

DOCKER

DETI; Universidade de Aveiro

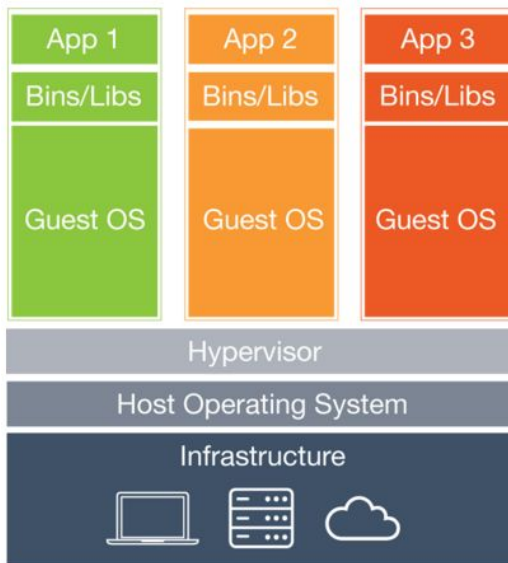
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WHAT IS DOCKER?

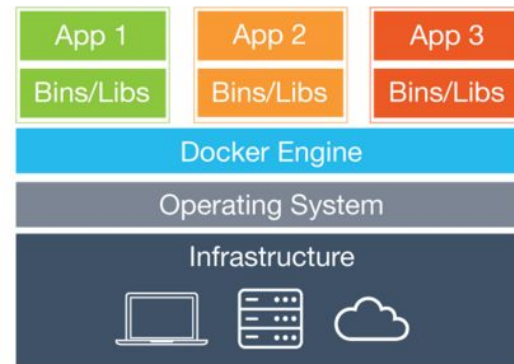
- Lightweight
- Open
- Secure

Share:

- Docker Hub
- Quay.io

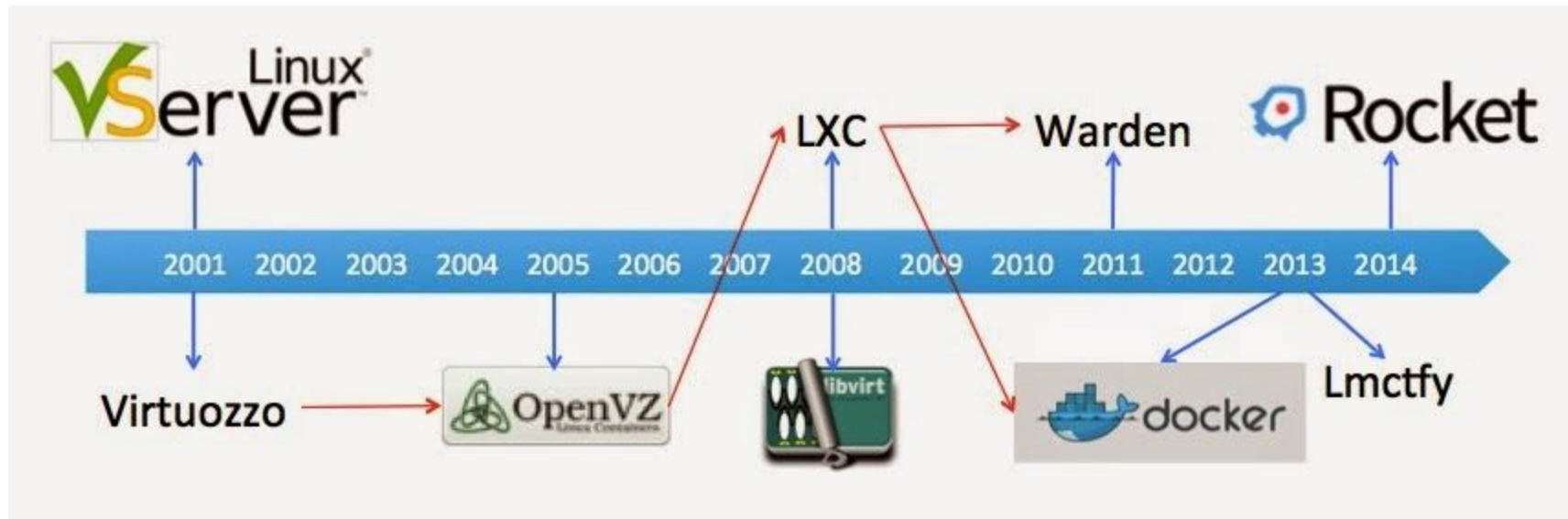


Virtual Machines




Containers

HISTORY



WHY IS IT SO DARN POPULAR?

