



Genomics in the Cloud

Book Club - Week 4

December 21, 2020

Agenda

- Chapter 3: Computing Technology Basics for Life Scientists
- Additional resources
- Open discussion

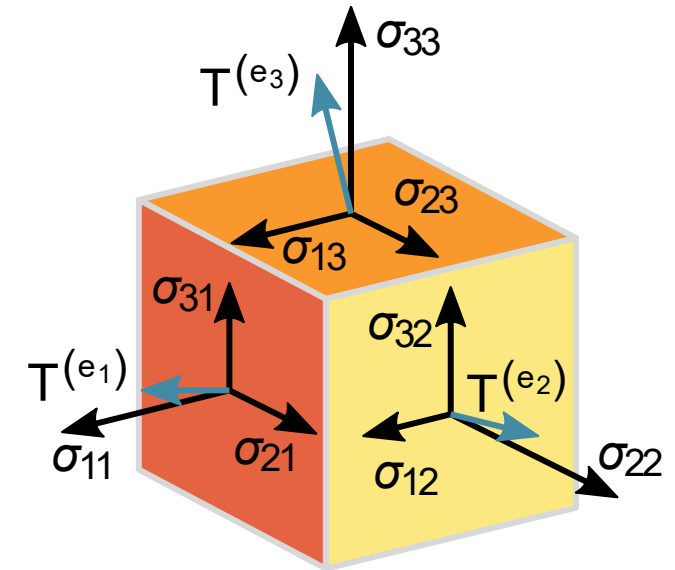


Chapter 3: Computing Technology Basics for Life Scientists

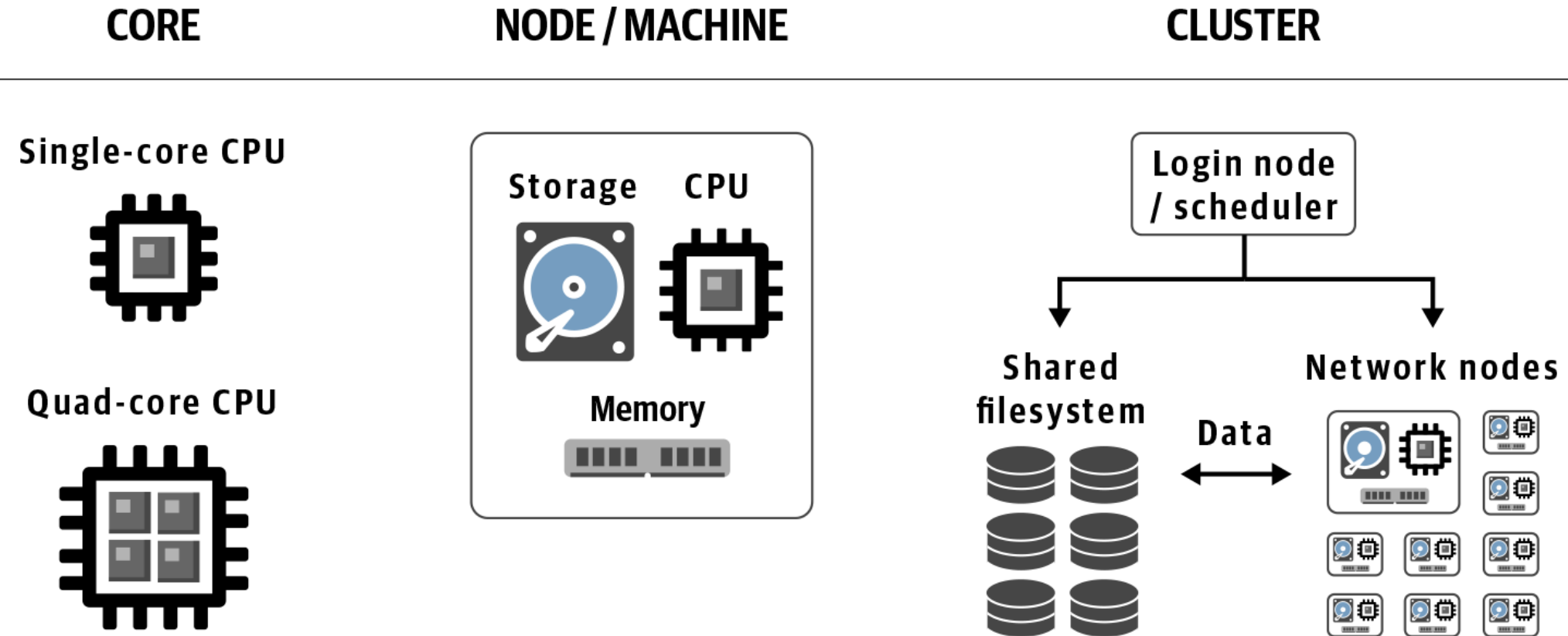
Genomics in the Cloud by Geraldine A. Van der Auwera and Brian D. O'Connor (O'Reilly). Copyright 2020 The Broad Institute, Inc. and Brian O'Connor, 978-1-491-97519-0.

