Using Docker in development

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March 2017

Docker based build environment

A Docker container for building and deploying our VO services.

- Download the builder compose file

```
Wget -O builder.yml \
http://wfau.metagrid.co.uk/code/firethorn/raw-file/9c5be2402ce0/docker/compose/builder.yml
```

- Run a builder container

```
docker-compose \
    --file "builder.yml" \
    run builder
```

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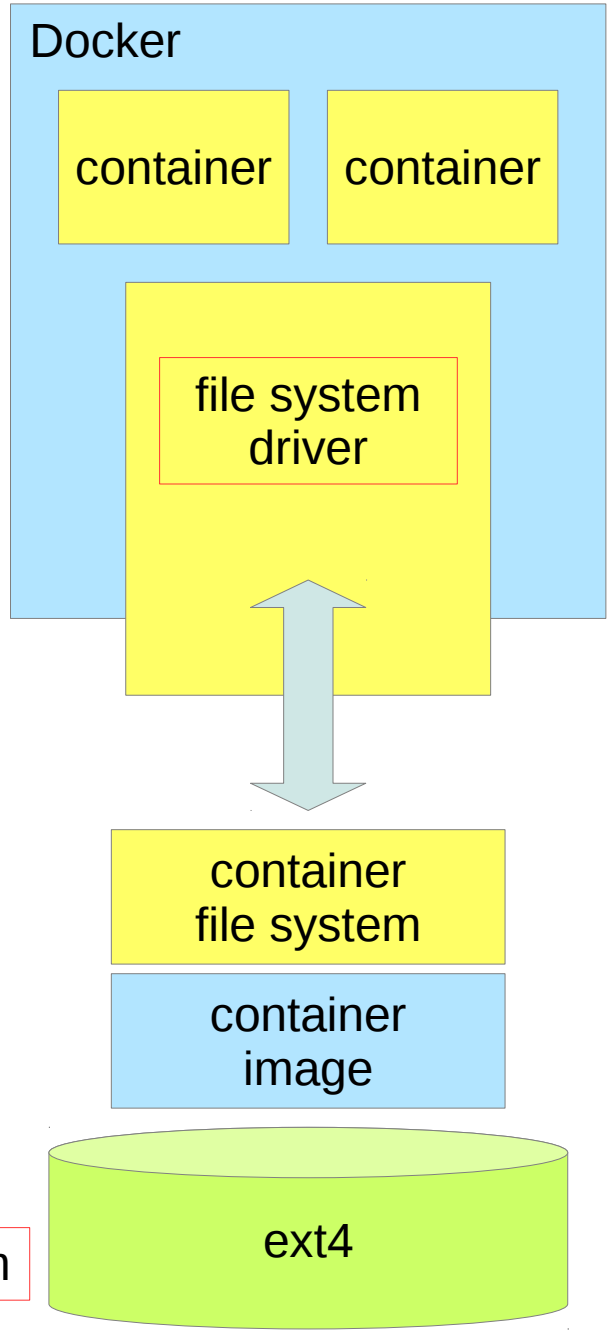
Docker filesystem

At runtime, Docker manages the container file system as a copy-on-write layer on top of the container image.

Depending on which file system driver you are using this can have significant performance issues.

If your file system doesn't support copy-on-write, then Docker has to do it itself, which is slow.

The *loopback* and the *device mapper* drivers are the most portable, but they are also the slowest.



