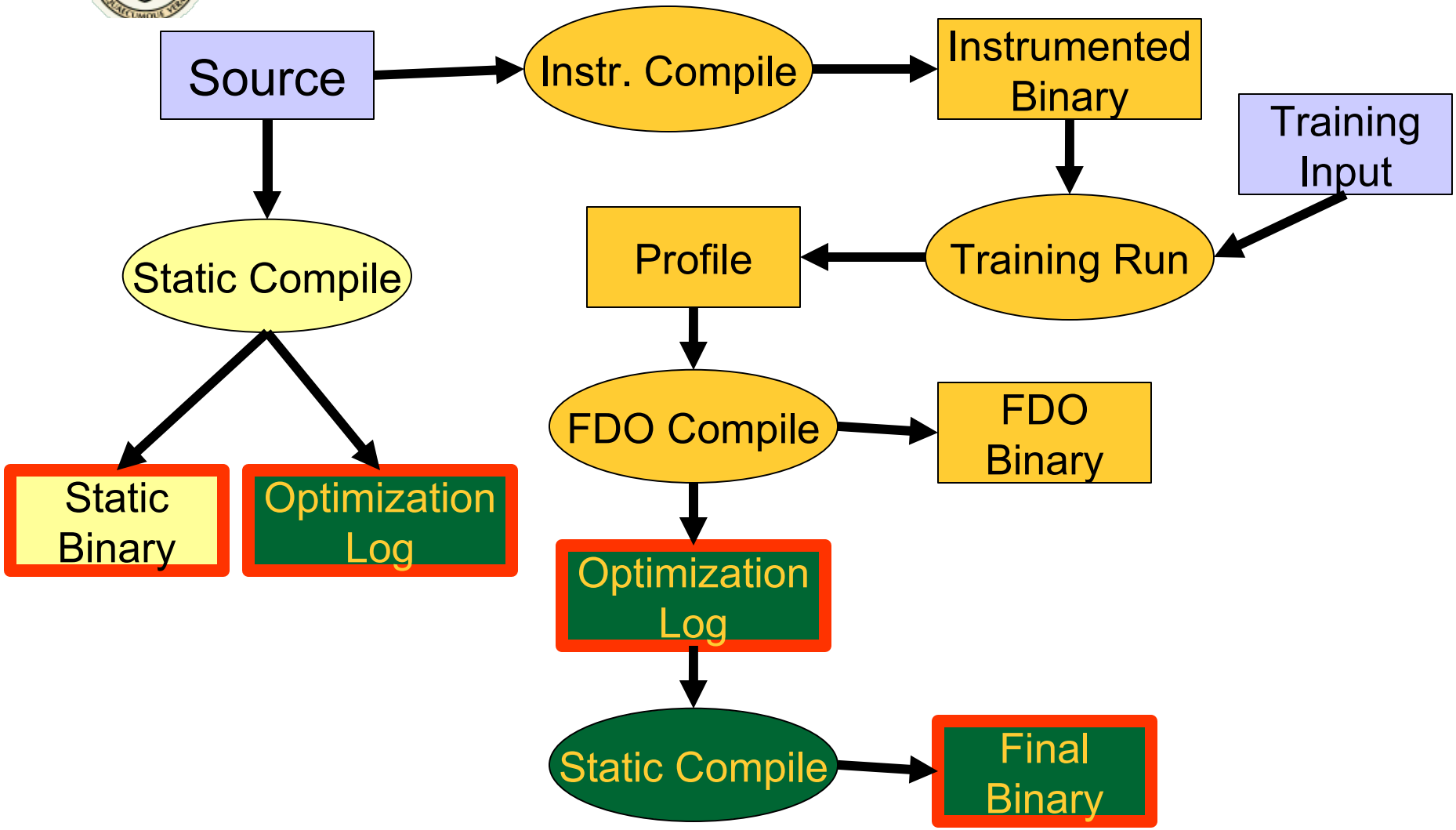
Compilation Process



Compilation Process



Compilation Process



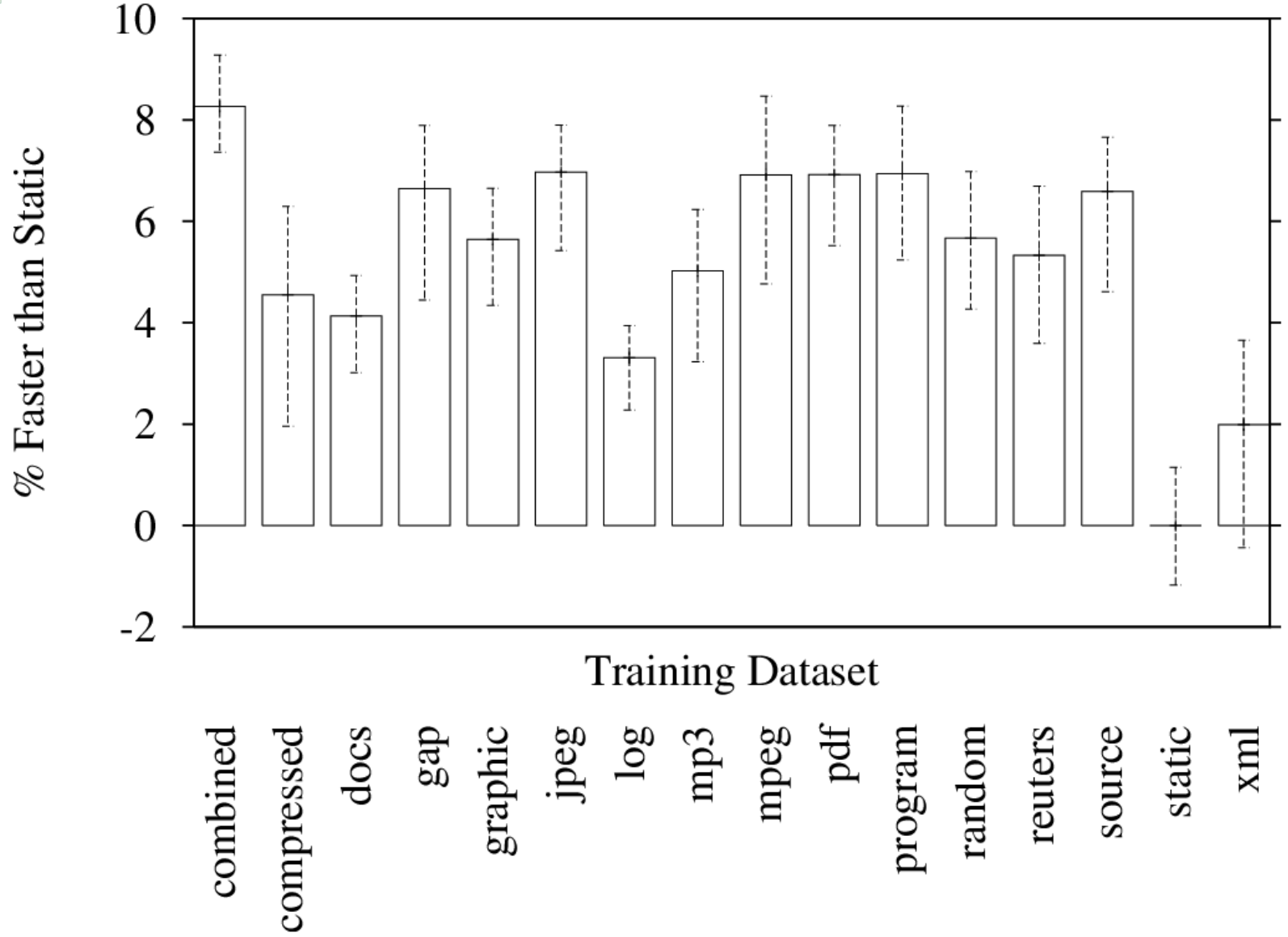
Workload Selection

- SPEC CINT2000 Benchmark inputs
  - 8 programs, 32 input
- 84 Additional Inputs
  - Contacted benchmark authors
  - Varied representative inputs
  - Existing collections
  - Synthetic input generator

Results

- ORC compiler
- **Inlining** and if conversion
- **Itanium** and Itanium 2 processors