Some terms

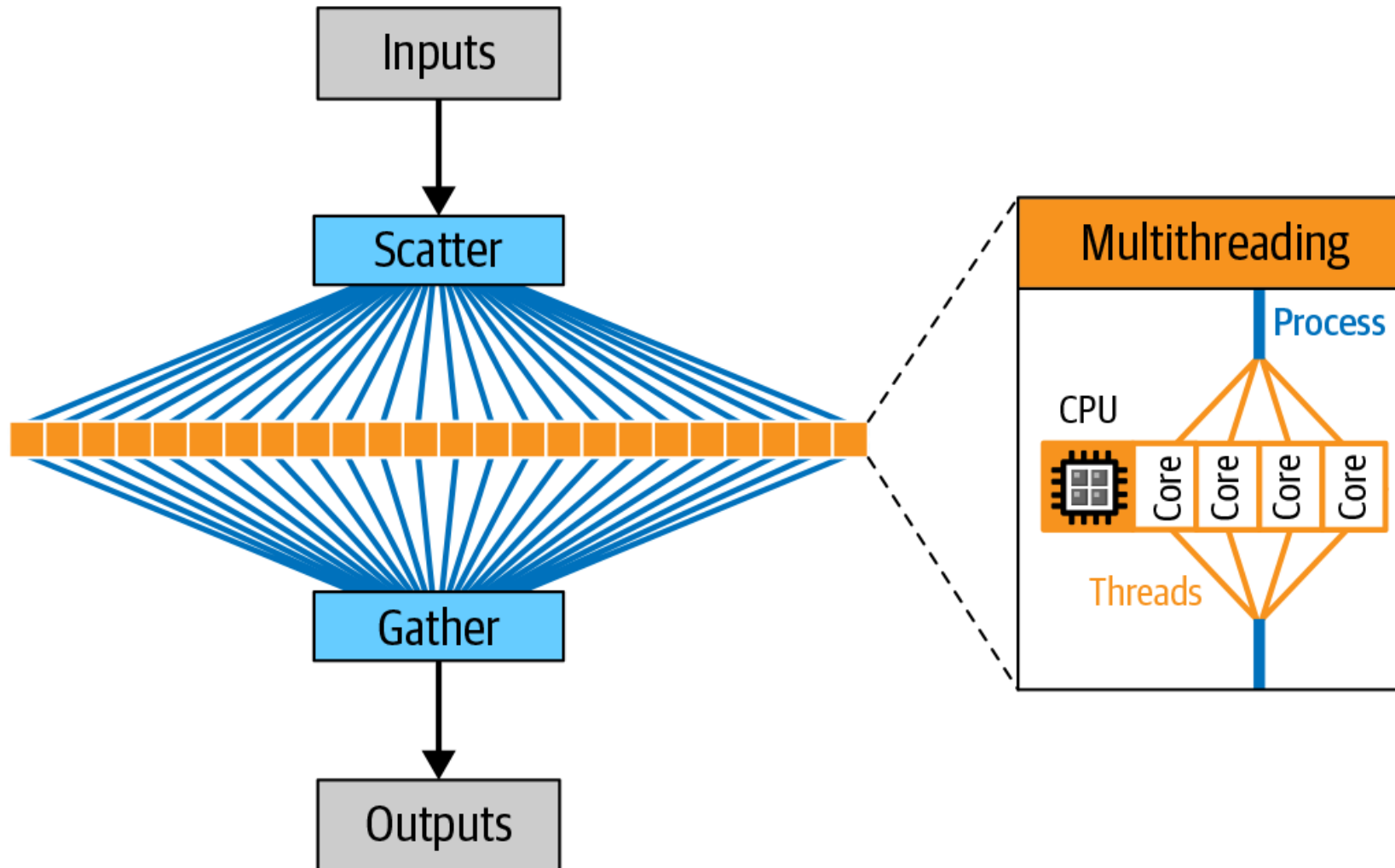
- CPU – Central Processing Unit
- GPU – Graphical Processing Unit
- FPGA – Field-Programmable Gate Array
- TPU – Tensor Processing Unit
 - ASIC – Application-Specific Integrated Circuit



