Day 8: What's on an FPGA?

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ble!s (ble!s)

- Use multiplexors to select output of function

Interconnect

- This was the real breakthrough for FPGAs
- "programmable wires" - choose which spots connect
- Each connection has a cost - need a combination of connected points and unconnected points
- Some wires skip some junctions to alleviate bottlenecks
- Interconnect takes more than half the chip

Specialized Hardware

- FPGA contains specialized blocks for common tasks
- Hardware Accelerators
  - Adders - speed up carry chain because exceptionally slow in CLBs
  - Block RAM - all in one place, not distributed
  - DSP48E1s - multiply/add combinations for DSP
  - Networking - ethernet, PCIE, etc.
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Distributed RAM

- configurable logic block (CLB) lookup tables (LUTs) cab be used for distributed RAM

IO Blocks

- Flip flops in CLB can access outside world with a little analog hardware