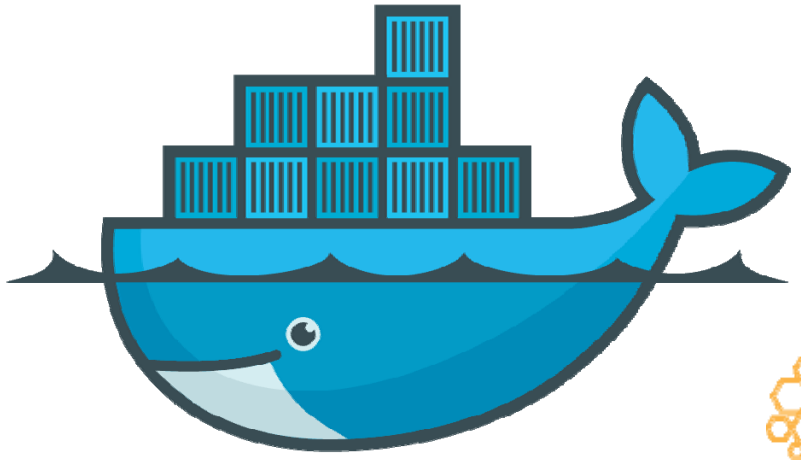


Open Source Projects for Linux Containers

docker

Container-Virtualization within the Space Industry

Jens Pfau, Pavol Safarik & Sascha Schünemann

CGI

Experience the commitment®

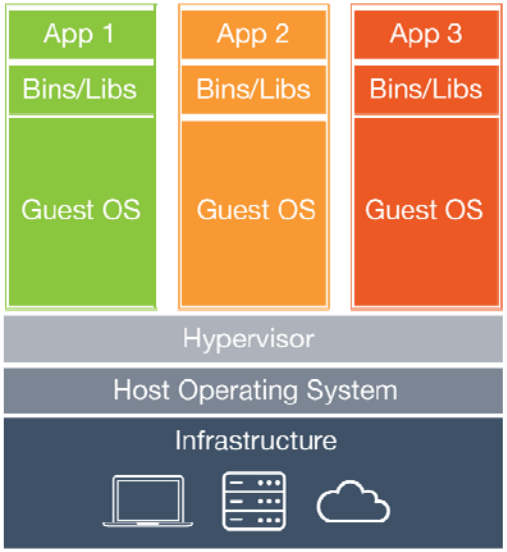
Outline

- Containers vs. Virtual Machines
  - Efficiency
  - Portability
  - Scalabity
- Tool Support
- Benefits of using container technology
  - In development
  - In production

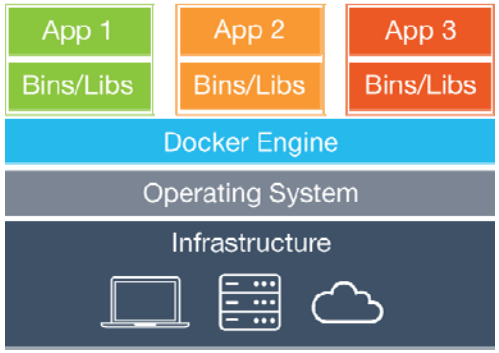
CGI

Containers vs. Virtual Machines

Virtual Machine



Container



Benefits

- Efficient resource usage
- Portable
- Simplified automated scaling

Source: https://www.docker.com/what-docker/

CGI

What can run inside a container?

- Originally only Linux applications,
- But others are catching up (e.g. Microsoft)

Most starred images from docker hub

Rank	Repository	Stars
1	ubuntu	2,007
2	centos	1,164
3	nginx	1,163
4	redis	957
5	node	891
6	postgres	889
7	mysql	885
8	mongo	796
9	debian	573
10	jenkins	508

CGI

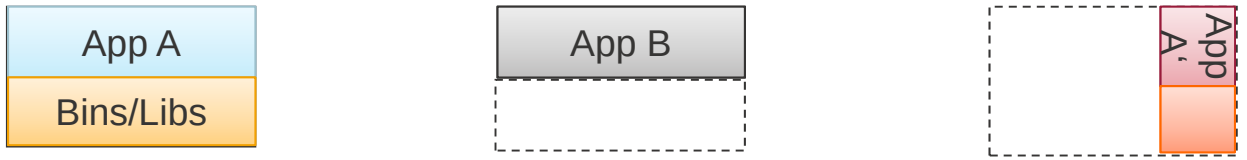
Efficiency

Memory / CPU Consumption

All containers on a host share the same kernel.

- Little overhead in terms of memory and CPU consumption.
- Containers do not allocate more memory or CPU than required.
- Fast starting of containers (almost instantaneous).

