

Breaking Moore's Law: Pushing PC's to Blistering New Levels

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Introduction

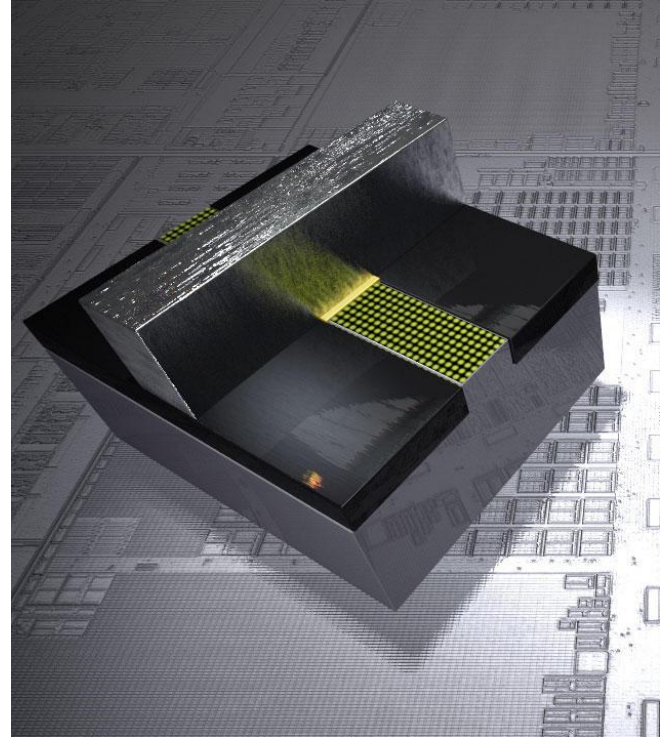
- ▶ Performance gains from newer CPUs much lower than those in the past
- ▶ 15-20% in modern intel CPUs vs 50-60% in the past

Moore's Law

- ▶ The number of transistors on a chip doubles about every two years

Transistor 101

- ▶ CMOS
- ▶ source/drain for electron flow
- ▶ metal gate insulated from body of transistor
- ▶ max current flow when on, 0 when off
- ▶ switch quickly between on and off

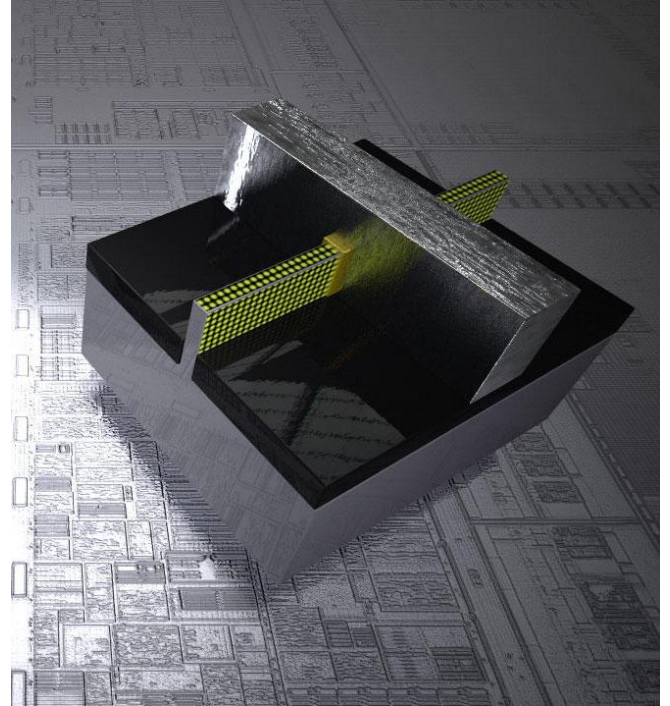


Problems

- ▶ Power Wall
- ▶ Transistor Size
- ▶ leakage

Current Solutions: Hardware

- ▶ Transistors
 - ▶ high-k metal gate
 - ▶ tri-gate



Current Solutions: Software

- ▶ Parallel optimized hardware
- ▶ Larger amount of work on GPU
- ▶ encourage software developers to use parallel programming
 - ▶ CUDA
 - ▶ OpenCL

Future Solutions

- ▶ graphene
- ▶ gallium arsenide
- ▶ molecular transistors
- ▶ quantum computing

References

- ▶ <http://bit.ly/ZiY2be>
- ▶ <http://bit.ly/4W5LKx>
- ▶ <http://bit.ly/XY1cAQ>
- ▶ <http://bit.ly/lo1qGM>

Fin.

Questions?