Levels of compute organization

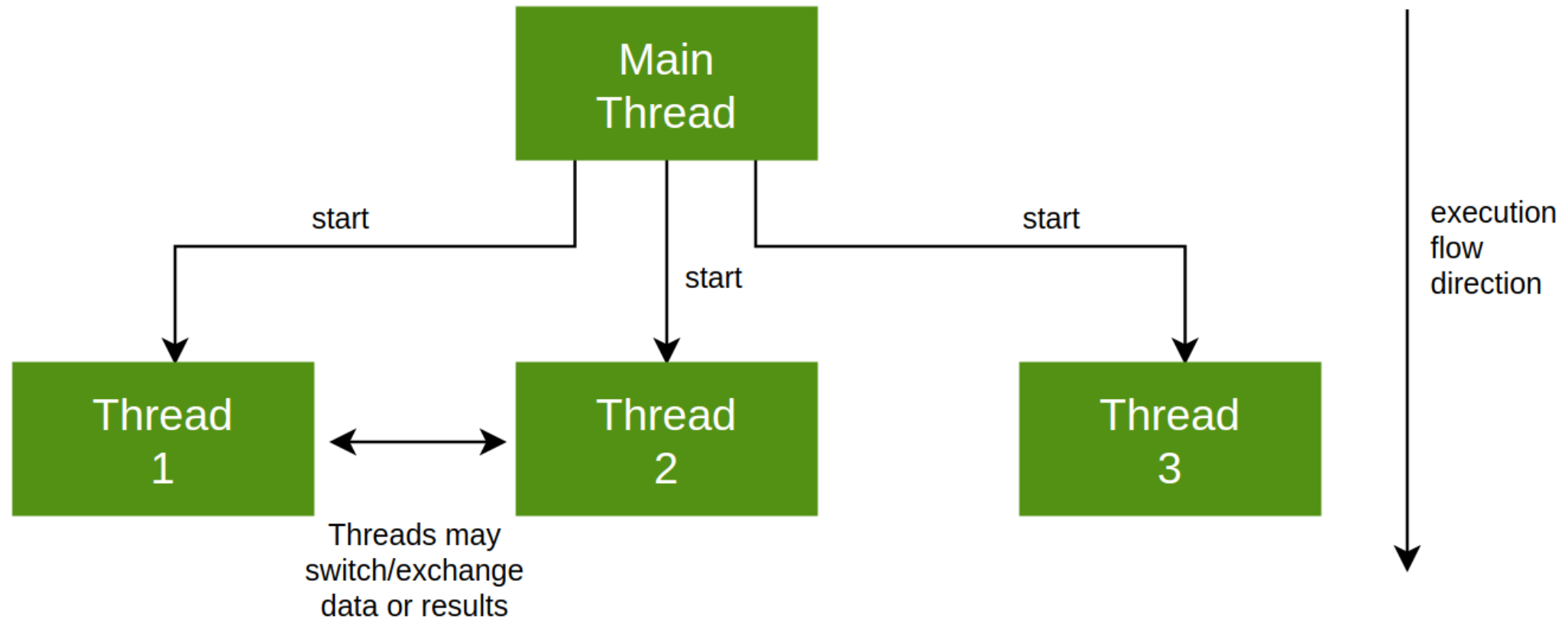


Parallel task execution



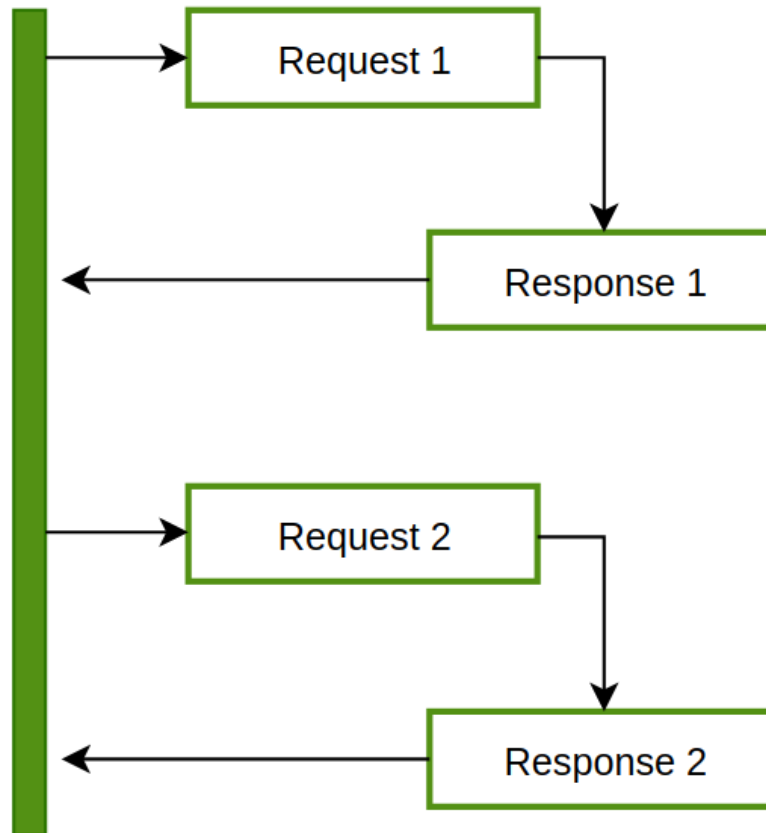
Multithreading

Multithreading Programming

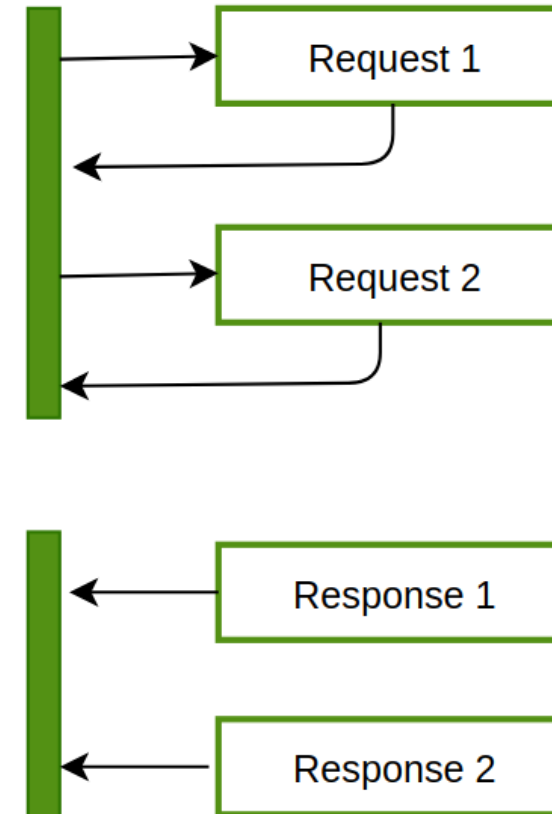


