



Virtualisation & Conteneurisation

+100

Services

31

VM

17

Servers

50

Conteneurs

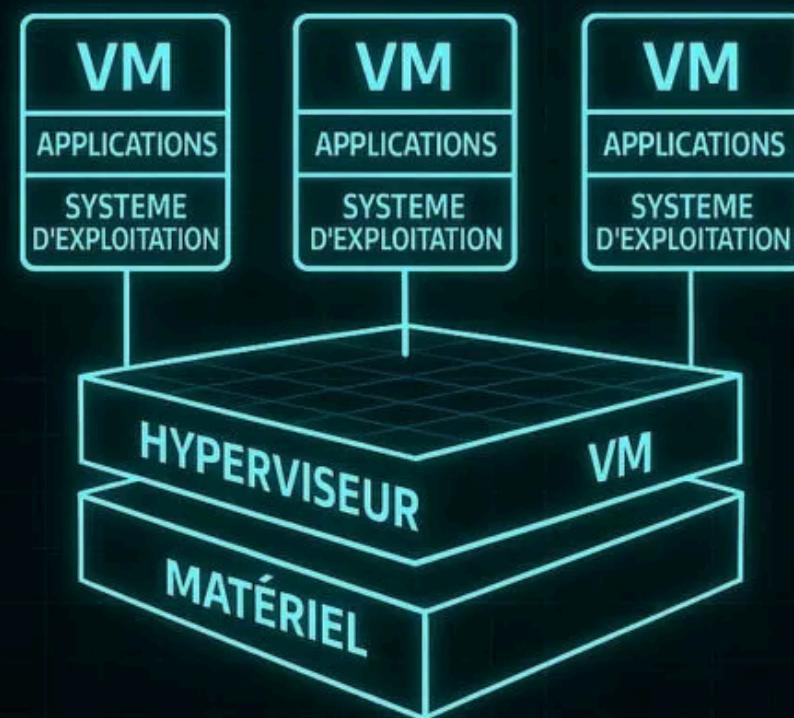
MiNET
en 2025

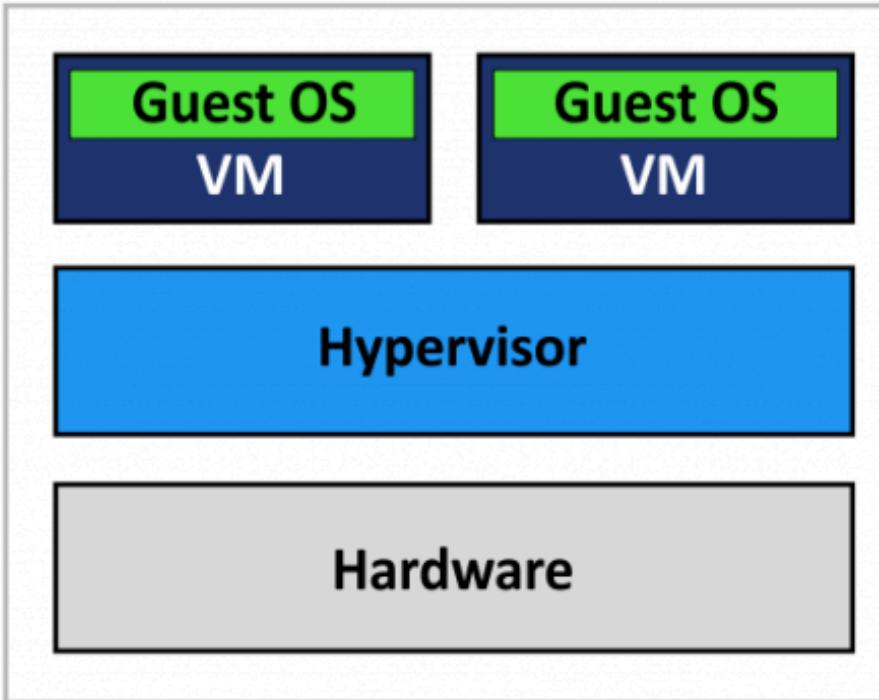
