PULP Software Development Kit and Tools

Compiler, Virtual Platform, PulpOS

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PULP Software Development Kit (SDK)

- Package for **compiling, running, debugging and profiling applications** on PULP platforms
- Supports all recent and upcoming PULP chips: Mr.Wolf, GAP, Vega, ...
- Supports all targets: Virtual Platform, RTL platform, FPGA, dev boards
- RISC-V GCC with support for PULP extensions
- Basic OpenMP support
Compiler

- Forked GCC 7.1
- **Extended** with all PULP custom instructions
- Some **custom instructions** instantiated by GCC (e.g. bit manipulation instructions, auto-vectorization), others available through builtins
- **CoreMark 3.1** with RI5CY v2
- Extended binutils for **full GDB support** of all custom instructions
Virtual Platform: Features

- 100% functional equivalence to RTL (or supposed to)
- Performance estimation (20% error margin)
- Frequency scaling
- Power on/off
- Power consumption estimation
- Architecture traces
- VCD traces
- Peripheral models (camera, ADC, microphone, etc)
- GDB connection
Runtime / OS

- **PulpOS**
  - Provides a simple OS for quick prototyping
  - Supports all PULP variants, with or without fabric controller (FC) and multiple clusters
  - Used for full applications including drivers, as well as basic tests
  - All APIs are asynchronous to support small reactive applications

- **Zephyr**
  - Just starting now
  - Plan is to port the kernel to PULP platforms, create new API for managing the cluster and port Zephyr drivers (SPI, etc)
PulpOS

- **Features**
  - **Multi-threading**: to get different priorities
  - **Event scheduler**: one per thread, to schedule run-to-completion tasks (all APIs are asynchronous)
  - **Memory allocators**: for all PULP memory levels (L2, L1)
  - **Cluster management**: cluster mount/unmount, remote cluster call, FC remote services for cluster
  - **Power management**: frequency scaling, deep sleep, voltage scaling
  - **Drivers**: SPI, I2S, I2C, CPI, etc.
  - **Cluster execution**: team fork / barriers / critical sections, DMA transfers
PULP SDK: Getting Started

git clone \n  https://github.com/pulp-platform/pulp-sdk

Check README.md for prerequisites and install them.

Source the configuration file of your target platform.

make all
Questions?

www.pulp-platform.org

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