Synchronous vs asynchronous computing

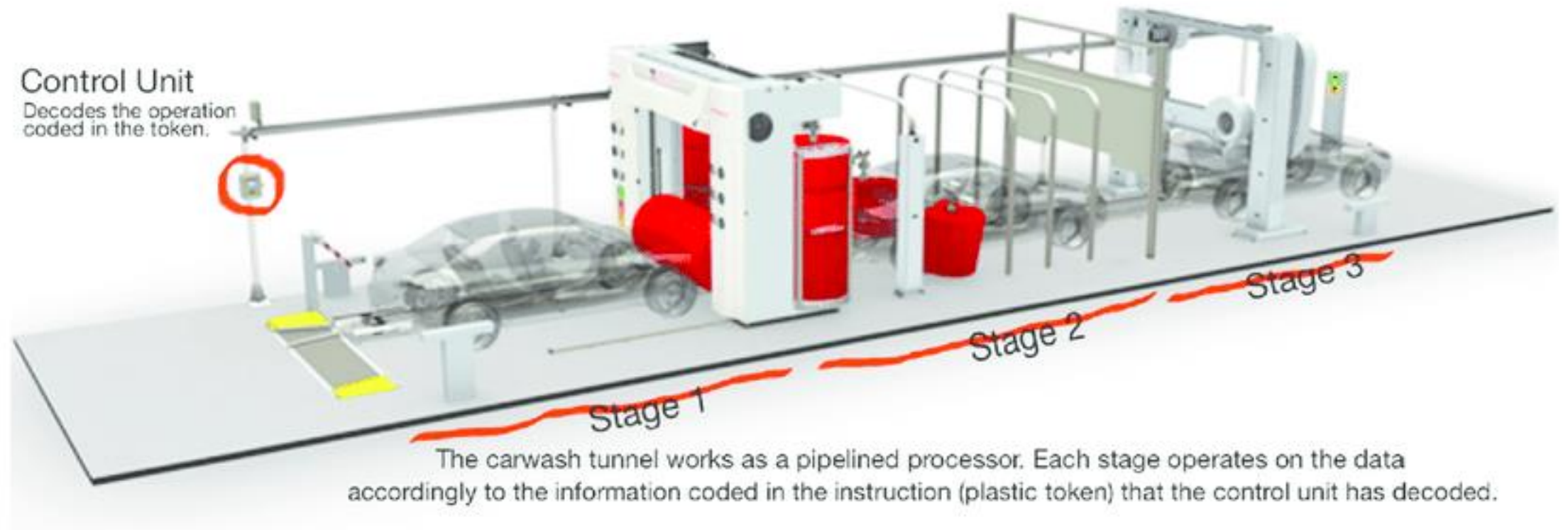
Synchronous



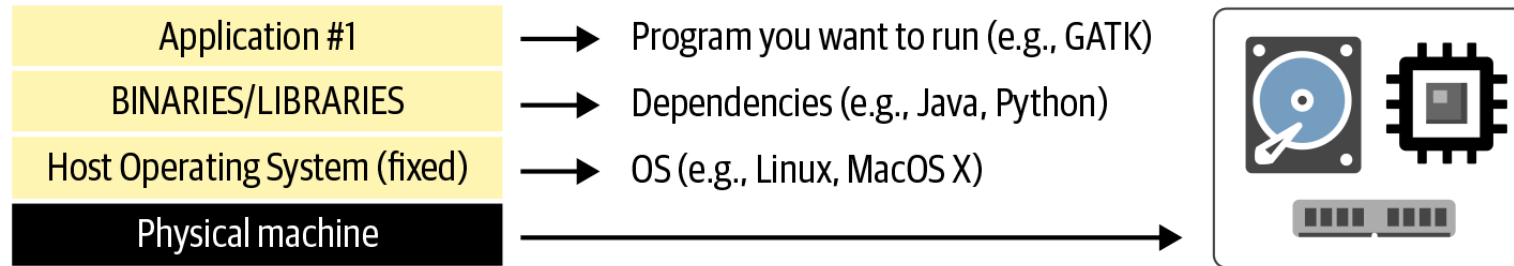
Asynchronous



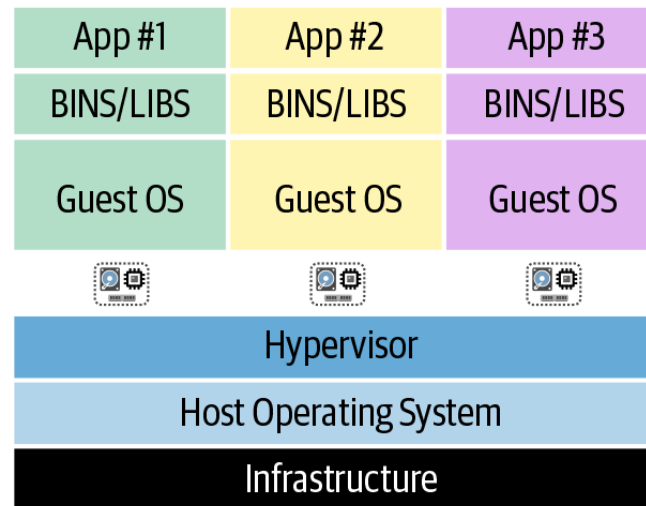
