Ops

DSIA-5102A - ESIEE Paris

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Why are containers an industry standard ?

Containerization
Agile & DevOps
Immutability
Scalability
Orchestration

Road to containers 🐳

Containers ❤️ Agile

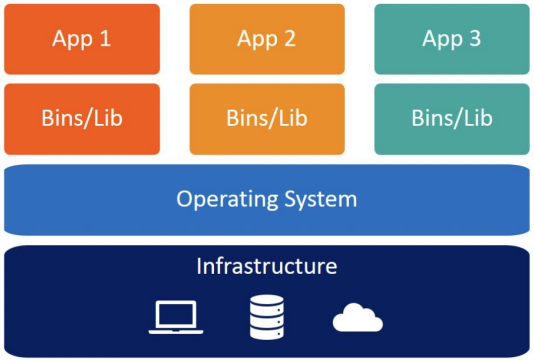
Orchestration 🐙

Local setup 👷

History of application deployment

Infrastructure

Physical machine



Infrastructure

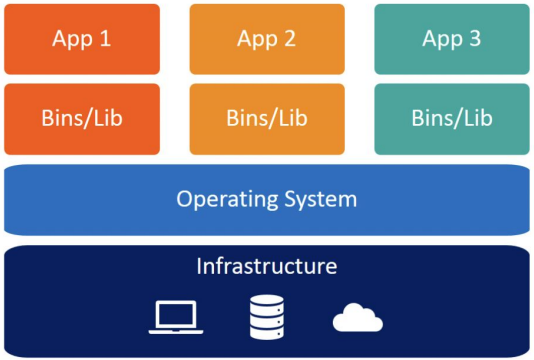
Physical machine

Pros

- No resource sharing
- Performance

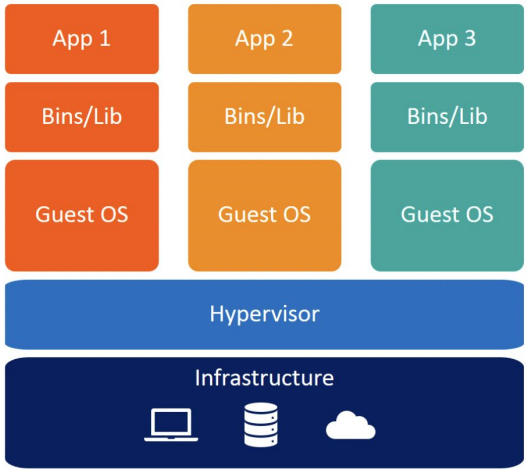
Cons

- No resource sharing
- Expensive
- Time to set up
- Time to maintain



Infrastructure

Virtual machine



Infrastructure

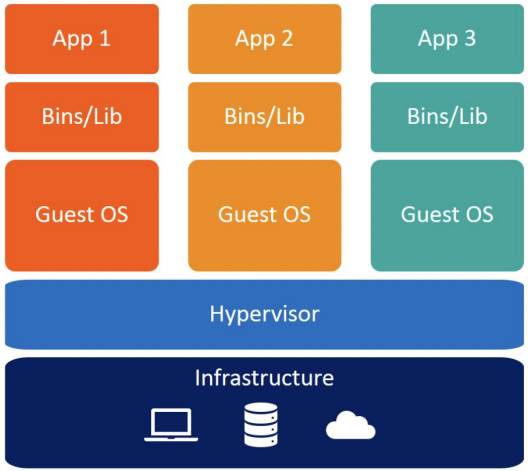
Virtual machine

Pros

- Resource usage
- Flexible configuration
- Maintainability

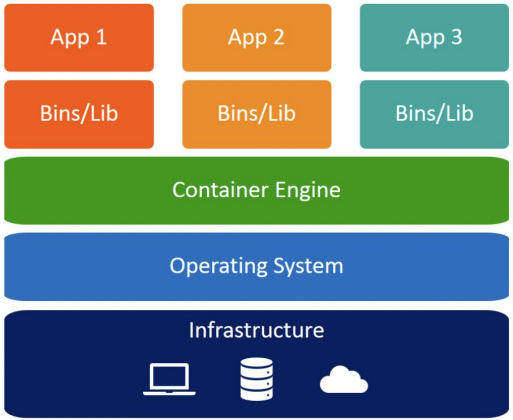
Cons

- Resource-hungry
- Expensive (still)
- Time to set up (still)