Virtual Machine

- OS
- Application
- Hardware virtuel

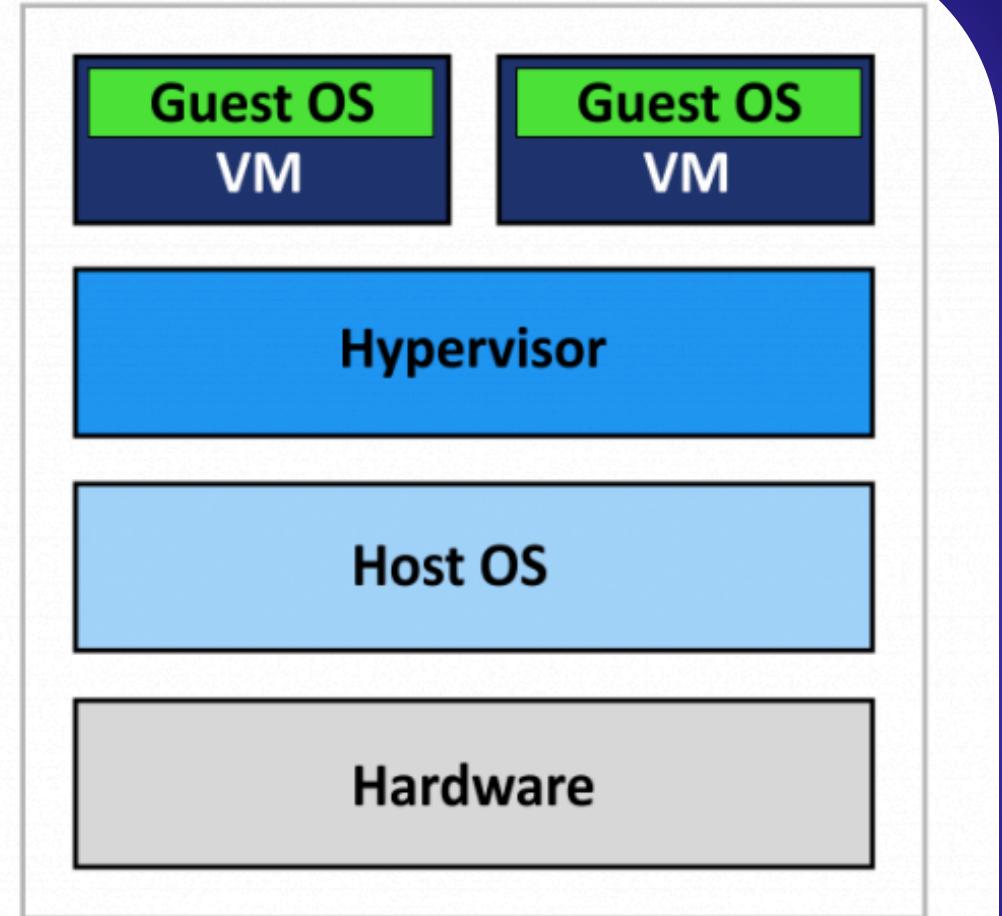


VIRTUALISATION DE SERVEUR





Type 1 Hypervisor
(Bare-Metal Architecture)



