Outlook on Future CPUs

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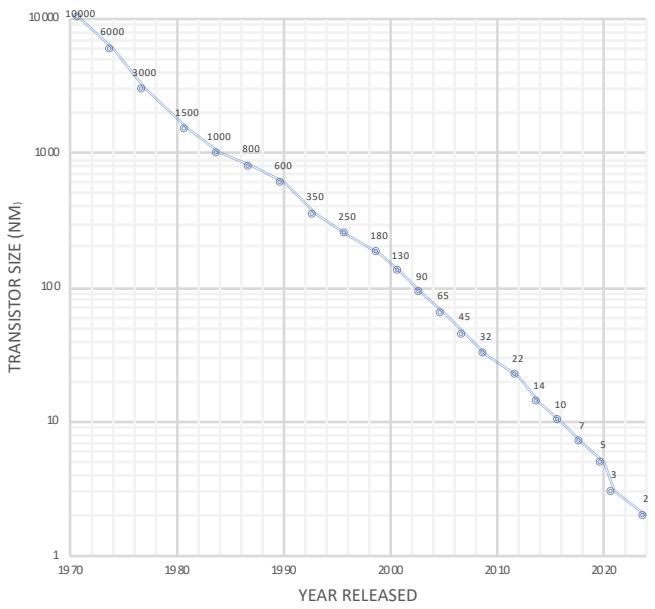
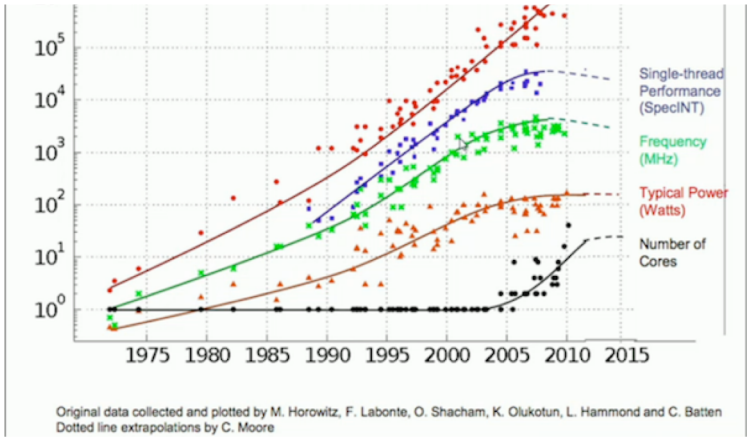
Transistor Size Prediction

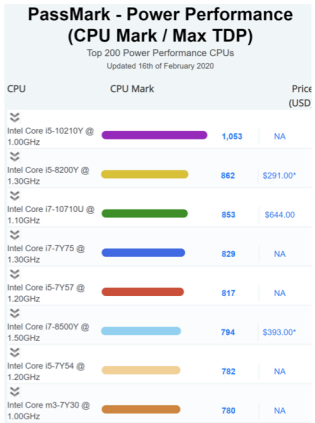


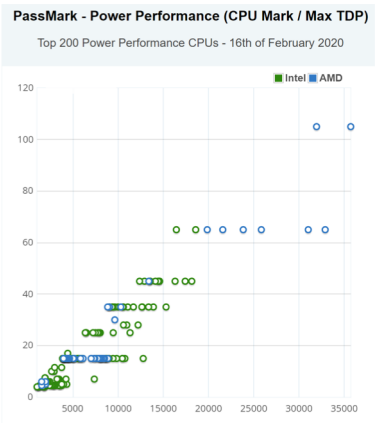


What about transistor density?

- No longer a valid indication of performance late 2000s

How will we get more power in the future?





Better architecture, or if not better, add additional hardware features

- Additional transistors on a chip have been used to add hardware features, relieving the CPU directly of a program running on it, where this additional hardware does it directly.

Sure, they found a few places to nip and tuck, picking up a few percent in performance here and there, but it is hard to improve a highly out-of-order four-issue CPU that already has the world's best branch prediction.

- Linnley Gwennap

The Big Idea

- Future CPUs
  - More cores
    - Not necessarily higher clock speeds
    - Smaller increases in performance
  - Larger area
    - Fit more cores and transistors
    - Spreads power dissipation over wider area
  - More transistors support additional architecture
    - CPUs begin to look more and more different as they begin to direct tasks away from central cores into specific hardware (acceleration)
  - Smaller transistors
    - Furthers the power dissipation problem if used in central CPU
    - However, they would be used in additional feature hardware
  - Better algorithms
    - Very important

References

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