

Lucy Whalley // lucydot.github.io



Research problems can outgrow the computer where they started

- Statistical validation running the same model 1000 times, each time takes an hour
- Increase in dataset size the new data is 10 times as large and will crash a laptop
- Increase in model complexity going from 2D to 3D simulations leads to a large increase in simulation time

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Supercomputers (also known as clusters) are optimized for intensive computing

This calculation would take 24 days on my laptop (and would really slow down Netflix Teams meetings)

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Using a cluster has several advantages

- Speed clusters have *lots of* cores
- Volume processing memory (RAM) and disk storage for large amounts of data
- Efficiency as there are many system users
- Cost bulk purchasing results in a reduction in cost
- **Convenience** why tie up your own computer for hours if you can use another one?

Top500.org Rmax Rpeak Power (TFlop/s) (TFlop/s) (kW) Rank System Cores Supercomputer Fugaku - Supercomputer Fugaku, 7,630,848 442,010.0 537,212.0 29,899 A64FX 48C 2.2GHz, Tofu interconnect D, Fujitsu **RIKEN Center for Computational Science** Japan 2,414,592 2 Summit - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband, IBM DOE/SC/Oak Ridge National Laboratory United States 3 Sierra - IBM Power System AC922, IBM POWER9 22C 1,572,480 3.1GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband, IBM / NVIDIA / Mellanox DOE/NNSA/LLNL United States The path to exascale computing (1018 flops)

<> Which computers can I access? - X											
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Using a terminal (just like the movies)

<> How do I access the computer? -

lucy@lucys-MacBook-Air:~/Repos/2021_MixedCation

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(base) → 2021_MixedCation git:(main) × ssh

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Using a terminal and Unix commands

A schedular is used to manage the job queue

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	What next?	
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