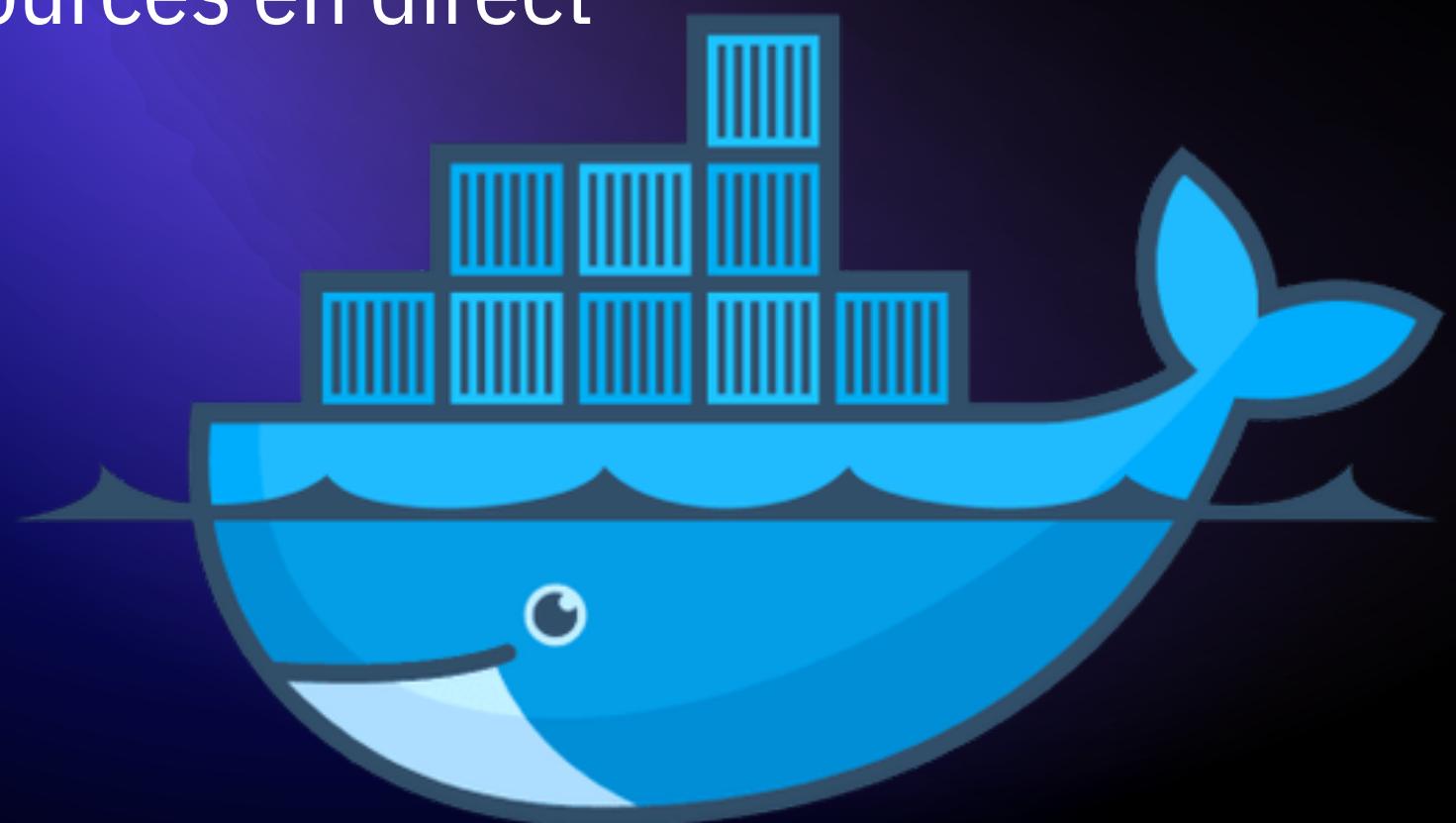
Type 2 Hypervisor
(Hosted Architecture)

Type
Hyperviseur



Conteneur

- Isolation d'un groupe de processus
- Léger (aucun OS)
- Contrôle des ressources en direct
- Reproductible