Infrastructure

Container



Infrastructure

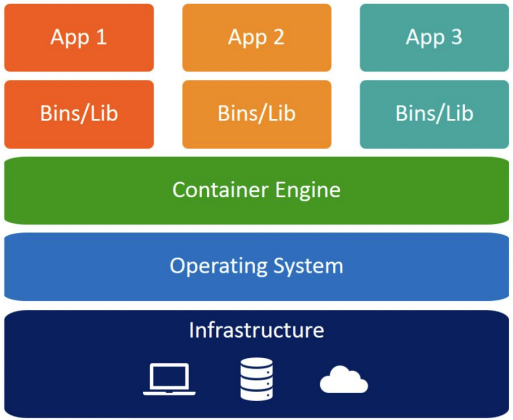
Container

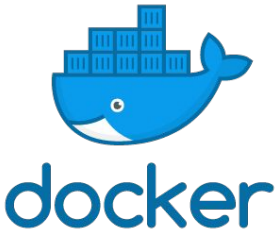
Pros

- Light resource usage
- Fast setup
- Fast teardown
- Runs everywhere 😉

Cons

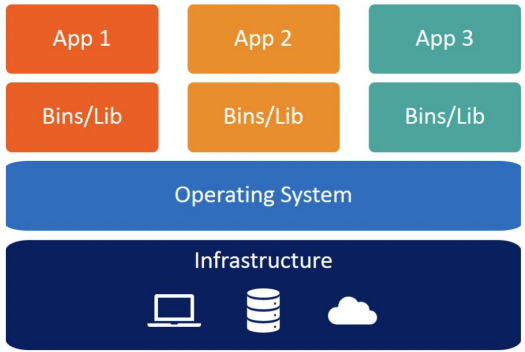
- Hard to correctly implement



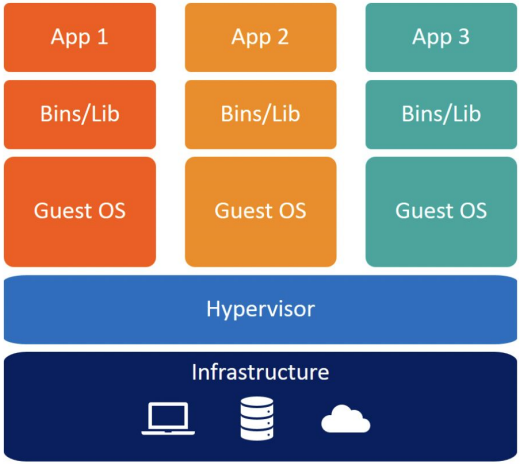