Pipelining



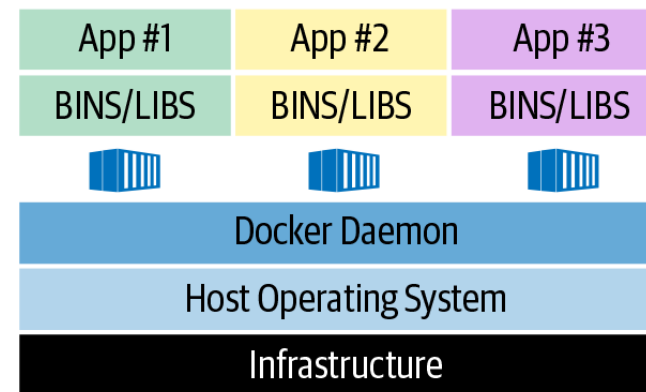
Virtualization



A. Software stack on physical machine, e.g., your laptop



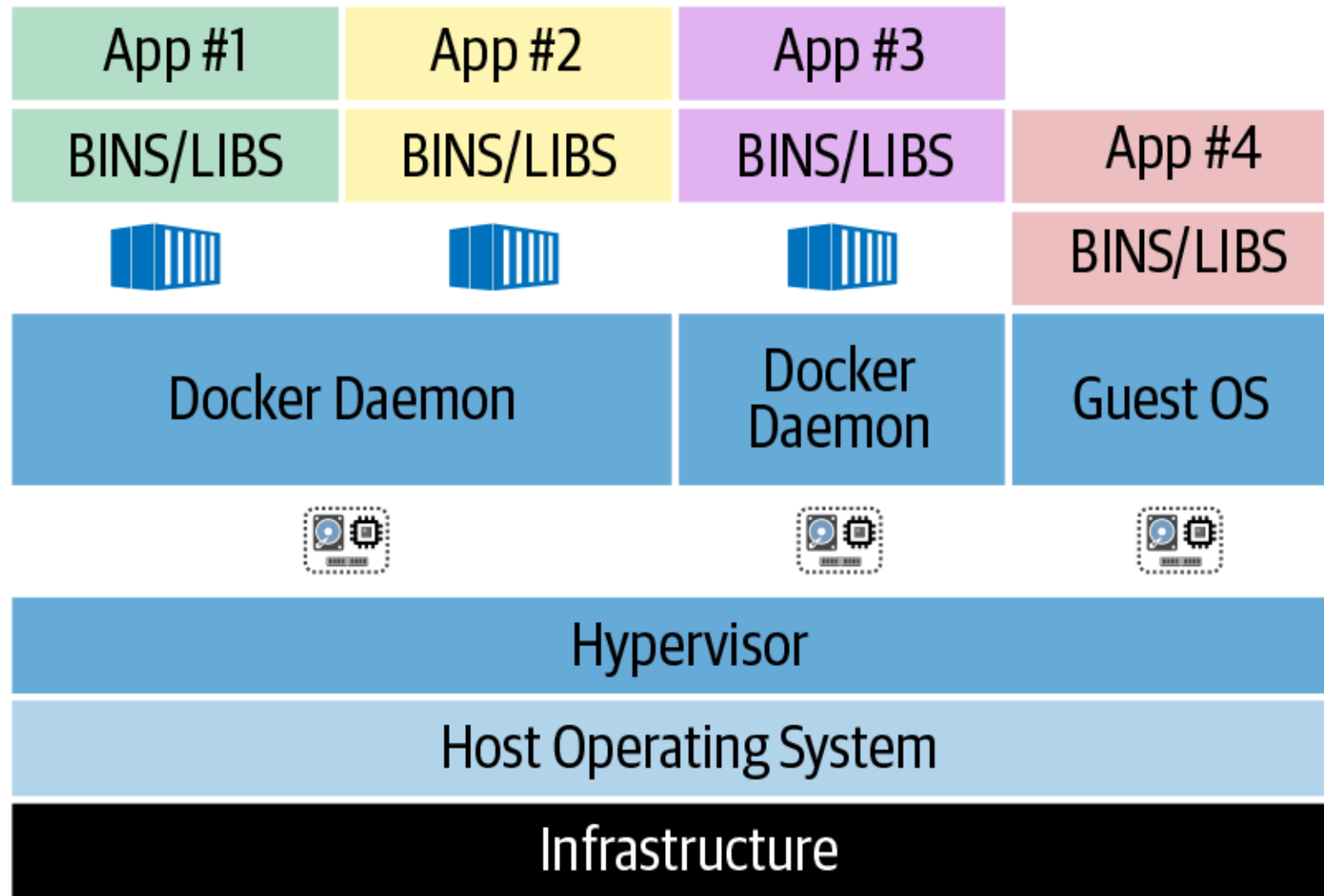
B. Virtual machines