Workload Performance: bzip2



Inlining
Itanium

Workload Performan

Inlining Itanium

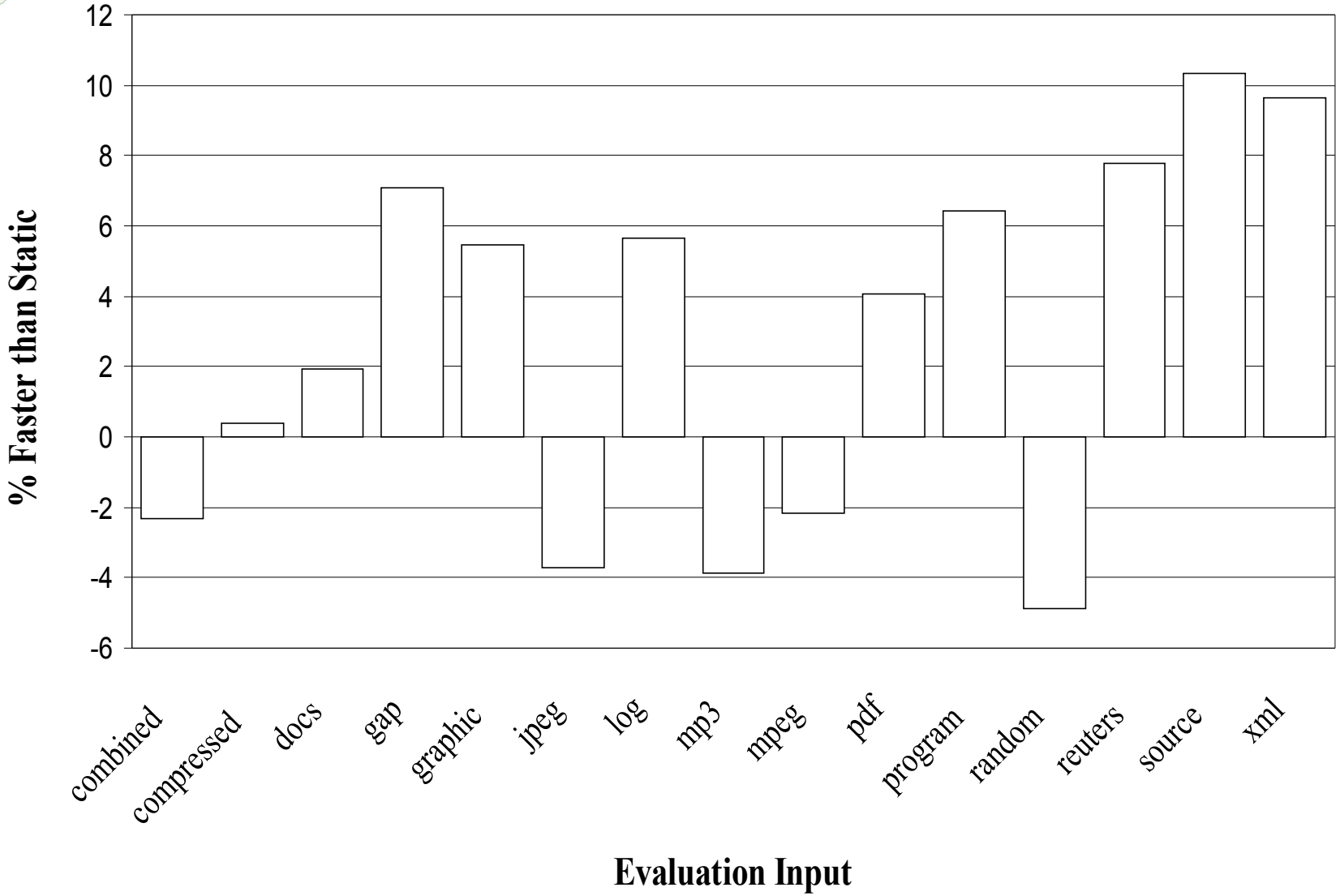
Summary of Contributions

- Training input selection does impact optimization decisions and performance
- *Aestimo*:
  - Automates training and evaluating on a large number of inputs
  - Isolates individual transformations
- A large collection of representative inputs for SPEC CINT2000 programs