Disk Usage



Original App

App B using same binaries and libraries

Modified App A‘

Source: https://www.docker.com/whatisdocker/

Portability

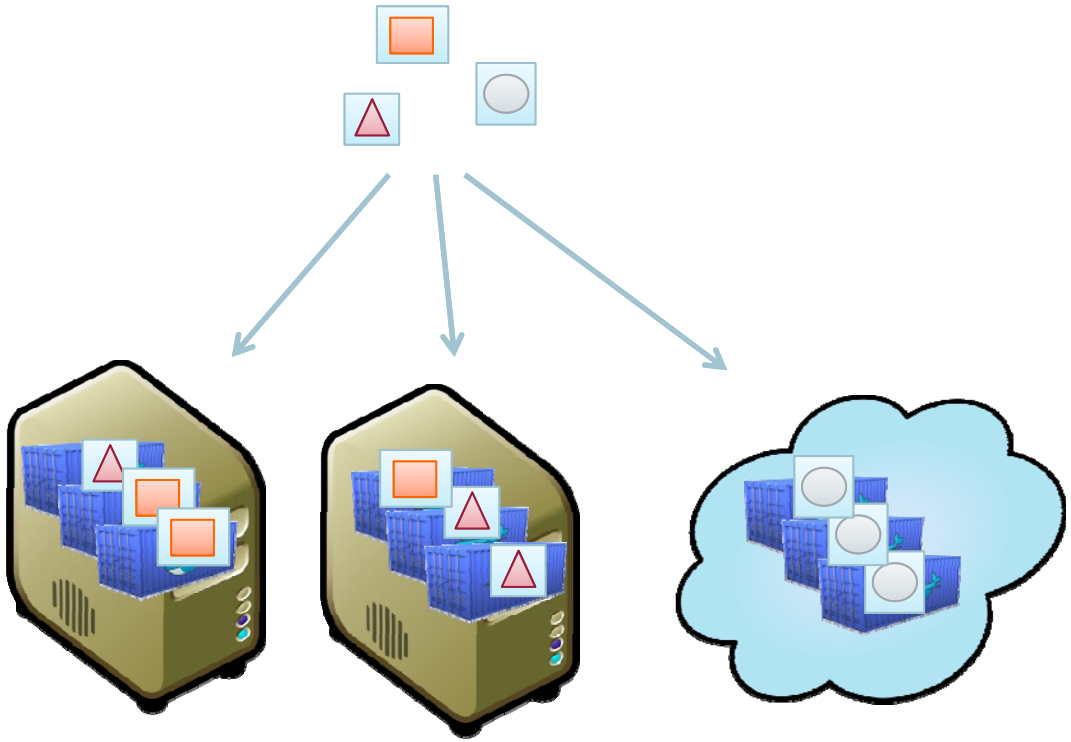
Off-premise / public cloud

Bare metal

On-premise / private cloud

CGI

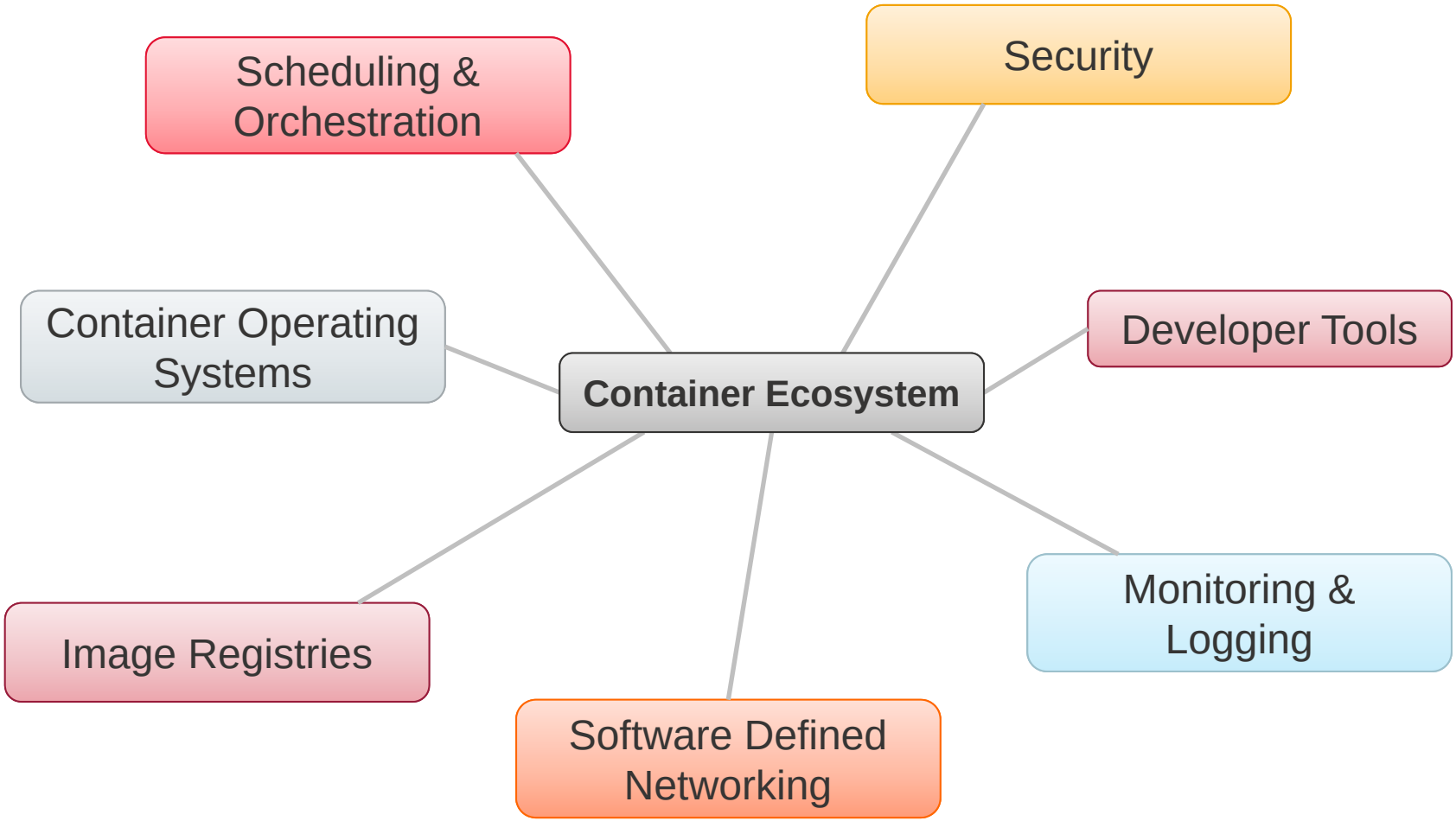
Scaling using containers



