

Hardware and FPGAs computing just right

Florent de Dinechin, INSA Lyon

A software designer has to carefully select the arithmetic that best suits each step of her application, but the choice remains limited: only a handful of operators are supported in hardware, and only in a handful of precisions. Conversely, the hardware or FPGA designer is faced with overwhelming freedom: in principle, any precision can be designed, any number encoding, but also any operation and function, provided it can be implemented in hardware and its performance/cost is competitive. This talk will expose some of the opportunities offered by this freedom, and some of the methodologies and tools that allow a designer to exploit it. Two issues will be surveyed. The first is the design of tools that provide designers with such open-ended arithmetic. The second issue, much more difficult, is to compose such arithmetic into applications that use at each point the right operator at the right precision.