

# Pyps Pass Manager

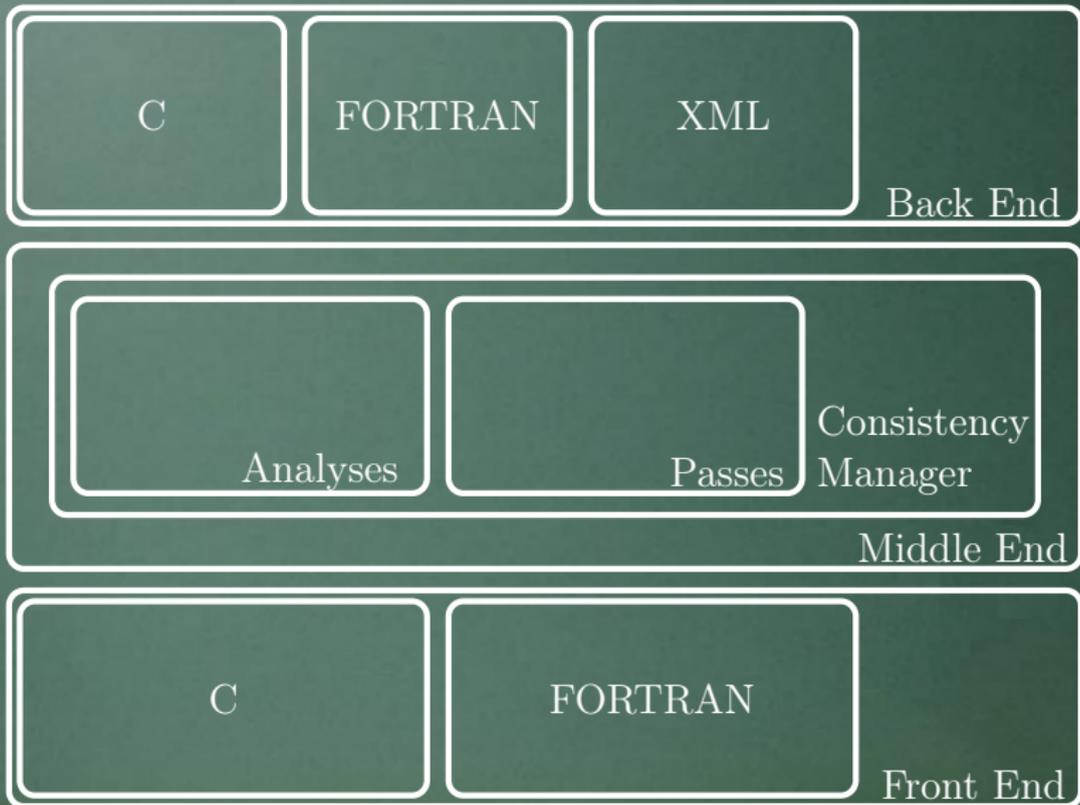
Serge Guelton    Grégoire Payen de La Garanderie

Télécom Bretagne

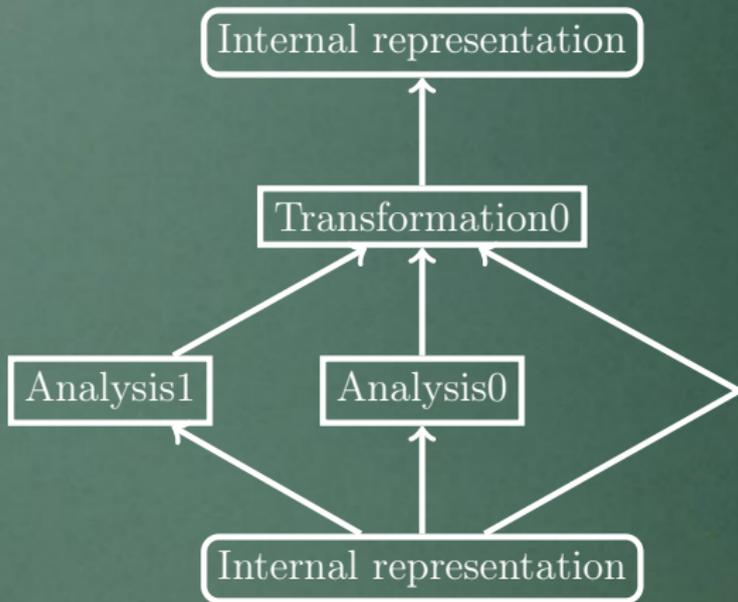
25 octobre 2010



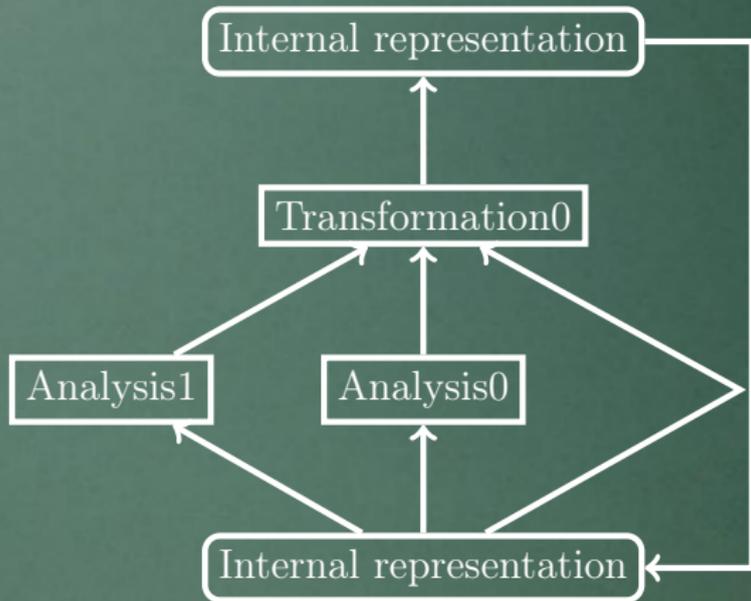
# Compilation Infrastructure Overview



# In the Middle End



# In the Middle End



# What is a pass manager ?

## > Definition

Schedules transformations to reach a goal.