Source: http://martinfowler.com/articles/microservices.html

CGI

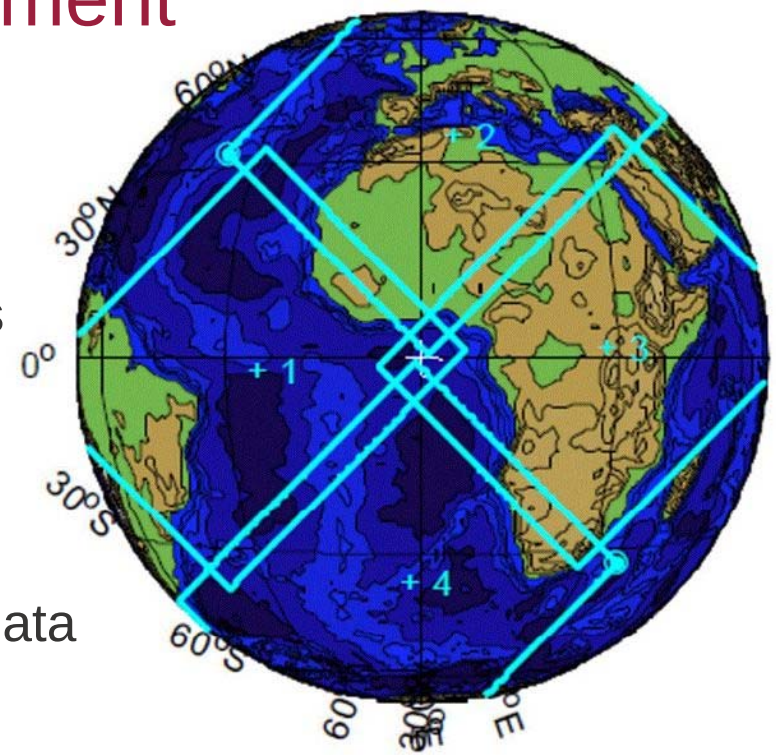
Tool Support



Container Usage in Development

IDPF

Processing infrastructure for EUMETSAT's Meteosat Third Generation Ground Segment Level 1 data facility



- Receives high volume raw instrument data
- Performs spectral, radiometric and geometric calibrations and corrections.