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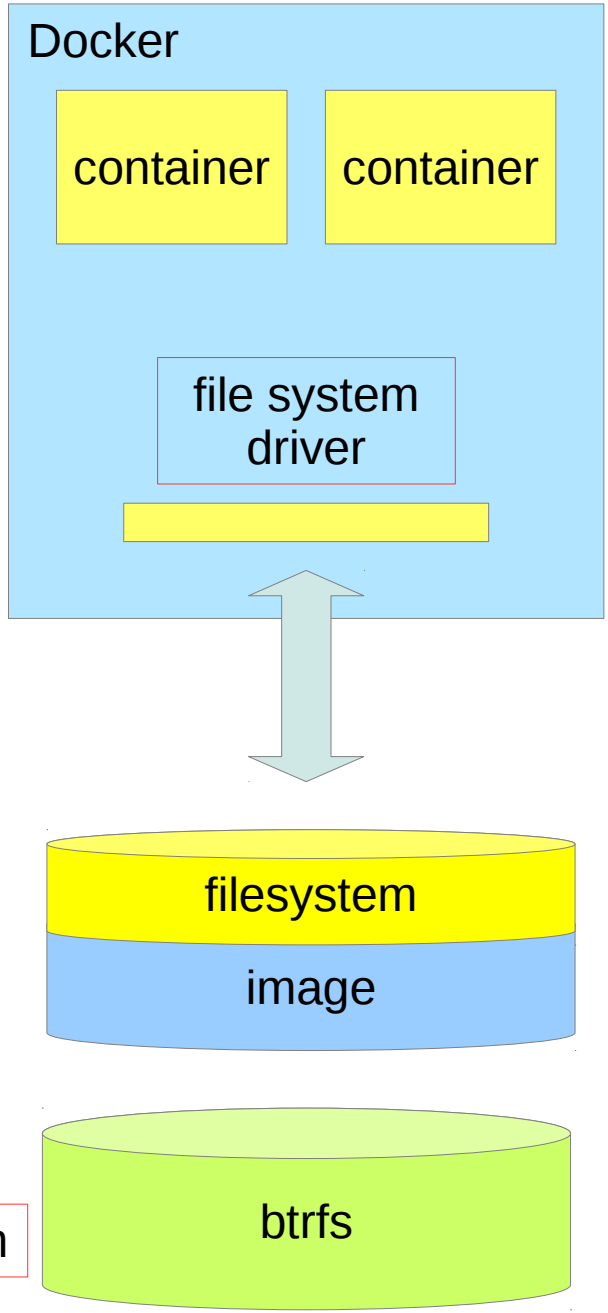
Btrfs filesystem

We have seen good results using btrfs.

If your host system is running btrfs, then Docker will automatically use the corresponding driver.

Btrfs is a copy-on-write file system, so the Docker driver can just pass everything through to the native file system, making it much faster.



Native copy-on-write file system

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Docker volumes

Compose file defines two volumes

```
volumes:

    sourcecode:

    buildcache:
```

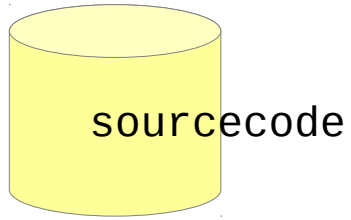
If they don't exist, Docker will create them automatically.

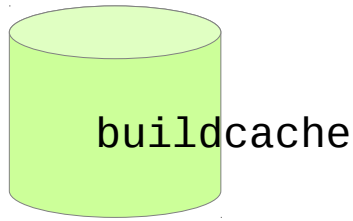
If you don't specify a path, Docker will create volumes in Docker managed space.