In PIPS : `tpips` and `pips`

---

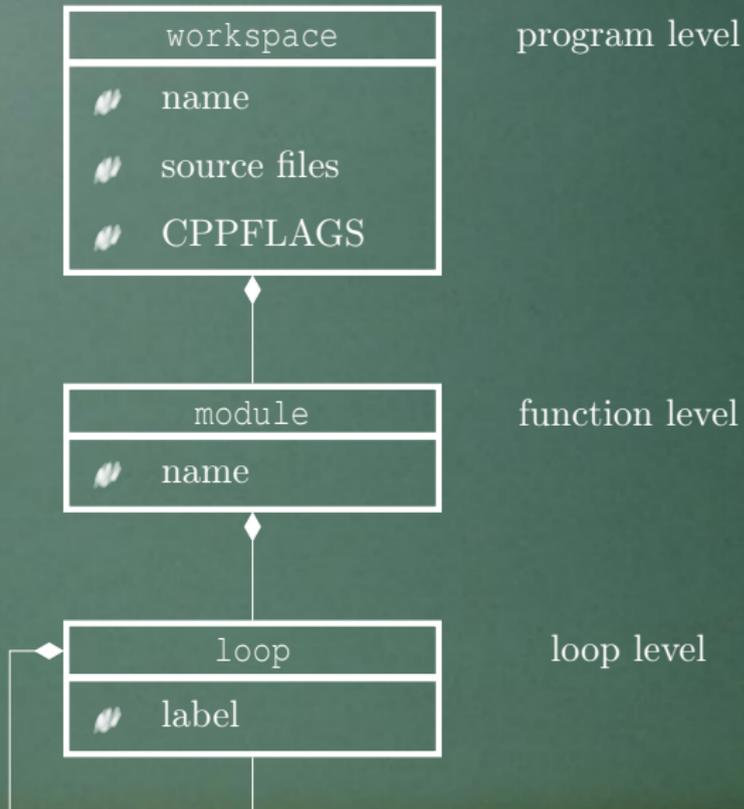
## > Issues

In gcc, llvm and pips : sequential transformations

- # Heterogeneous computing ?
  - # Iterative Compilation ?
- 

→ Programmable pass manager !

# API - the model



## workspace : Methods of interest

- # `__init__(...,verbose, recoverInclude,deleteOnClose)`
- # `save(rep="")`
- # `compile(CC,CFLAGS,LDFLAGS,rep,outfile,extrafiles)`
- # `all / all_functions / compilation_units`
- # `fun.module name / cu.cu name`
- # `props.property name`
- # `filter(matching=lambda x :True)`
- # `checkpoint() / restore(handle)`

# module and modules : Methods of interest

## ➤ Automatically Generated ☺

One method with local parameters for each pips pass.

A proxy to manipulate set of modules : the modules class.

---

- # code / display
- # callers / calles
- # loops(label="") / inner\_loops()
- # run(cmd)
- # saveas(path)
- # capply equivalent : concurrent=False

# Loops : Methods of interest

## ➤ Automatically Generated ☺

One method for each PIPS pass that uses the `LOOP_LABEL` property.



## ➤ Exempla Gratia

`loop_unroll`, `loop_tiling`, `loop_interchange`, `strip_mining`



☛ `loops()`

# Pyrops

## > Issues

- # PIPS is leaking ☹
  - # PIPS is segfaulting (sometimes) ☹
  - # PIPS is not reentrant ☹
- 

## > Pyrops moto : Hide it under the carpet

- # One process per workspace ☺
  - # Transparent thxs to RPC ☺ (Uses Pyro)
- 

```
from pyps import *
w = workspace(...)
...
w.close()
# I love pyps
```

```
from pyrops import *
w = pworkspace(...)
...
w.close()
pyrops.Launcher.shutdown()
```

# Pyps Drivers

## ➤ ipyps

interactive pyps shell (25 SLOC)

---

## ➤ p3

Pyps pragma handler (24SLOC)

```
#pragma pyps inlining(callers="main")
```

---

## ➤ benchmark

workspace\_gettime : instrument main

provides the benchamrk method

---

# More Pyps Drivers

## >pipscc

gcc front end for pips (124SLOC)



## >pips-make

gather source files from a build (118 SLOC)



## >pypsearch

Nature-inspired iterative compilation (584SLOC)



## >sac

multimedia instruction generator



# Interested ? Discover

➤ A modern interface

pyps, the programable pass manager for pips

→ read `src/Documentation/pyps!` ☺



# Interested ? Discover

➤ A modern interface

pyps, the programable pass manager for pips

→ read src/Documentation/pyps! ☺

---

➤ A modern build infrastructure

Only compiling with (a)utopips

→ read src/Documentation/auto\_pips! ☺

---

# Interested ? Discover

➤ A modern interface

pyps, the programmable pass manager for pips

→ read `src/Documentation/pyps!` ☺

---

➤ A modern build infrastructure

Only compiling with (a)utopips

→ read `src/Documentation/auto_pips!` ☺

---

➤ A modern validation tool

Only validated with buildbot

→ check `http://ridee.enstb.org:8010!` ☺

---

SEVEN  
SEVEN  
SEVEN

DEAD