- Use shared operating systems
- **Instead** of virtualizing hardware, containers rest on top of a **single** Linux instance  This in turn means you can “leave behind” the useless 99.9% VM junk !!
- According to Parallels CTO, with a perfectly tuned container system, you can have as many as **four-to-six times** the number of server application instances as you can using **Xen** or **KVM VMs** on the same hardware.

DOCKERFILE > IMAGE > CONTAINER


- Builds one docker image
 - Docker image: contains **packages** pre-installed ≠ ubuntu machine image
- When the image is ready we can run it
 - Then we have one container
- Other machines can run your images
- **What is the +?**
 - We can make images to one team use the same environment, for example, the same Python version and env, Django version, PyCharm version with all the configurations done etc

WHAT ABOUT HOSTING PROVIDER?

We need to **limit** the:

- Memory (RAM)
- Number of cores
- Disk space
- Network data transfer



 **DigitalOcean**

Pricing in USD. Excludes any applicable tax.

\$5/mo	\$10/mo	\$20/mo Most Popular Plan	\$40/mo	\$80/mo
512MB Memory	1GB Memory	2GB Memory	4GB Memory	8GB Memory
1 Core Processor	1 Core Processor	2 Core Processor	2 Core Processor	4 Core Processor
20GB SSD Disk	30GB SSD Disk	40GB SSD Disk	60GB SSD Disk	80GB SSD Disk
1TB Transfer	2TB Transfer	3TB Transfer	4TB Transfer	5TB Transfer
SIGN UP	SIGN UP	SIGN UP	SIGN UP	SIGN UP

[HTTPS://WWW.DIGITALOCEAN.COM/?REFCODE=7836853b6ce1](https://www.digitalocean.com/?refcode=7836853b6ce1)

CPU LIMIT

TEST 1

- With this test we tried to fulfill all the CPU's available to the container.

```
1. root@b4f185650025: / (ssh)
root@girs02m1: /home/girs... root@b4f185650025: / (ssh)
stress
0 upgraded, 1 newly installed, 0 to remove and 4 not upgraded.
Need to get 17.0 kB of archives.
After this operation, 73.7 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu/ trusty/universe stress amd64 1.0.1-1ubuntu1 [
Fetched 17.0 kB in 0s (38.2 kB/s)
Selecting previously unselected package stress.
(Reading database ... 11542 files and directories currently installed.)
Preparing to unpack .../stress_1.0.1-1ubuntu1_amd64.deb ...
Unpacking stress (1.0.1-1ubuntu1) ...
Setting up stress (1.0.1-1ubuntu1) ...
root@b4f185650025:/# stress -c 2 -i 1 -m 1 --vm-bytes 128M -t 10s
stress: info: [73] dispatching hogs: 2 cpu, 1 io, 1 vm, 0 hdd
stress: info: [73] successful run completed in 10s
root@b4f185650025:/# stress -c 2 -i 1 -m 1 --vm-bytes 128M -t 30s
stress: info: [78] dispatching hogs: 2 cpu, 1 io, 1 vm, 0 hdd

^C
root@b4f185650025:/# stress -c 2 -i 1 -m 1 --vm-bytes 500M -t 30s
stress: info: [83] dispatching hogs: 2 cpu, 1 io, 1 vm, 0 hdd
^C
root@b4f185650025:/# stress -c 2 -i 1 -m 4 --vm-bytes 500M -t 30s
stress: info: [88] dispatching hogs: 2 cpu, 1 io, 4 vm, 0 hdd
stress: info: [88] successful run completed in 30s
root@b4f185650025:/# stress -c 2 -i 1 -m 4 --vm-bytes 500M -t 30s
stress: info: [96] dispatching hogs: 2 cpu, 1 io, 4 vm, 0 hdd
```

198.41%

root@girs02m1: /home/girs... root@b4f185650025: / (ssh)		1. root@girs02m1: /home/girs02m1 (ssh)			
CONTAINER	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O
test	198.41%	1.351 GB / 2.089 GB	64.69%	22.52 MB / 560.5 kB	391.7 MB / 471 MB

CPU LIMIT

TEST 2

- With this test we tried to fulfill all the CPU's available to the container.

```
1. root@bdf95bf3b9c9: / (ssh)
root@bdf95bf3b9c9: / (ssh)
ubuntu.com trusty/main amd64 Packages [1743 kB]
ubuntu.com trusty/restricted amd64 Packages [16.0 kB]
ubuntu.com trusty/universe amd64 Packages [7589 kB]
in 18s (49.0 kB/s)
... Done
apt-get install -y stress
... Done
Free
Installation... Done
Packages will be installed:
Installed, 0 to remove and 4 not upgraded.
of archives.
73.7 kB of additional disk space will be used.
ubuntu.com/ubuntu/ trusty/universe stress amd64 1.0.1-1ubuntu1 [17.0 kB]
(4136 B/s)
unselected package stress.
11542 files and directories currently installed.)
./stress_1.0.1-1ubuntu1_amd64.deb ...
1-1ubuntu1) ...
0.1-1ubuntu1) ...
stress -c 2 -i 1 -m 4 --vm-bytes 500M -t 30s
spatching hogs: 2 cpu, 1 io, 4 vm, 0 hdd
Successful run completed in 30s
stress -c 2 -i 1 -m 4 --vm-bytes 500M -t 50s
spatching hogs: 2 cpu, 1 io, 4 vm, 0 hdd
```