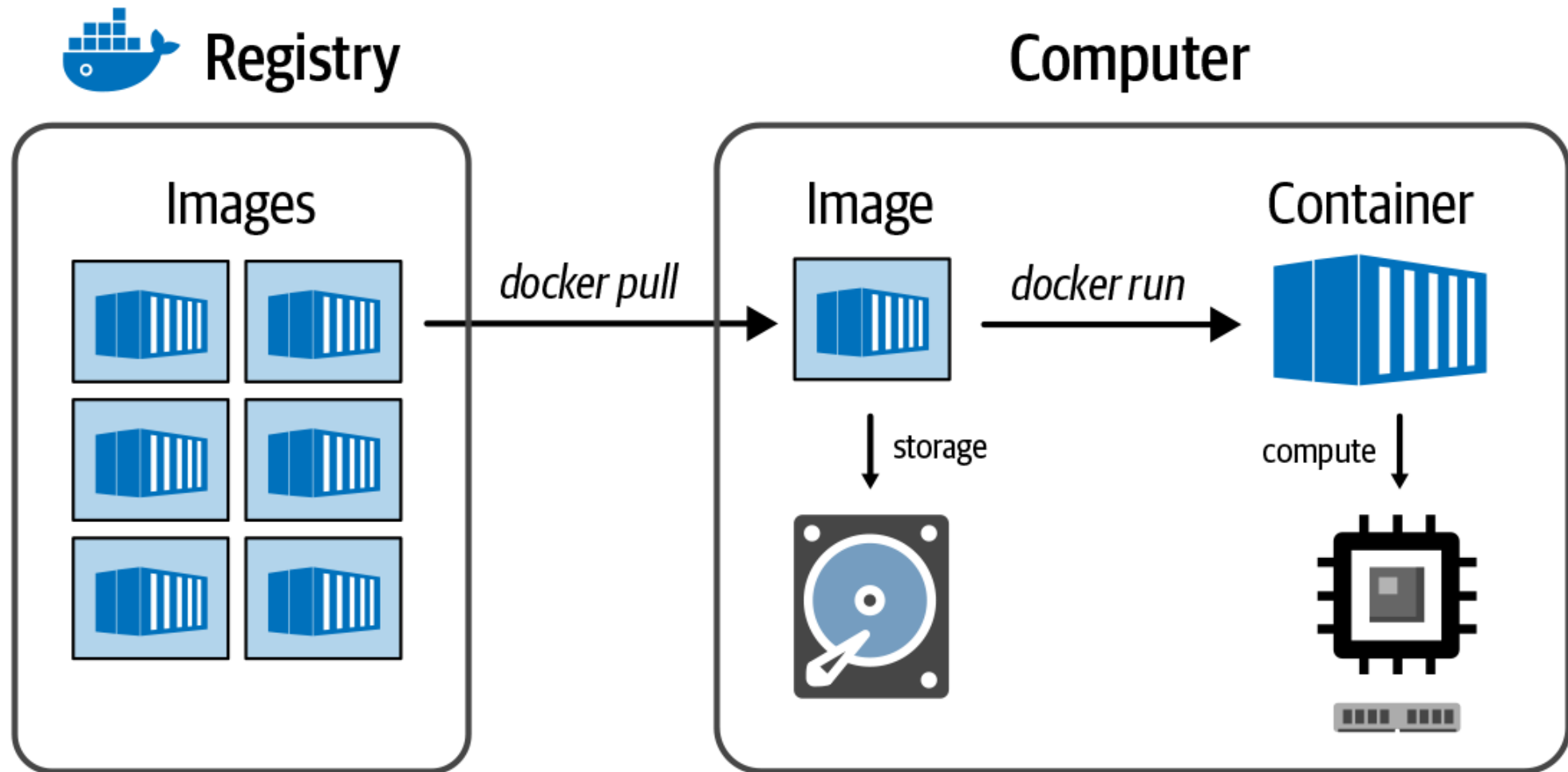
C. Containers



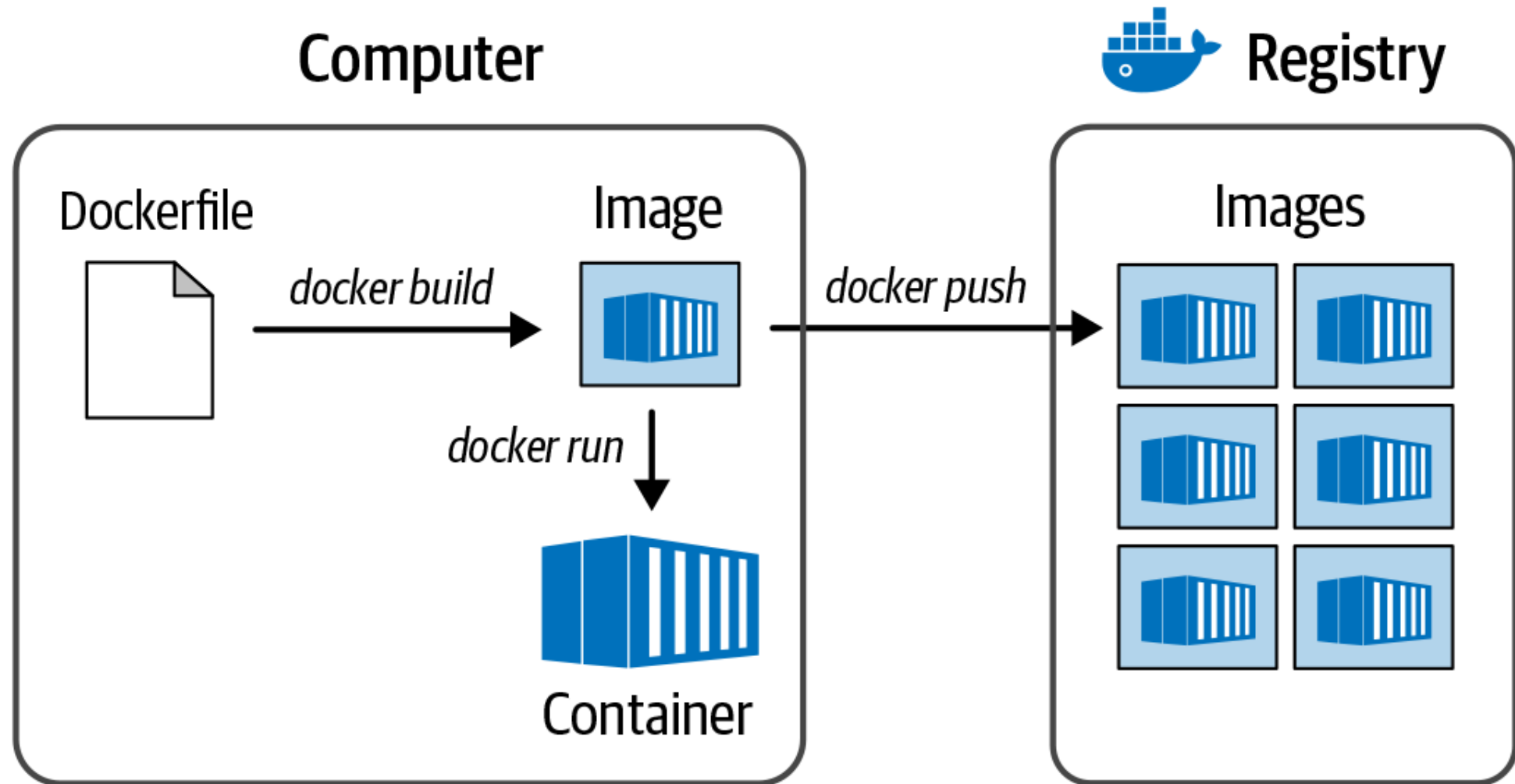
Mixed architecture



Docker basics



Creating a Docker image



Additional resources

- Docker registries
 - <https://hub.docker.com>
 - <https://quay.io>
 - <https://cloud.google.com/container-registry>
- Learning Docker
 - <https://www.udemy.com/learn-docker>
 - <https://www.coursera.org/projects/docker-fundamentals>
- Learning Linux (free)
 - <https://www.edx.org/course/introduction-to-linux>
- Linux for beginners
 - <https://www.udemy.com/linuxforbeginners>





Thank you for joining us today!

Next week: Chapter 4

Next meeting: December 28, 2020