Will FPGAs make it this time?
Panel, SC18 – November 2018, Dallas, TX
FPGAs keep coming back …

- Every 10-15 years – e.g., Cray XD1
  - Nearly 15 years ago!

- I personally know no single application using the FPGA
  - At that time, would require users to write RTL-level code
    
    *I loved it! Of course, as a CS student 😊*

- Now fast forward to 2018?
  - Will FPGAs succeed?
    
    *My answer: yes and no!*
Why will FPGAs succeed?

1. The HPC industry largely bases on process scaling
   - The end of Moore’s law will kill our industry
   - Reconfigurable technologies can delay it a slight bit 😊

2. Because they can (now) and the interest is there!
   - HLS is widely available now (much better than 2004 at least!)

SC18 Sunday Tutorial: Productive Parallel Programming for FPGA with High-Level Synthesis
1. FPGA vendors don’t understand software! The toolchain is very sad ... a little play in three acts
   - Act 1: run 30 applications (polybench) through Vendor’s HLS compiler
     *all 30 simulate correctly but only 14 produce correct results on FPGA 😊*
   - Act 2: submit bug report: the compiler tool crashes due to the power report generated by the tool exceeding the maximum size for the Google Protocol Buffer.
   - Act 3: Company’s Principal Engineer on a public forum: “If it doesn't result in a bitstream, on a shipped board, then there is no money. No money = no interest. An academic exercise is of little import here.”

2. FPGAs may not be the right design for HPC

Learn from the past failures? 😊