Using COSMA

A telescope for cosmology

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Using telescopes

Credit: wikipedia / ESO

- Where are you pointing / where is your observa[tory]?
    - Below the horizon?
- What are the seeing conditions like?
    - And is it raining?
- What wavelength filters are in use?
- How long does the observation need to be?
- What is the sensitivity of the instrument?
- How do you use the data analysis platform / pipeline?
- You need to understand the physics behind what you're trying to achieve!

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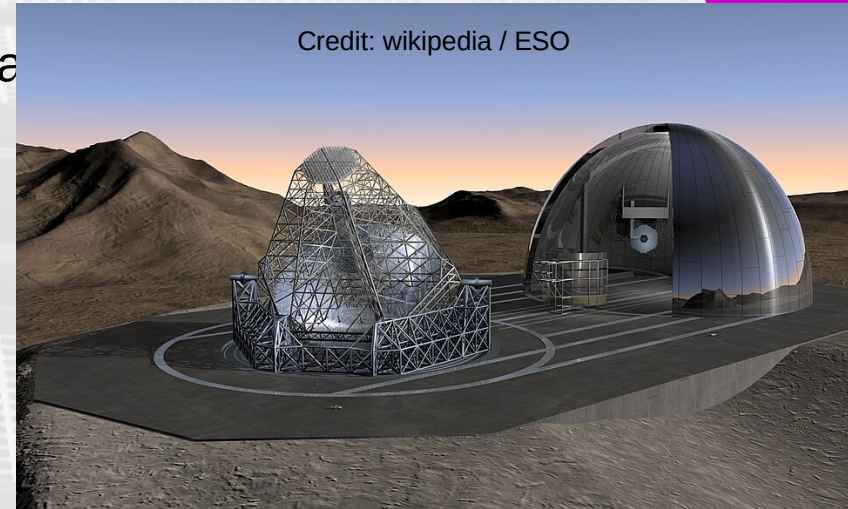
Using cosmascopes

- You will benefit most if you try to understand a HPC system

  - They all vary slightly, the basics are the same

- If something isn't working try taking a scientific approach

  - Why, what has happened, how can it be resolved?

- And learn to make best use of it

  - Optimised codes, tuned to the system

  - Best for aiding net-zero

- If someone/website gives you instructions spend time to understand them

  - Don't just follow them blindly (sudo apt install just won't work!)

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Accessing the system

- First, sign up for an account on SAFE:

  – You'll need a password and authenticator app

- Upload an ssh key (the public part)

  – Protected by a passphrase

- Request a login account on COSMA

  – And join the do020 project

  – Once authorised, you'll get an email from COSMA

    - Read it!

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Logging in

- You will need:
  - Your ssh key (protected by a passphrase)
  - Your COSMA password
    - This will be sent in the welcome email

- ssh to COSMA may fail:
  - You've forgotten your passphrase or password
  - Your account has been disabled
    - Inactivity, failure to verify details on SAFE, invalid email
  - You are blocked temporarily
    - Too many password failures
  - You're using the wrong ssh key, or its file permissions are wrong
  - You're a Windows user!

- ssh -vvv will give you more information

- If you are asked to reset your password when you log in, please follow the instruction carefully

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Login nodes

- A shared resource
  - Think about what you run here
  - Don't use all the cores
  - Don't use all the RAM
  - Don't leave things running when not needed
- Good for:
  - Compiling code
  - Quick test jobs
  - Submitting to the queues
  - Managing files

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Slurm batch queues

- Slurm is your friend
  - Provides access to the compute resources
- Be inquisitive: learn the environment
  - What queues are available to you
  - How busy are they?
  - What type of nodes?
    - Cores, RAM, GPUs

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Storage

- Your home space:
  - /cosma/home/do020/USERNAME
- Application space:
  - /cosma/apps/do020/USERNAME
- Scratch space:
  - /snap8/scratch/do020/USERNAME
- Data space:
  - /cosma8/data/
- Each is optimal for different things – and can be tuned

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Storage usage

- HPC file systems typically like smaller numbers of larger files
  - Many small files can cause performance issues
  - Therefore think about how you will write your outputs
    - e.g. don't let your simulation produce 100k files per day!

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Software

- Available as "modules"
  - Set up your desired environment using
    - "module load …"
  - Try to understand what the module command does
- Or install your own
  - Python virtual environments are useful for this

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Jupyter hub

- You'll need an ssh tunnel:

  - ssh -L localhost:PORT1:node:PORT2
    USERNAME@LOGIN.NODE

  - Understand what this means (and check its output)

    - PORT1 on your laptop (localhost) will act like a wormhole
      - Transporting data
        - Via LOGIN.NODE
          - To/from PORT2 on node

- Close notebooks when you no longer need them

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Conclusions

- Learn to master your HPC systems
  - Don't them them master you!

- Visit the support pages
  - cosma.rtfd.io

- Ask around for help and advice
  - As a last resort, contact cosma-support@durham.ac.uk

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