101.85% 

root@girs02m1: /home/girs...		root@bdf95bf3b9c9: / (ssh)		1. root@girs02m1: /home/girs02m1 (ssh)			
CONTAINER	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O		
test	101.85%	667.4 MB / 2.089 GB	31.95%	22.55 MB / 617 kB	239.3 MB / 482.1 MB		

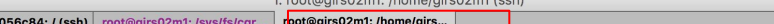
MEMORY LIMIT

TEST 1

- With this test we tried to fulfill all the memory available to the container.

[illegible]

LIMIT: 500MB 



1. root@girs02m1: /home/girs02m1 (ssh)

```
root@66e564056c84: / (ssh) | root@girs02m1: /sys/fs/cgr... | root@girs02m1: /home/girs...
```

CONTAINER	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O
test	0.00%	524.2 MB / 514.3 MB	99.99%	64.88 MB / 1.586 MB	26.3 MB / 227.7 MB

NETWORK DATA TRANSFER

- There is **no tool** available for the run command.
- Other options:
 - [HTTPS://GITHUB.COM/DOCKER/DOCKER/ISSUES/9607](https://github.com/docker/docker/issues/9607)
 - BUILD YOUR OWN BRIDGE... (?)



DISK SPACE LIMIT

- There is **no support** in the atual version of Docker.
- Alternative:
 - Sparse loopback mounted ext4 directory (not tested)
- Or:
 - By default limit the disk space for all containers
 - `docker -d --storage-opt dm.basesize=5G`

[HTTPS://GITHUB.COM/DOCKER/DOCKER/ISSUES/3804](https://github.com/docker/docker/issues/3804)

[HTTPS://GOLDMANN.PL/BLOG/2014/09/11/RESOURCE-MANAGEMENT-IN-DOCKER/#_LIMITING_DISK_SPACE](https://goldmann.pl/blog/2014/09/11/resource-management-in-docker/#_limiting_disk_space)

[HTTPS://DOCS.DOCKER.COM/ENGINE/REFERENCE/COMMANDLINE/DAEMON/#STORAGE-DRIVER-OPTIONS](https://docs.docker.com/engine/reference/commandline/daemon/#storage-driver-options)

[HTTP://STACKOVERFLOW.COM/QUESTIONS/29029326/HOW-TO-DEFINE-A-DISK-QUOTA-FOR-DOCKER-CONTAINERS](http://stackoverflow.com/questions/29029326/how-to-define-a-disk-quota-for-docker-containers)

GEEK BENCH

Host Vs Container

Geekbench Browser

Geekbench 3 ▾

Geekbench 2 ▾

Benchmark Charts ▾

Search Geekbench 3 Results

System manufacturer System Product Name vs System manufacturer System Product Name

	System manufacturer System Product Name	System manufacturer System Product Name
Geekbench 3 Score	1003	995
Geekbench 3 Multicore Score	2244	2246

System Information

	System manufacturer System Product Name	System manufacturer System Product Name
Operating System	Ubuntu 15.10 4.2.0-16-generic x86_64	Ubuntu 14.04.4 LTS 4.2.0-16-generic x86_64
Model	System manufacturer System Product Name	System manufacturer System Product Name
Processor	Intel Core 2 Duo E8200 @ 2.66 GHz 1 processor, 2 cores	Intel Core 2 Duo E8200 @ 2.66 GHz 1 processor, 2 cores
Processor ID	GenuineIntel Family 6 Model 23 Stepping 6	GenuineIntel Family 6 Model 23 Stepping 6
L1 Instruction Cache	32 KB x 2	32 KB x 2
L1 Data Cache	32 KB x 2	32 KB x 2
L2 Cache	6144 KB	6144 KB
L3 Cache	0 KB	0 KB
Motherboard	ASUSTeK Computer INC. P5GC-MX	ASUSTeK Computer INC. P5GC-MX
BIOS	American Megatrends Inc. 0402	American Megatrends Inc. 0402
Memory	1992 MB	1992 MB

[HTTP://BROWSER.PRIMATELABS.COM/GEEKBENCH3/COMPARE/5420023?BASELINE=5419394](http://browser.primatelabs.com/geekbench3/compare/5420023?baseline=5419394)

END.

THANK YOU!

Questions...