# OpenSoC System Architect: An Open Source Supercomputing Platform

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## Motivation

- The idea of SoCs is starting to be applied to HPC, building chips from IP building blocks.
- Commercial, closed-source IP is a major drag on innovation in all technology spaces. Open-source hardware has the potential to ignite multiple paths in the semiconductor industry: increasing diversity by driving costs down, lowering the barrier to entry, and opening the door for customization.
- New companies are being founded based on open source.

## Software Infrastructure

### Programming Models

- The programming model relies on a RHIP approach where a single host (ARM A64) application will launch multiple RISC-V threads. Each RISC-V thread may have additional, extended instruction support for application-specific computing workloads.

## Hardware Architecture

### Tiled Architecture

- Each tile will contain the open source RISC-V based Rocket core with a custom Personal Memory Engine (PME), connected to an OpenSoC Fabric network.

### Configurable Network

- The tiles will be arranged in a mesh networking using the open source OpenSoC Fabric, with a node for a connection to main memory and off-chip communication.

## Overview

### Instruction Set Extensions

- Black Box Modules

### CHISEL

- Chisel Modules

### OpenSoC System Architecture

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For further reading, please visit our website: opensoc.community