On RedHat volumes are created in

`/var/lib/docker/volumes/`

Docker managed disk space





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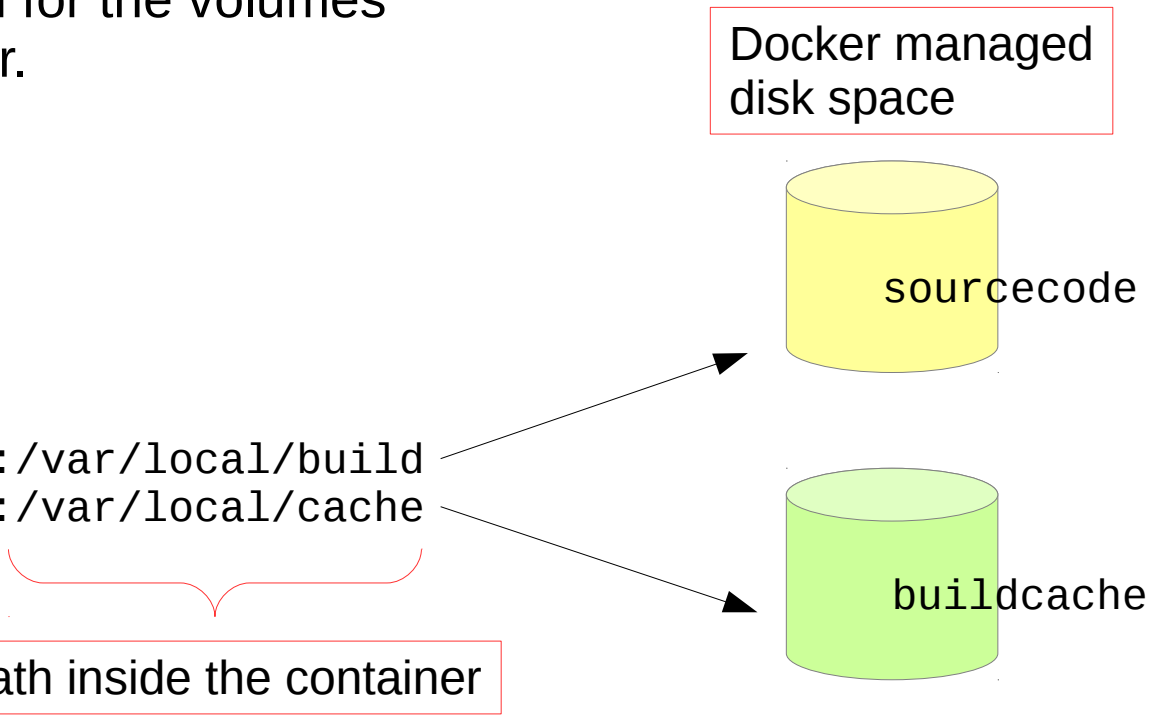
Docker volumes

Compose file sets the path for the volumes inside our builder container.

```
services:

    builder:

        ....
        volumes:
            - sourcecode:/var/local/build
            - buildcache:/var/local/cache
```