- Scheduling over a cluster of nodes

Container Usage in Development

Single Docker host running

- IDPF server container
- Multiple IDPF processing containers

Docker host can be

Developer workstation

Virtual machine

CGI

Benefits of Containers in Development Phase

Portability:

- To run the test system, only a Docker engine is needed

Scalability:

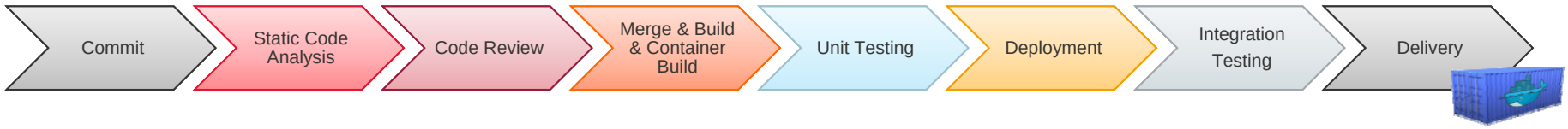
- Due to autoscaling, only necessary amount of resources is used
- Inactive nodes are automatically removed freeing memory, CPU, and storage resources

Efficiency:

- Reduced disk, memory, and CPU consumption during testing
- Increased automated test coverage by allowing usage of distributed test scenarios during nightly automated testing

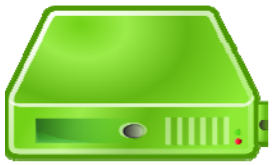
CGI

Benefits of Containers in Production



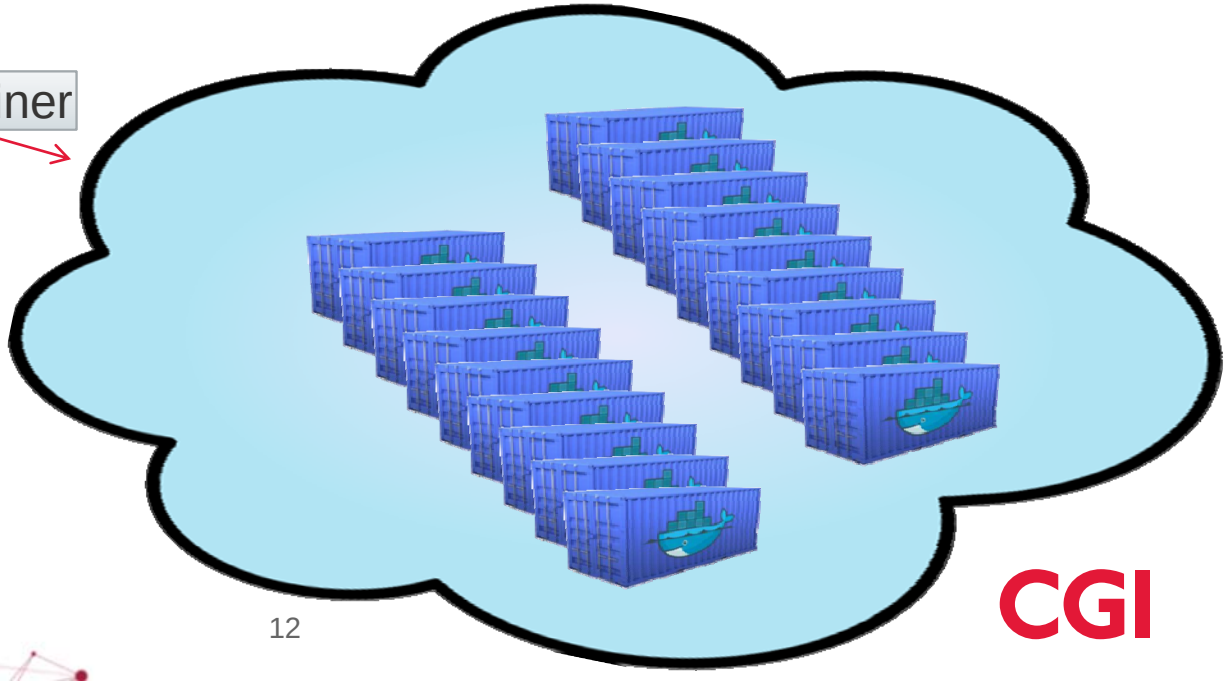
Development

Customer



Server

Replace container



CGI

Summary

- Containers are efficient, portable, and scalable.
  - Reduced operating costs
  - Increased flexibility
- Container technology complements virtualization.
- Particularly suited for container deployment:
  - Systems with loose coupling between components.
  - Systems that require the scheduling and scaling of tasks.

CGI

Thank you.

Jens Pfau
System Architect
CGI Deutschland Ltd & Co KG
Tel: +49 6151 36860 191

jens.pfau@cgi.com

Pavol Safarik
Software Engineer
CGI Deutschland Ltd & Co KG
Tel: +49 6151 36860 197

pavol.safarik@cgi.com

Sascha Schuenemann
Associate Consultant
CGI Deutschland Ltd & Co KG
Tel: +49 6151 36860 208

sascha.schuenemann@cgi.com