Infrastructure

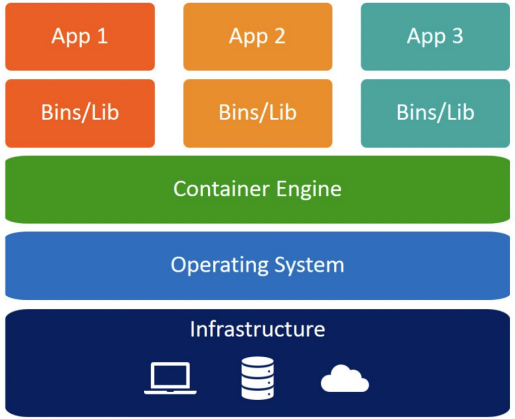
Summary



Bare metal



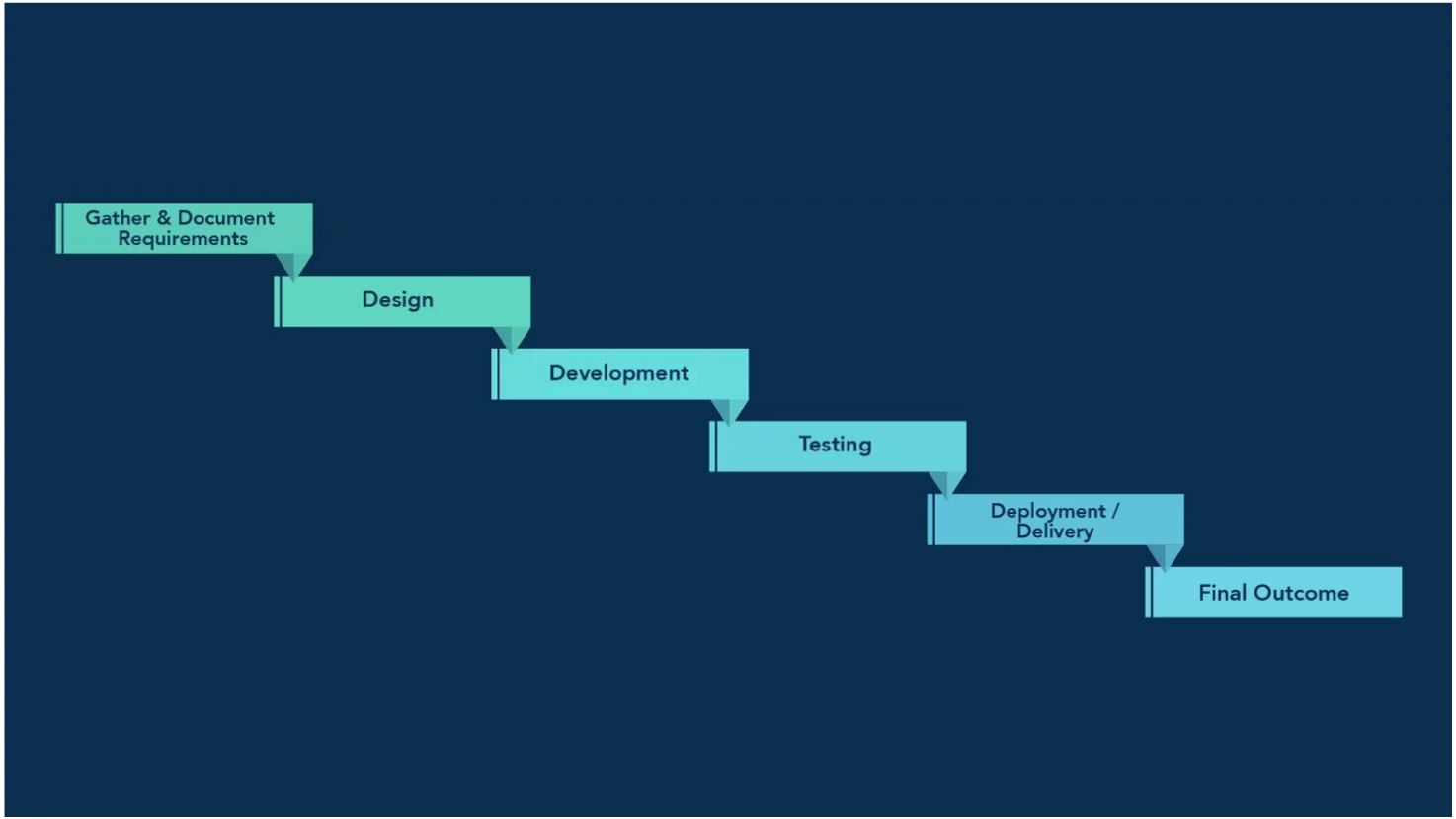
Virtual machine



Container

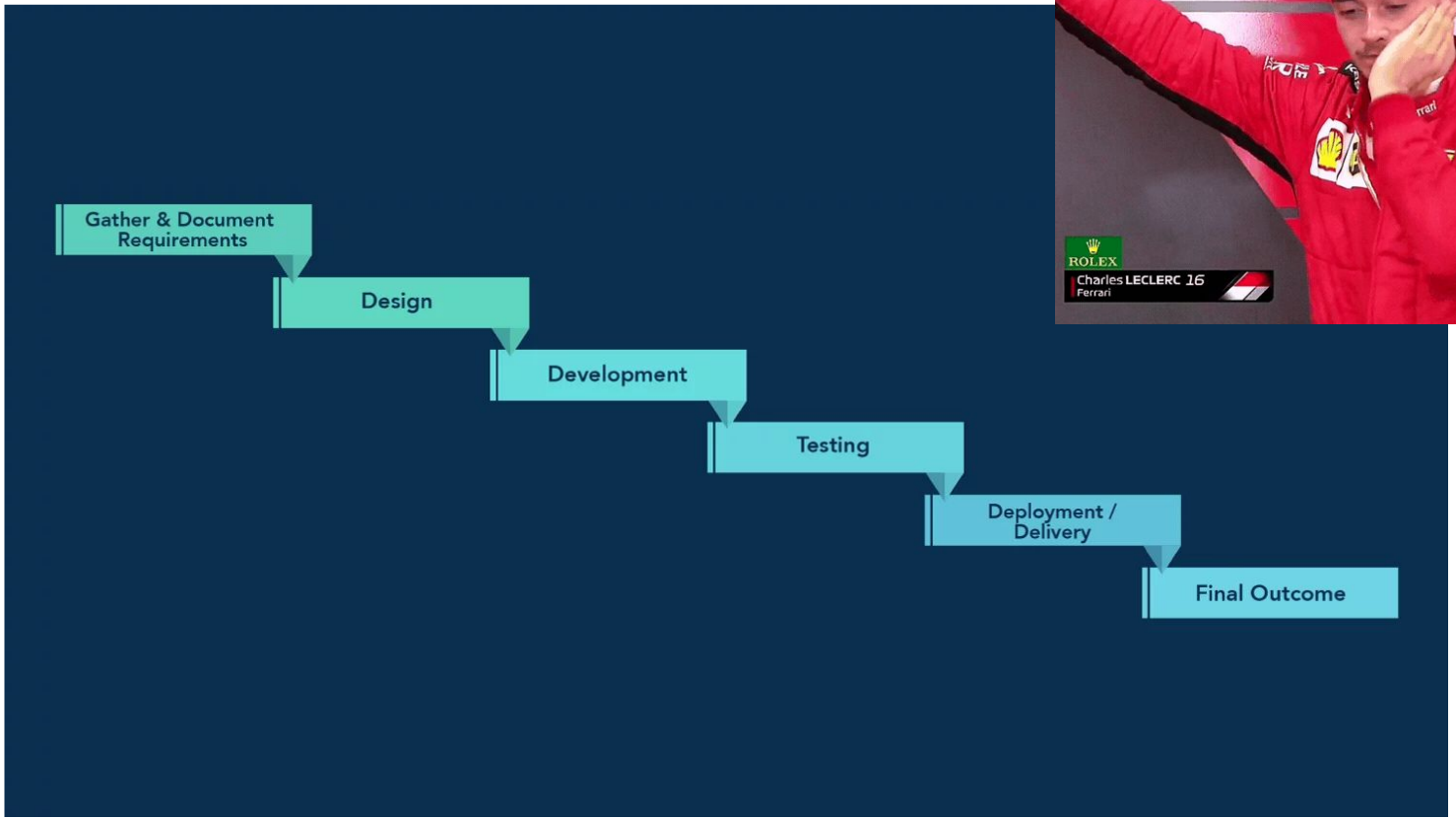
History of application development

Waterfall

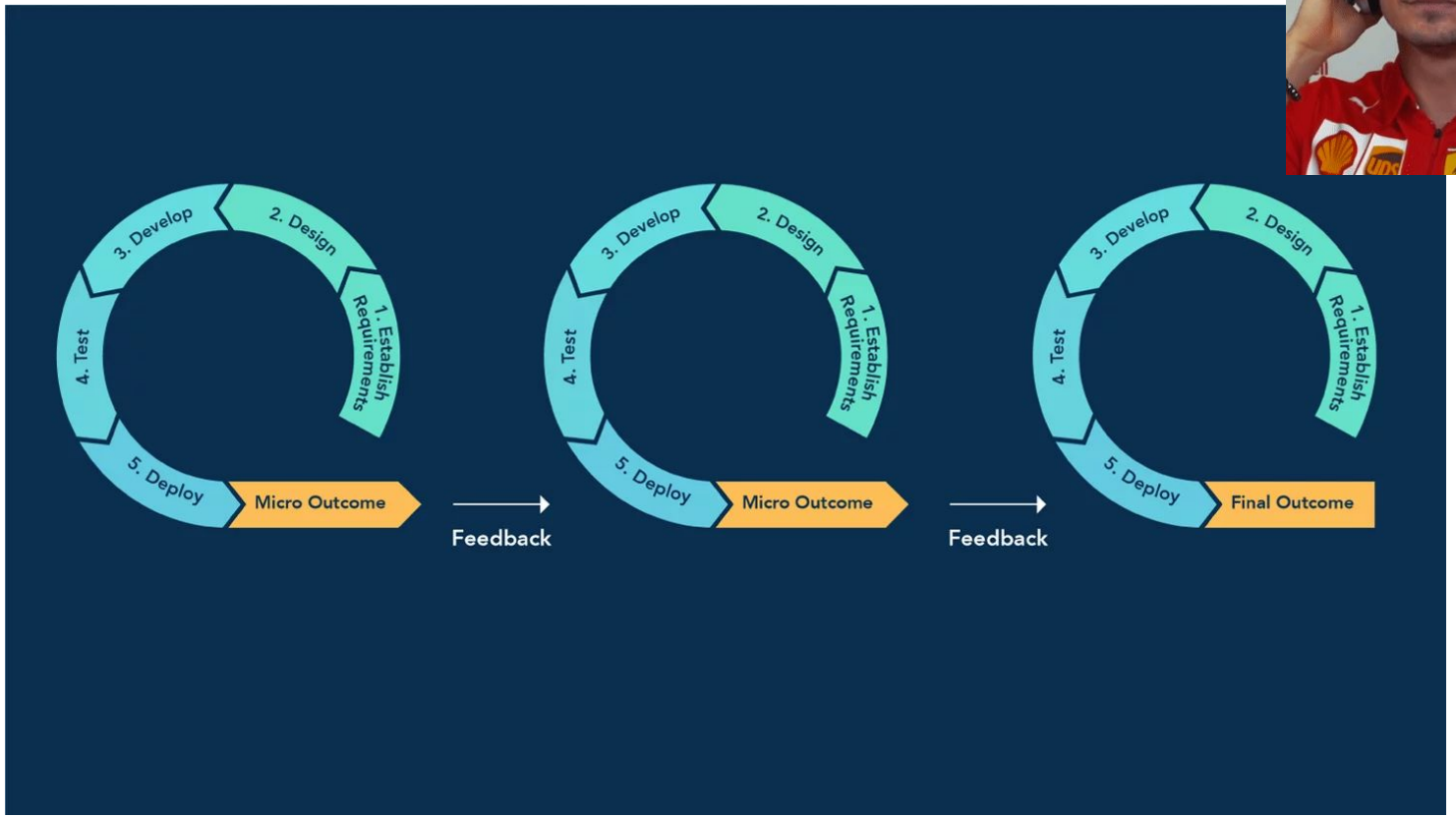

Gather & Document Requirements
