

# Distributed Computing on a (tiny) Budget: Building a Raspberry Pi Zero Microcluster

Richard MILLER<sup>1</sup>

*Miller Research, Oxford, United Kingdom*

**Abstract.** The small, low-cost and tinkering-friendly Raspberry Pi computer board has been used as the basis for a variety of distributed computing clusters built by research groups and individuals for experimental and pedagogical use. The new Raspberry Pi Zero model is smaller, consumes less power, and costs only \$5.00 (when supplies are available), but lacks the built-in ethernet interface of its larger predecessors. Making a virtue of necessity, an Altera Cyclone II FPGA on an inexpensive development board can be used to provide the communication fabric for a pocket-sized Raspberry Pi Zero cluster, avoiding the need for bulky network cables and routers, and enabling experimentation with different networking architectures which may be more suited to fine-grained closely-coupled distributed computations than the usual TCP/IP over commodity ethernet. (*Work in progress.*)

**Keywords.** cluster, Raspberry Pi, FPGA

---

<sup>1</sup>Corresponding Author: *Richard Miller, Miller Research, Oxford, United Kingdom.* E-mail: miller@hamnavoe.com.

