Environment manager from your OS to your environment

Encapuslation levels using docker, conda [1]

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1. This work is derived from the IFB and I2BC team members

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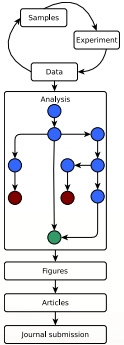
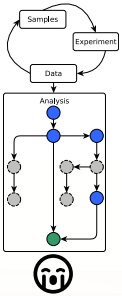




What are the changes ?

- Tool version
- Packages
- Environment variables

- OS version
- The computer
- ...

Encapsulation levels

Encapsulation : capture the system environment of applications (OS, packages,libraries) to control their execution

- Hardware virtualisation (virtual machines)

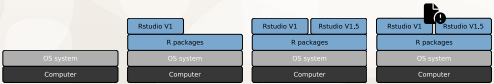
- OS virtualisation (images and containers)

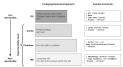
- Environment management (package manager) CONDA

Example of R and package installation

Classical installation

- Start with a computer and a specific OS
- Inside, we installed a new application
- need some dependencies
- we tested the last R version –> might be conflicts





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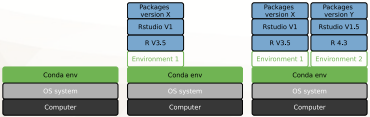
2. Practical Computational Reproducibility in the Life Sciences Grüning et al, Cell Systems, 2018. DOI 10.1016/j.cels.2018.03.014

A package first One tool, one container Tool and container versions should be explicit Avoid using ENTRYPOINT Reduce the size of your container as much as possible Keep data outside of the container Add functional testing logic Check the license of the software Make your package or container discoverable Provide reproducible and documented builds Provide helpful usage message

Example of R and package installation

Conda use

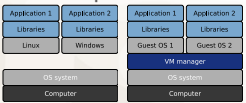
- The idea is to separate each application in here own environment CONDA
- A tool version, a conda environment
- Create a new environment for my new tool version, my analysis...



Example of R and package installation

hardware virtualisation

- If we want a software from a different OS ?
- Use virtual machines
- Each application get a total different and independant environment
- Virtual machine could be transfered to another computer

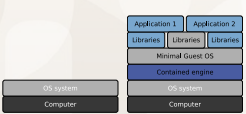


- Redundancy between VMs
- Heavy to set up
- No automation

Example of R and package installation

OS virtualisation

- "trick" applications into believing that they are in a different OS than the host's docker
- Avoid redundancy
- Speed
  - Faster installation
  - No boot time
- Lightweight
  - Minimal base OS
  - Minimal set of library and global environment
  - Easy sharing of application



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- No easy use on a cluster system
- Docker private company policies

3. https://www.docker.com/blog/scaling-docker-to-serve-millions-more-developers-network-egress/

Conda system

- Anaconda
- Miniconda
- Conda


CONDA CHEATSHEET