Design
Development
Testing
Deployment / Delivery
Final Outcome

Waterfall


ROLEX
Charles LECLERC 16
Ferrari


Gather & Document Requirements
Design
Development
Testing
Deployment / Delivery
Final Outcome

Agile

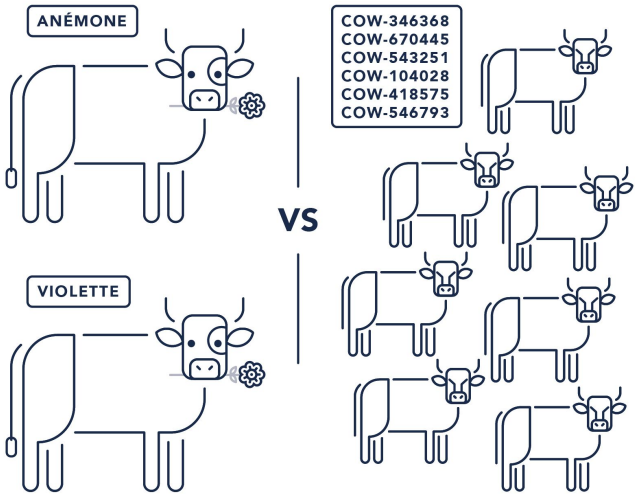

1. Establish Requirements
2. Design
3. Develop
4. Test
5. Deploy
Micro Outcome
Feedback
1. Establish Requirements
2. Design
3. Develop
4. Test
5. Deploy
Micro Outcome
Feedback
1. Establish Requirements
2. Design
3. Develop
4. Test
5. Deploy
Final Outcome

Containers ❤️ Agile

- Continuous integration (CI)
- Continuous delivery (CD)
- Short dev cycle
- Runs everywhere 😉
- Fast to create and destroy 🧨