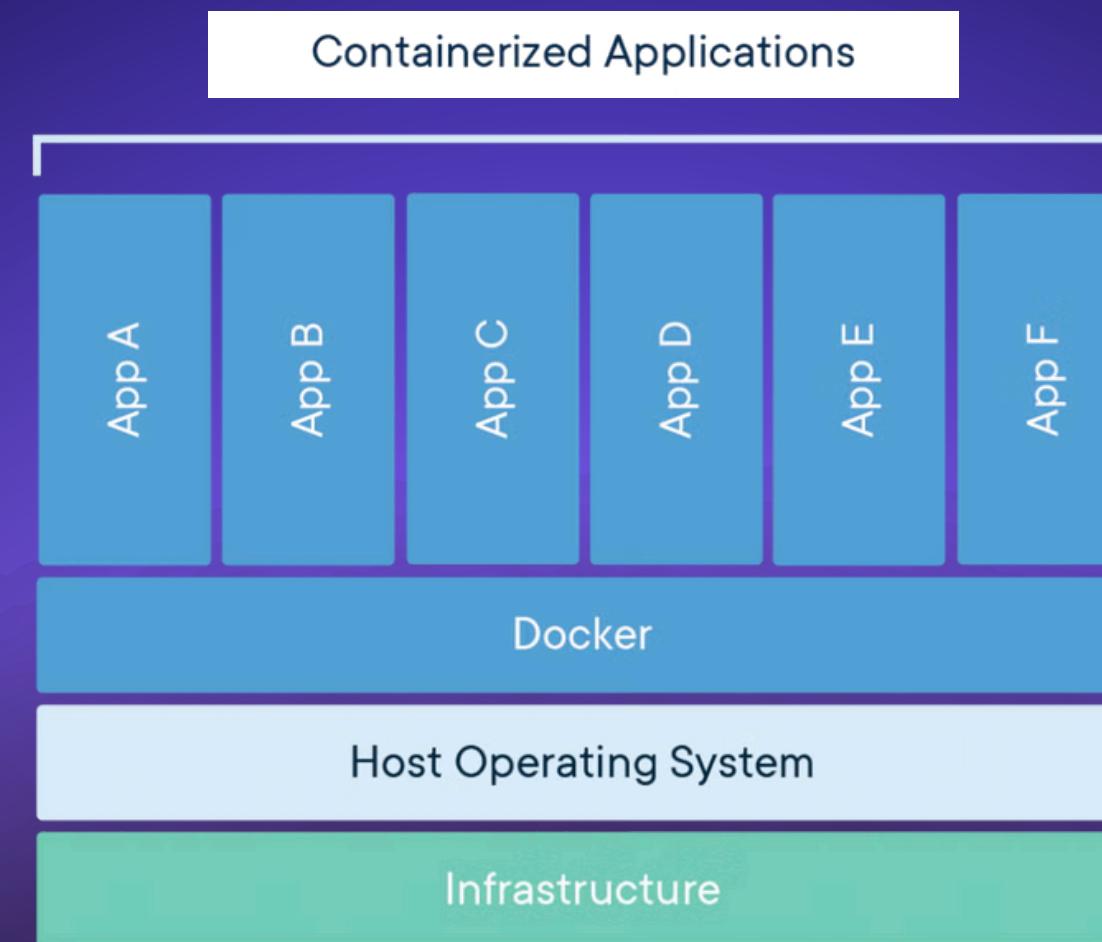


podman

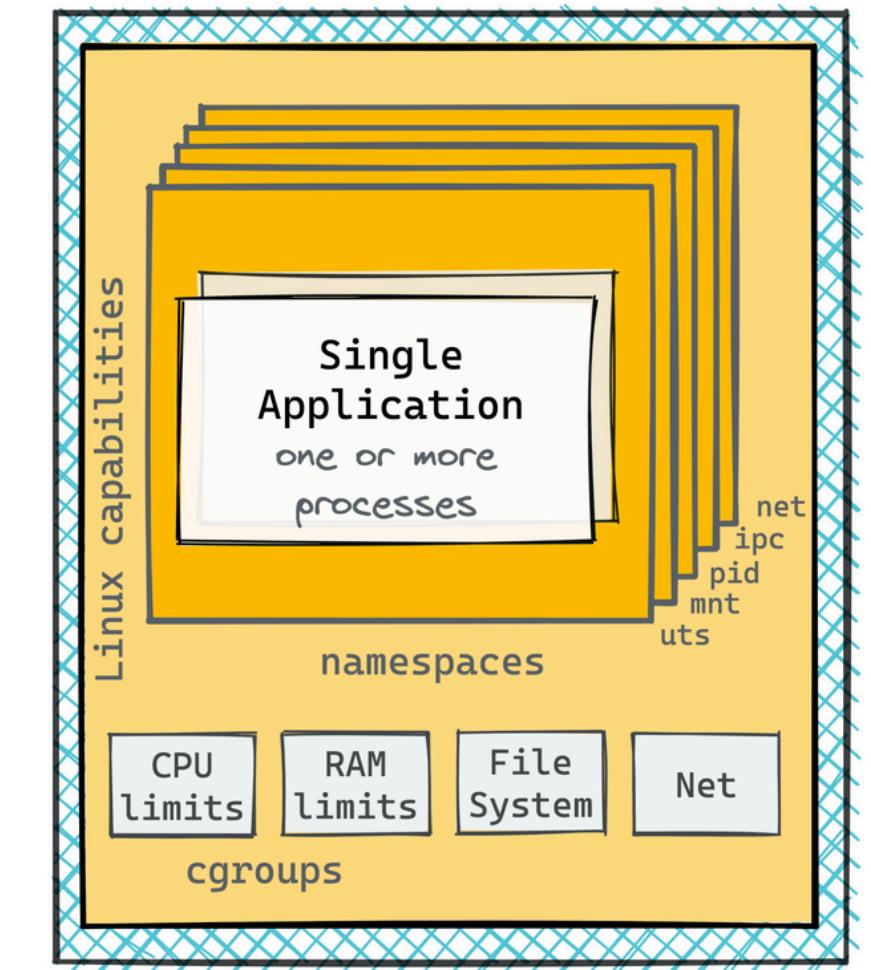


Structure

- Namespaces
- cgroups
- overlay
- agit sur des **processus**
- partage le noyaux



Container - a "box" for one app



typically has a dedicated address

e.g. 172.18.0.3

```

0[off] 4[off] 8[off] 12[7.3] 16[9.8] 20[off] 24[off] 28[off]
1[off] 5[off] 9[4.6] 13[off] 17[off] 21[off] 25[off] 29[off]
2[off] 6[off] 10[off] 14[off] 18[off] 22[off] 26[off] 30[off]
3[14.] 7[off] 11[off] 15[off] 19[off] 23[off] 27[off] 31[off]
Mem[|||] 102M/4.00G Tasks: 31, 24 thr, 0 kthr; 3 runnin
Swp[ 0K/0K] Load average: 6.12 5.86 5.65
Uptime: 2 days, 18:46:04

```

conteneur

```

0[27.] 4[3.9] 8[4.6] 12[6.1] 16[7.8] 20[4.6] 24[5.6] 28[3.4]
1[4.0] 5[1.7] 9[2.2] 13[2.8] 17[6.9] 21[6.7] 25[1.1] 29[2.3]
2[5.7] 6[5.1] 10[6.8] 14[5.8] 18[4.5] 22[16.] 26[18.] 30[10.]
3[17.] 7[2.3] 11[4.0] 15[3.4] 19[14.] 23[2.3] 27[3.9] 31[3.4]
Mem[|||||] 80.4G/126G Tasks: 1126, 1526 thr, 610 kthr; 2
Swp[ 0K/0K] Load average: 6.12 5.86 5.65
Uptime: 17 days, 20:30:01

```

hôte

```

root@home-server:~# 
[~/home/pi]
> # head -n1 /etc/os-release
PRETTY_NAME="Ubuntu 24.04.3 LTS"
root@home-server:~# 
[~/home/pi]
> # docker run -it --rm docker.io/archlinux head -n1 /etc/os-release
NAME="Arch Linux"

