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Docker for Efficient Development

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The problem

- How do I deploy multiple versions of different database vendors in an easy to manage way?
  - Possible client requirement
- Most often this is solved by using Virtual Machines
  - Use a lot of memory for a bit more performance
  - Hard to manage; RDP or otherwise
  - Take a lot of drive space

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How much space does a Windows VM require?

25 GB+ (excl. Page file, etc.)

And a Ubuntu VM?

And a Ubuntu VM?

20+ GB

And then for memory

- Windows VM’s:
  - Require at least 2 GB of memory for the base…
    - After installing SQL Server, an additional 1 GB!
- Ubuntu VM’s:
  - Server version could get away with 1GB…
    - But if you have a big database then MySQL or MariaDB will need additional GB’s too!

Is there a better solution?

- What do we want?
  - Easier to deploy
  - Easier to manage
  - Use less resources / Virtual Machine

Two ways

- Use smaller distributions as Virtual Machine (host)
  - Linux – Alpine
    - 51 MB installation for VMs
    - Less than 40-100 MB in memory usage!
- Containers!
  - Docker
  - Podman
  - Kubernetes
  - …

What are containers?

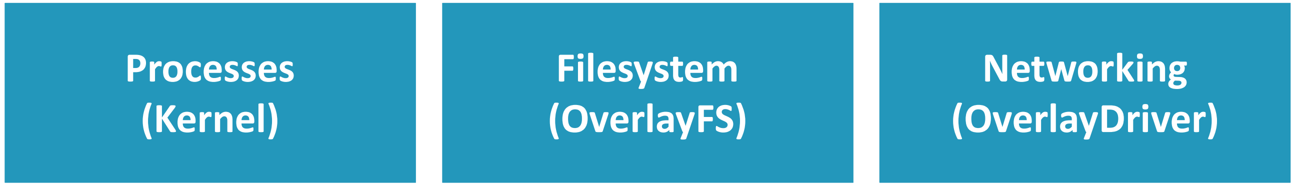
- “A container is a standard unit of software that packages up code and all its dependencies, so the application runs quickly and reliably from one computing environment to another.”

- Not; it works on my machine?
- It works on all machines!

How do they work compared to virtual machines?

- Virtual machines are complete virtualized computers.
- Containers are processes that run in a restricted state on the host (based of an image).

- Improves portability, and if used correctly, security.
- Containers are layer-based on the filesystem. This safes a lot of space and makes deployment easy.
- Containers can be put in a “connected” state through networking.

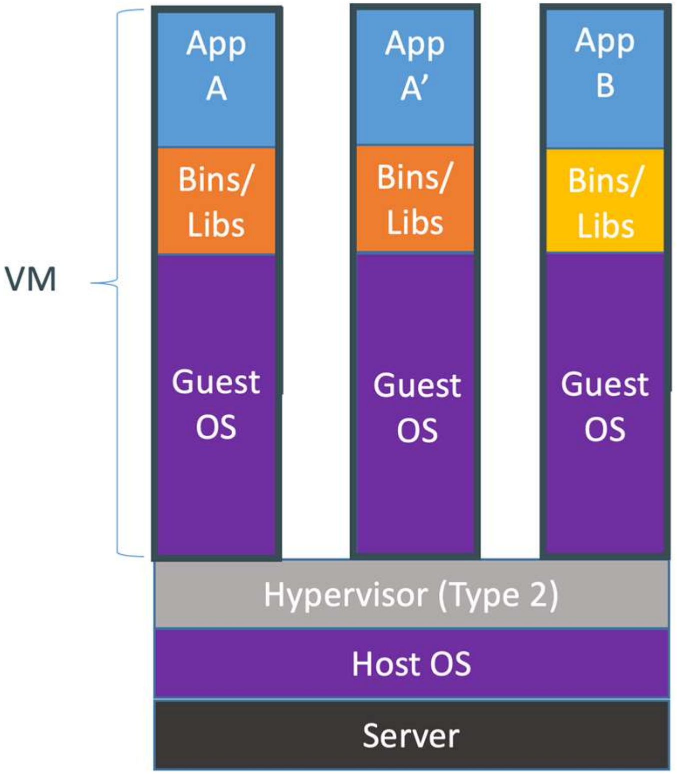


Processes (Kernel)

Filesystem (OverlayFS)

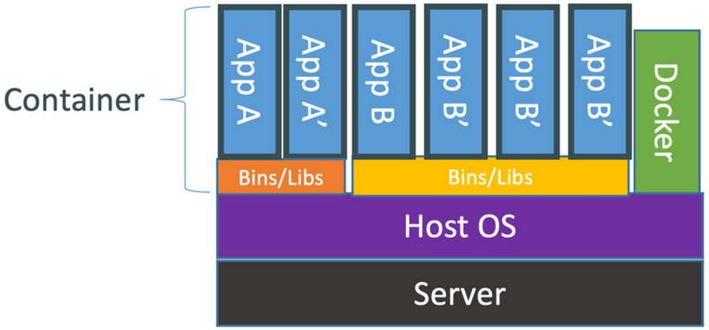
Networking (OverlayDriver)

How do they work compared to virtual machines?



Containers are isolated, but share the OS and, where appropriate, bins/libraries

…results is significantly faster deployment, much less overhead, easier migration, faster restart



What part does Docker play in this?

- Is the first commercial/enterprise product that provides the concept of containers. Though the “kernel” (Linux) functionality already existed.
- Docker cooperated with Microsoft to bring containers to Windows. They are now the standard on Windows.
- Docker has over 9,638,585 images (2022, October), in its own registry (storage location for the images).
- There are other types of containers like LXC containers with the same principle. The de facto container “provider” would however still be Docker.

What is the cost?

- Well, it costs less (on Windows);
  - ±400 MB (and from then on only for applications!
  - If not in use; it won’t take up anything, just like VMs
  - Deduplication of libraries depending on the images you download
  - Customizable limits for usage
- On Linux?
  - Practically none…

Let’s go see it in action!

Available Databases on Docker Hub

- DB2: ibmcom/db2, v11.*, latest
- MySQL:
  - mariadb, v10.*, v5.5.*, latest
  - MySQL, v8.*, v5.*, latest
- Postgres: postgres, v10.*-v14.*, latest
- Microsoft SQL Server: 2017-win, 2017-linux, 2019-win, 2019-linux, 2022-win, 2022-linux
- …
- A lot more including Oracle versions!

Thank you!

Are there any questions?