Mutable and immutable infrastructure

Mutable vs immutable infrastructure

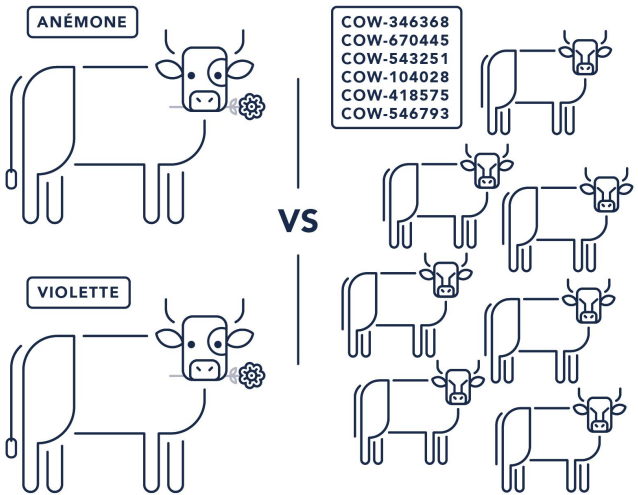


Pet vs Cattle

Mutable vs immutable infrastructure

Mutable

- Hard to maintain
- Hard to upgrade

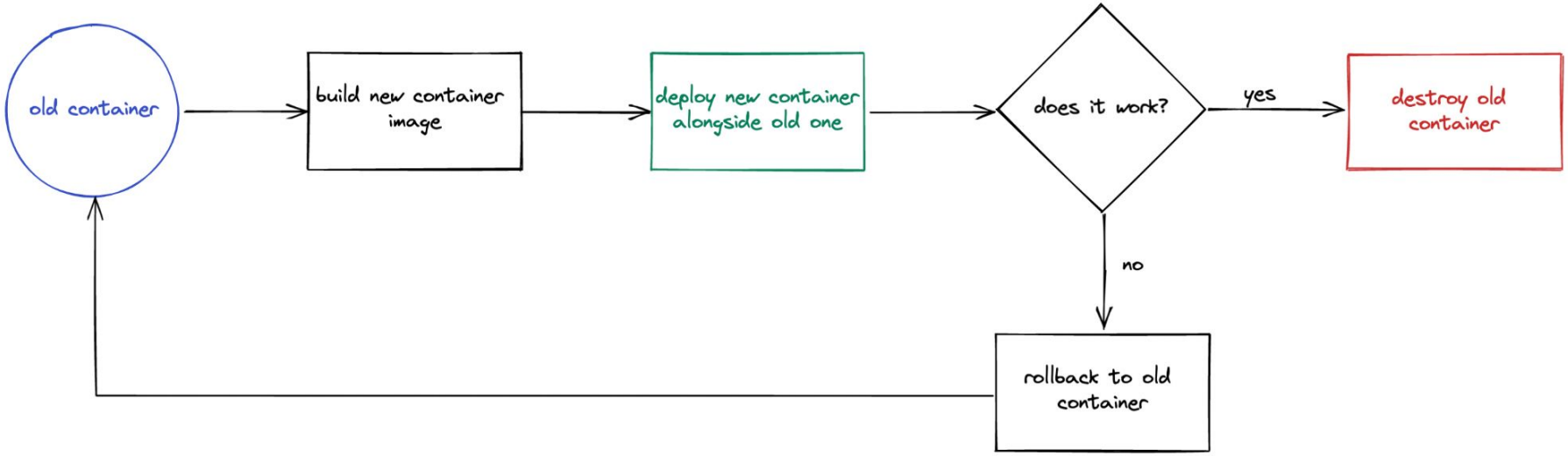


Pet vs Cattle

Immutable

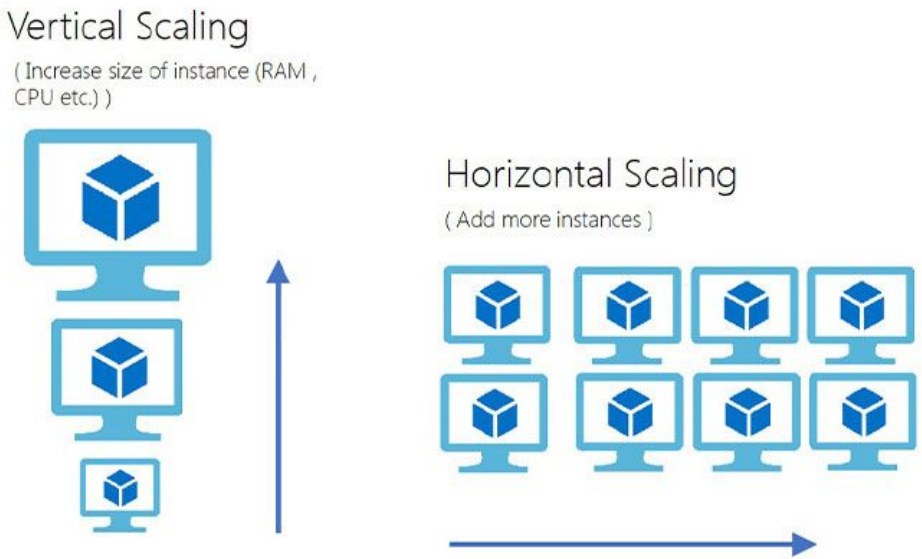
- Consistency
- No drift
- Hard to correctly implement