```

distributions différentes

```

0[|||||] 3.3% Tasks: 184,
1[|||||] 6.0% Load average
2[|||||] 9.9% Uptime: 27
3[|||||] 3.4%
Mem[|||||] 3.54G/31.2G
Swp[ 0K/23.6G]

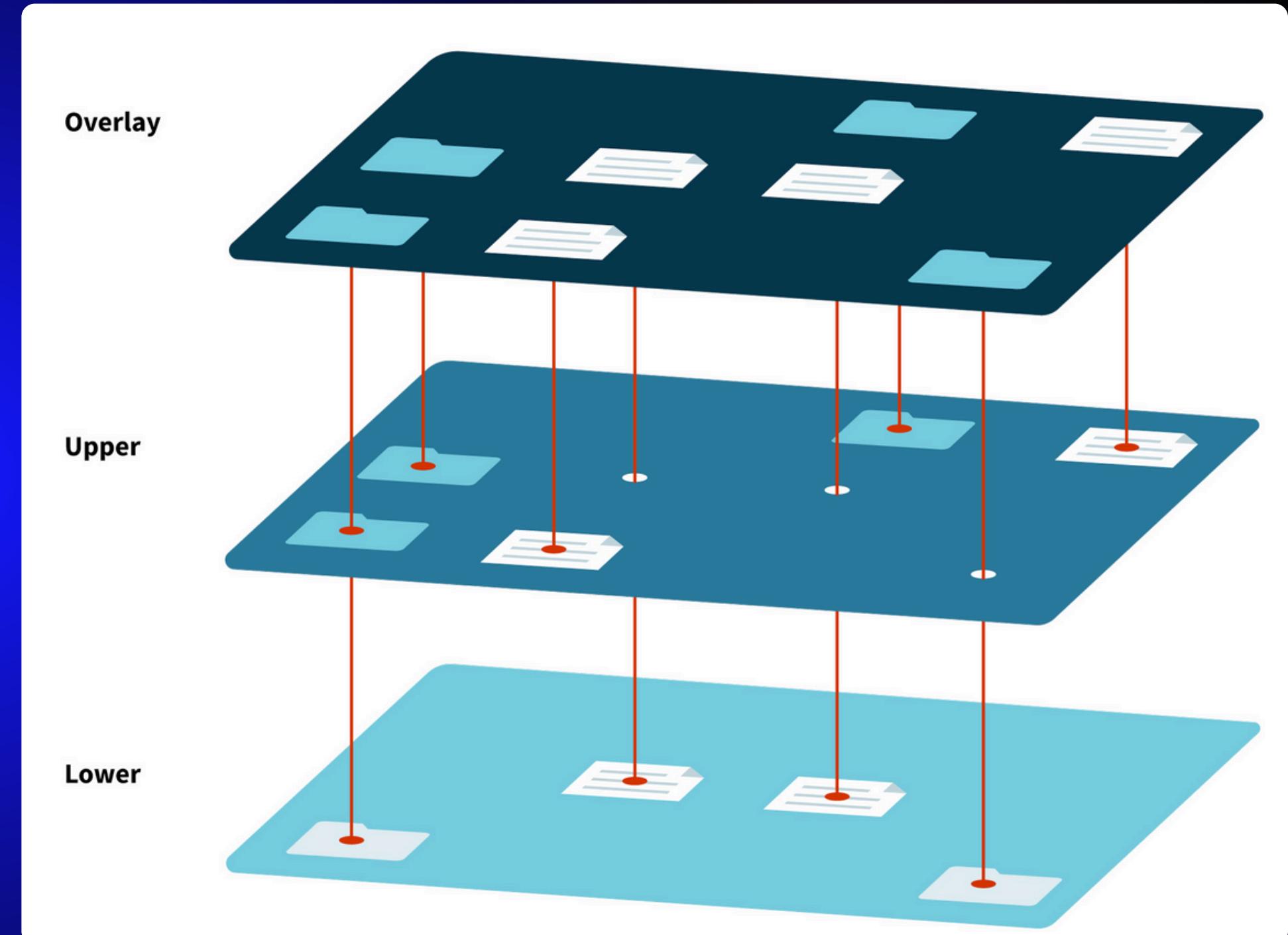
```

