What problems do we face?

- We have more Si than we know how to use
  - ➤ For powerful single core
    - Single core performance is still very important, but how much more can we get?
    - Power, wire delay, lack of new uArch features
    - Multi-threading, e.g. SMT
  - ➤ For more cache
    - Simple and effective so far
    - Latency won't scale
  - ➤ For multiple cores
    - Likely most exploited in the coming decade
    - Not because people want to but they have to

Multi-core Architecture

- Is this for everyone?
  - ➤ Unlikely; not for the foreseeable future
- Both HW and SW will be segmented by apps
  - ➤ Specialized cores, e.g. IO, codec, GPU
  - ➤ A unified parallel programming model?
    - It's a very long shot.
    - Domain-specific programming models
      E.g. media, graphics, packet processing,
  - ➤ Look beyond performance
    - E.g. software testing, debugging, security