Containers ❤️ immutable infrastructure



Blue-green deployment

Containers ❤️ horizontal scaling

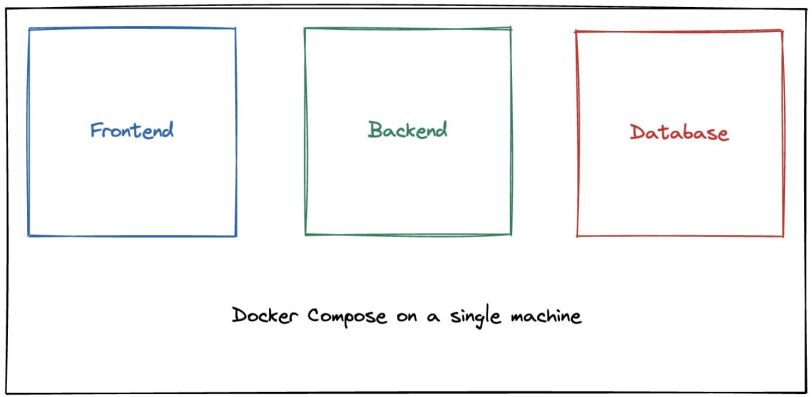


Container orchestration

Docker Compose

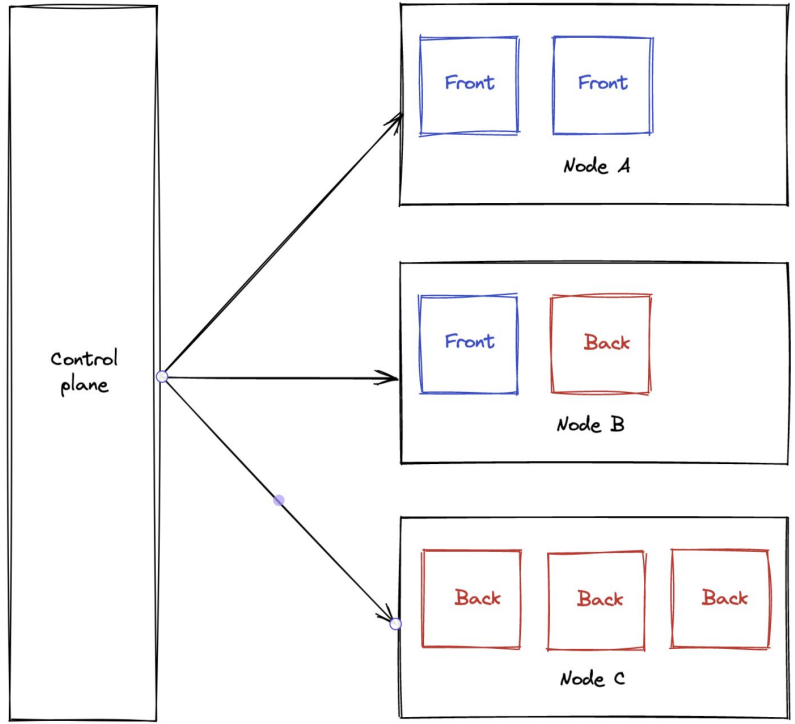
Declare container configurations:

- Container image
- Ports opened
- Volumes mounted
- Env variables
- Deploy and manage multiple containers with a single Compose file
- Developer's friend 👌



Kubernetes

- Resource pooling
- Autoscaling and healing
- Rollout and rollback
- Hard to implement and maintain



Containers 💙 Dev

Containers 💙 Ops

Containers 💪 Immutability

Containers 💪 Scalability

Containers 💪 Orchestration

Demo