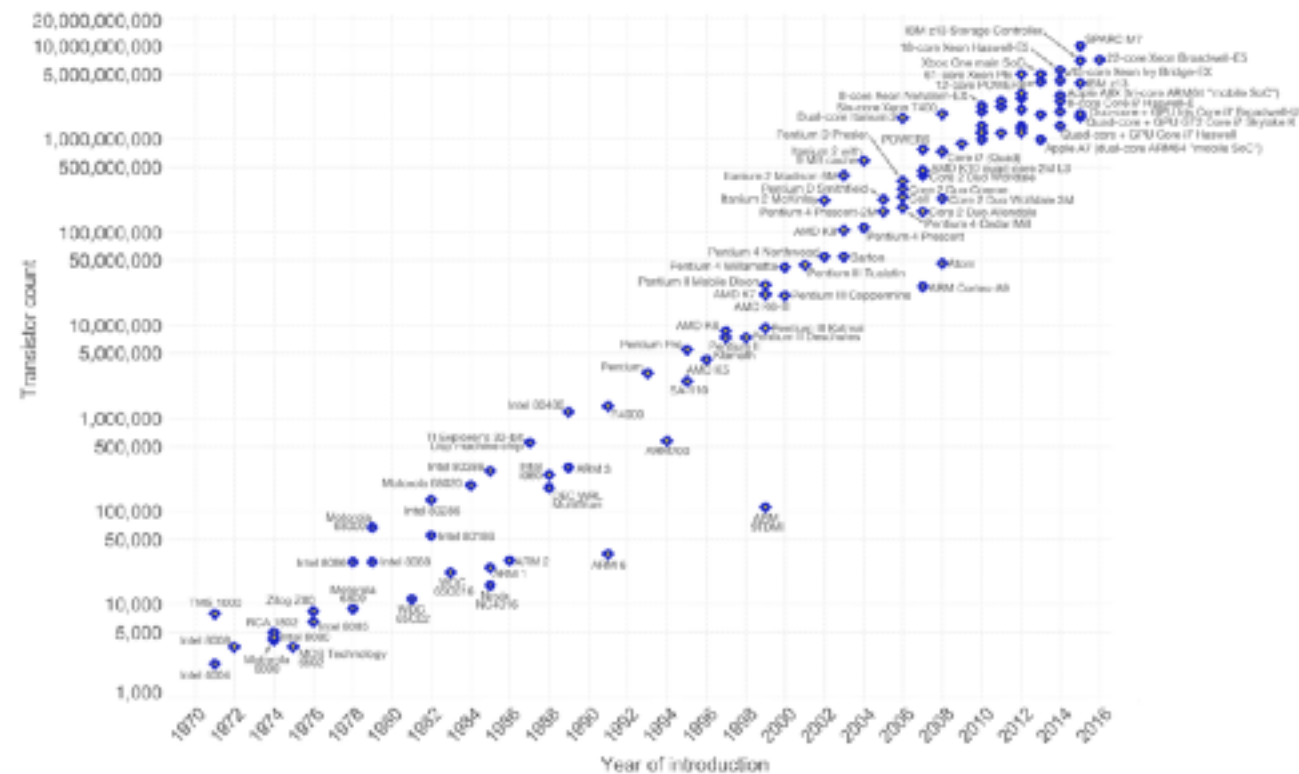


Why care about precision?

Moore's Law – The number of transistors on integrated circuit chips (1971-2016) 

Moore's law describes the empirical regularity that the number of transistors on integrated circuits doubles approximately every two years. This advancement is important as other aspects of technological progress – such as processing speed or the price of electronic products – are strongly linked to Moore's law.



The data visualization is available at [OurWorldinData.org](https://ourworldindata.org). There you find more visualizations and research on this topic.

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Moore's "law":
twice as many transistors per chip every 2 years

New computers are bigger but not faster.

- Reaching physical limits of transistor size.
- Parallel computing is the main route to higher grid resolution.

Energy consumption

- MetOffice supercomputer: 2.7 MW of electricity.

Looking for any possible paths to faster/more efficient code.

Floating point numbers

Method to encode numbers in binary

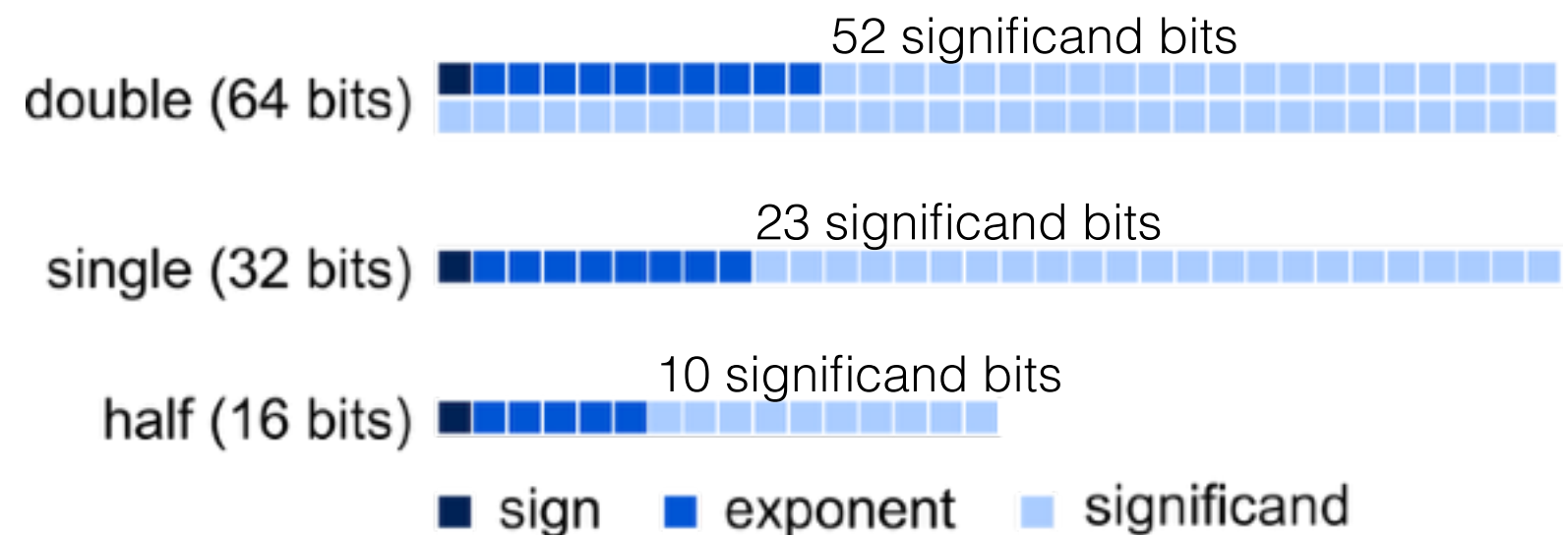
$$x = (-1)^{\text{sign}} \times \left(1 + \sum_{n=1}^N s_n 2^{-n} \right) \times 2^e$$

Significand Exponent
Precision Magnitude

Think of

$$65504 = 6.5504 \times 10^4$$

Computers have standards layouts for these numbers



This talk: focus on the significand (precision).