	Main	I/O	PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
49422	root		20	0	531M	15108		0 S	0.0	0.0	0:00.50	/usr/libexec/udisks2/udisksd		
3839132	root		20	0	2181M	55864		0 S	0.0	0.2	0:00.50	/usr/bin/containerd		
3839954	root		20	0	3556M	100M	58880	S	0.0	0.3	0:00.50	/usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock		
154088	lilkisss		20	0	623M	24680	19272	S	0.0	0.1	0:00.48	/usr/bin/wireplumber		
3842062	root		20	0	12.0G	265M		0 S	0.0	0.8	0:00.45	immich		
3842076	nobody		20	0	1103M	82388	58492	S	0.0	0.3	0:00.42	npm run server:start		
3842060	root		20	0	12.0G	265M		0 S	0.0	0.8	0:00.41	immich		
3844307	root		20	0	421M	62064	51012	S	0.0	0.2	0:00.39	php-fpm: master process (/usr/local/etc/php-fpm.conf)		
3842063	root		20	0	12.0G	265M		0 S	0.0	0.8	0:00.37	immich		
3841693	lilkisss		20	0	1212M	15680		0 S	0.0	0.0	0:00.36	nats-server -c /etc/nats.conf		
3839727	root		20	0	1289M	70556		0 S	0.0	0.2	0:00.35	/usr/sbin/tailscaled --state=/var/lib/tailscale/tailscaled.state		
3833330	root		20	0	84064	40996	39496	S	0.0	0.1	0:00.33	/usr/lib/systemd/systemd-journald		
3841030	dnsmasq		20	0	406M	186M	184M	S	0.0	0.6	0:00.32	postgres		
3841960	root		20	0	1753M	248M		0 S	0.0	0.8	0:00.31	grafana server --homepath=/usr/share/grafana --config=/etc/grafana/grafana.ini		
3842398	root		20	0	11.3G	179M		0 S	0.0	0.6	0:00.31	immich-api		
3844995	1001		20	0	798M	407M	29744	S	0.0	1.3	0:00.31	/usr/bin/coolforkit-caps --systemplate=/opt/cool/systemplate --systemplate=/opt/cool/systemplate --systemplate=/opt/cool/systemplate		
3841771	lilkisss		20	0	1251M	99856		0 S	0.0	0.3	0:00.29	/opt/eternal/bin/eternal -Bd -- -root /opt/eternal -bindir /opt/eternal/bin -chroot /opt/eternal -logdir /opt/eternal/log		
3852034	1001		20	0	798M	407M	29744	S	0.0	1.3	0:00.27	/usr/bin/coolforkit-caps --systemplate=/opt/cool/systemplate --systemplate=/opt/cool/systemplate --systemplate=/opt/cool/systemplate		
3852035	1001		20	0	798M	407M	29744	S	0.0	1.3	0:00.27	/usr/bin/coolforkit-caps --systemplate=/opt/cool/systemplate --systemplate=/opt/cool/systemplate		
49424	root		20	0	531M	15108		0 S	0.0	0.0	0:00.26	/usr/libexec/udisks2/udisksd		

processus visibles depuis l'hôte

Overlay

- Système de fichier
- Partage d'image entre conteneurs
- Base immuable (lower)
- Natif



Différents usages

micro-services

- 1 conteneur = 1 service
- mettre à jour le service = recréer le conteneur avec une nouvelle image
- durée de vie courte
- images légères

vm-like

- conteneur avec gestionnaire de services
- une distribution complète
- vie avec le service (mises à jours, etc...)

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Quiz Time



HTTPS://WIKI.MINET.NET/FR/MINI_TP_FORMATION/LINUX/CONTENEURISATION

Petit TéPé