Thank You

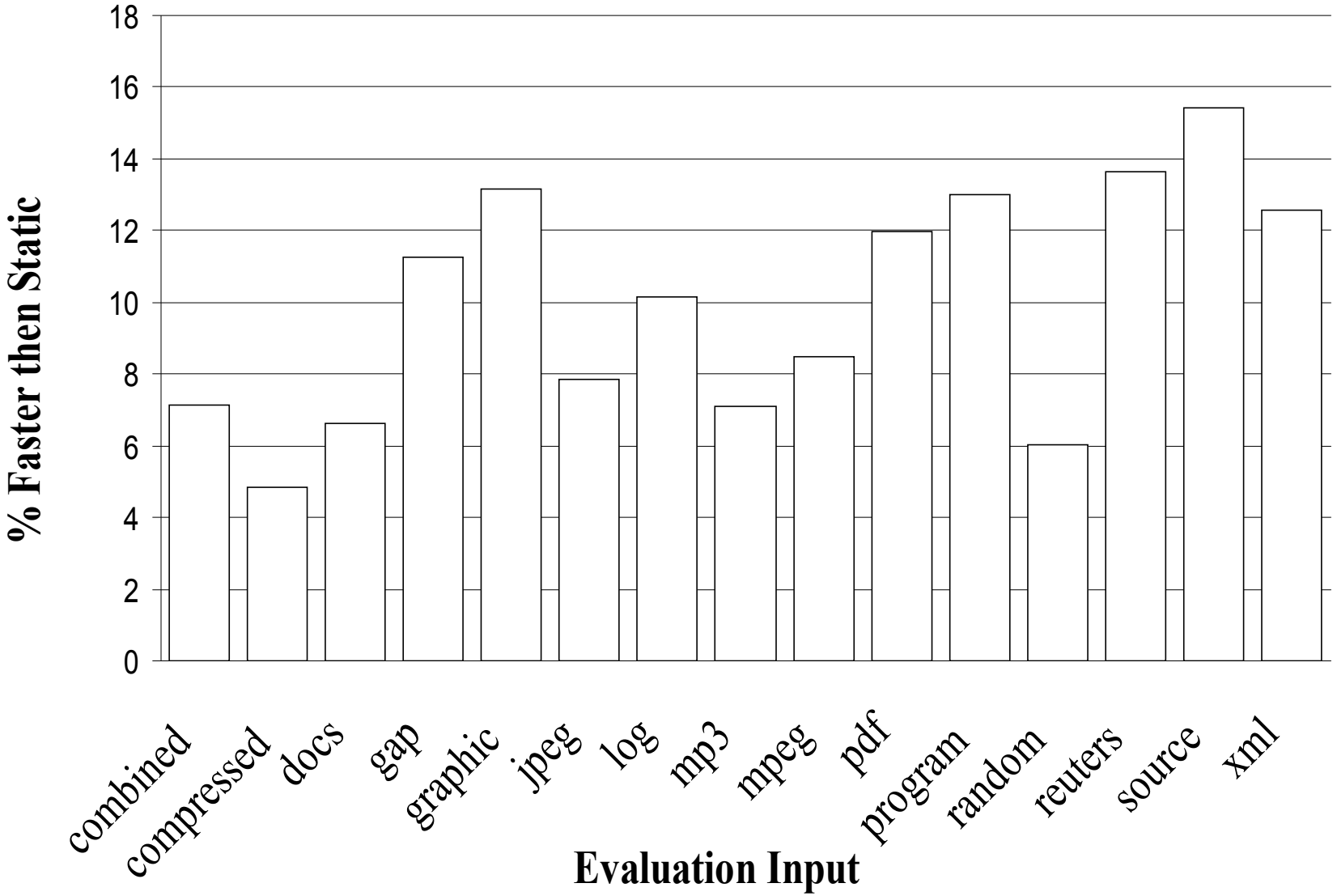
Questions?

Performance: bzip2 trained on xml



Inlining
Itanium

Performance: bzip2.combined



Inlining
Itanium