Moore’s Law

It’s not actually a physical law, but a prediction declared by Gordon Moore who is Intel’s co-founder. According to Gordon “the number of transistors incorporated in a chip will approximately double in every 2 years”.

His prediction was surprisingly accurate as we could see considerable improvements in the chips, reflecting straightly on the quality and speed of computers. However, the manufacturers started to face some issues with the exponential growth.

In order to increase the density of transistors in a chip so that it becomes faster, they need to be smaller. Robert Dennard observed that the power density remain the same for a given area of silicon when the density of transistors shrank, thus when that happen the same is applied for voltage and current. Because power is the product of voltage and current, the power dropped with the squared.

By scaling transistors, more power would be necessary to supply the transistors and cool them down. Keep dropping the voltage (hence the transistors) became a problem as smaller devices are more prone to leakage and because the transistors need to have a voltage above the threshold otherwise they can’t switch on.

Also, there is a physical limitation that will prevent us to create smaller transistors as they have become smaller and smaller over the years.

As the research can’t stop, more and more investments need to be done in order to figure out ways to overcome the limitations. It’s going to reach a point where it’s going to be so much expensive that won’t be viable to commercialize chips anymore.

As the specialist and manufacturers realized that the law won’t last forever, new research is being made in order to figure out how the future of chip manufacturing will be.

Dorian Neto

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