

# Getting to Work with OpenPiton

Jonathan Balkind, Michael McKeown, Yaosheng Fu, Tri Nguyen,  
Yanqi Zhou, Alexey Lavrov, Mohammad Shahradsad, Adi Fuchs,  
Samuel Payne, Xiaohua Liang, Matthew Matl, David Wentzlaff

Princeton University

<http://openpiton.org>



# Introduction

# What to download?

- RTL, scripts, documentation, FPGA disk images & FPGA bit files:
  - Grab the latest from <http://openpiton.org>
- Linux kernel for OS development:
  - <https://github.com/PrincetonUniversity/piton-linux>
- Hypervisor:
  - <https://github.com/PrincetonUniversity/piton-sw>

# Environment setup - Tools

- OS: Ubuntu 12.10, Springdale (Red Hat) 6.6
- VCS: vcs\_mx\_l-2014.03 (avoid 2015.09 for now)
- Vivado: 2015.4
- Synopsys Design Compiler: syn\_l-2013.12-SP4
- Synopsys IC Compiler: icc\_l-2013.12-SP4
  
- All other tool versions are listed on <http://openpiton.org>

# Environment setup - Paths

1. Source required tool scripts
  - VCS, Vivado, etc
2. `$PITON_ROOT`
  - Should point to the root directory of your piton install
3. `$PITON_ROOT/piton/piton_settings.bash`
  - Source before running any simulations

**Where is everything?**

# \$PITON\_ROOT

- `piton/`
  - Aliased to `$DV_ROOT`
  - Home to RTL, tools, assembly tests
- `build/`
  - Aliased to `$MODEL_DIR`
  - Temporary build files, files from FPGA flow
- `docs/`
  - Documentation as seen on <http://openpiton.org>

# piton/

- `design/`
  - Top level of the RTL module tree
  - Structure follows verilog module hierarchy
- `tools/`
  - Home to all simulation, synthesis, fpga tools
- `verif/`
  - Location for all verification-related files



# Useful Paths

- **Where's the RTL?**
  - `piton/design/*/rtl/`
- **Where are the assembly test cases?**
  - `piton/verif/diag/assembly/`
- **Where are the module-agnostic backend scripts?**
  - **FPGA:** `piton/tools/src/proto/`
  - **ASIC:** `piton/tools/synopsys/`
- **Where are the module-specific backend scripts?**
  - **FPGA:** `piton/design/*/xilinx/script/`
  - **ASIC:** `piton/design/*/synopsys/script/`

# What can I do with OpenPiton?

- Simulation
- ASIC Synthesis & Backend
- FPGA Synthesis & Backend
- Validation
- Configuration
- OS/Hypervisor Development

# Documentation

- Microarchitecture Specification
  - Specification of uncore microarchitecture
- Simulation Manual
  - How to use, add to simulation infrastructure
- Synthesis and Back-end Manual
  - Details infrastructure, how to run flows, porting
- FPGA Prototype Manual
  - Details infrastructure, implementation, porting