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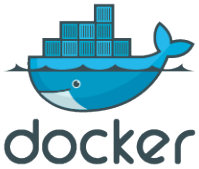
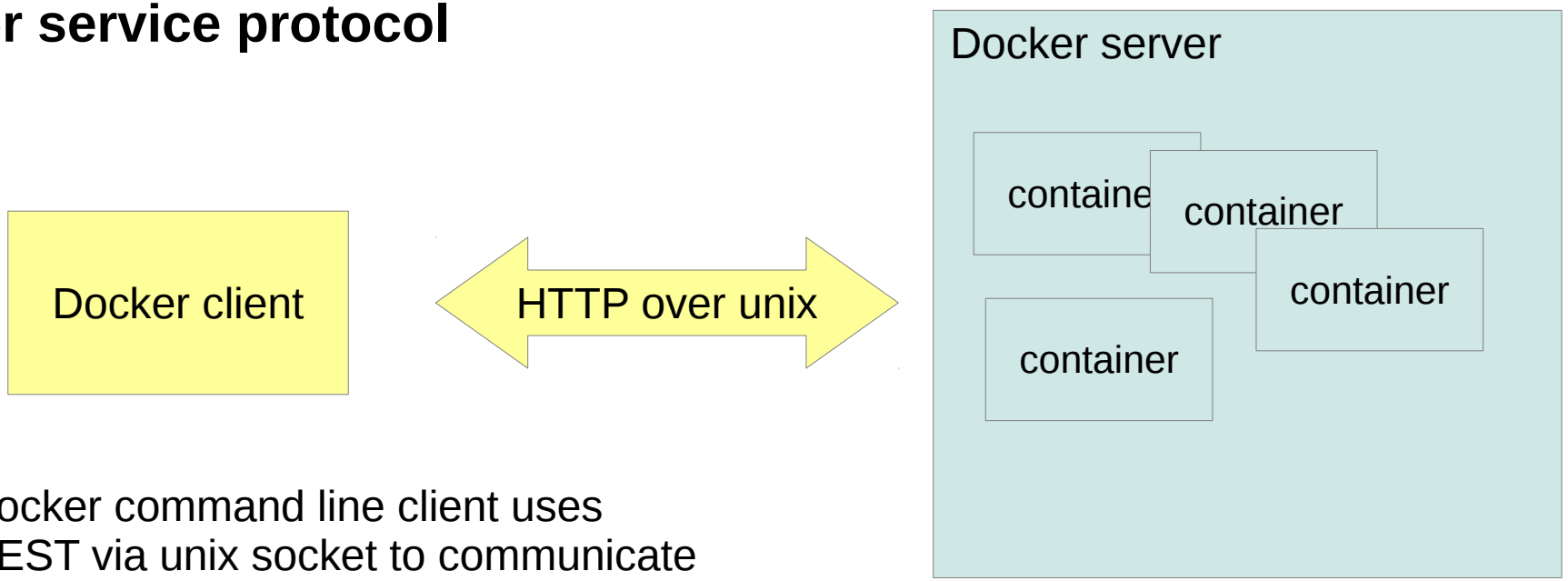


Docker service protocol



Docker command line client uses REST via unix socket to communicate with the Docker service.

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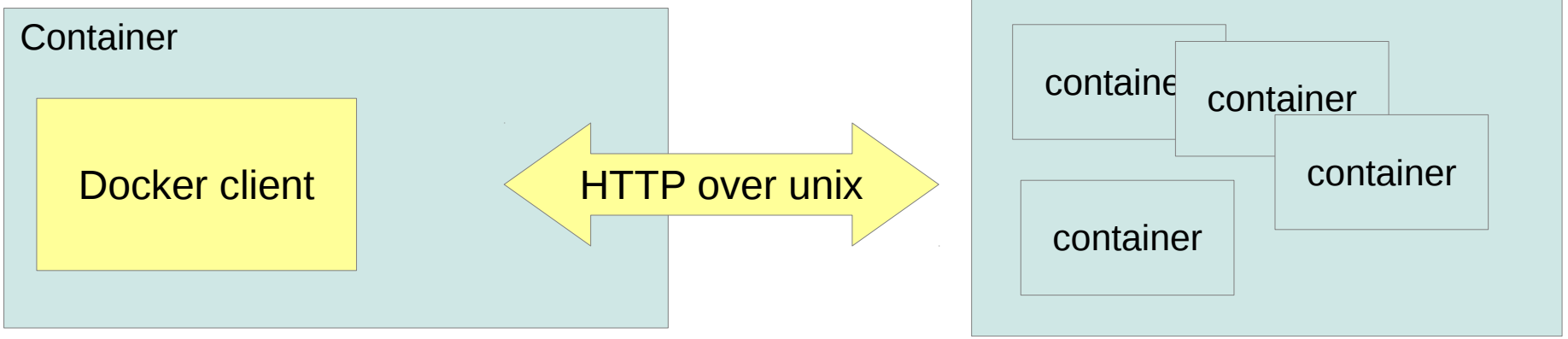
Docker inside Docker



Using a volume command to make the unix socket visible inside the container.

```
services:
    builder:
        ....
        volumes:
            ....
            - /var/run/docker.sock:/var/run/docker.sock
```

path on the host

path inside the container

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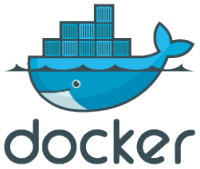
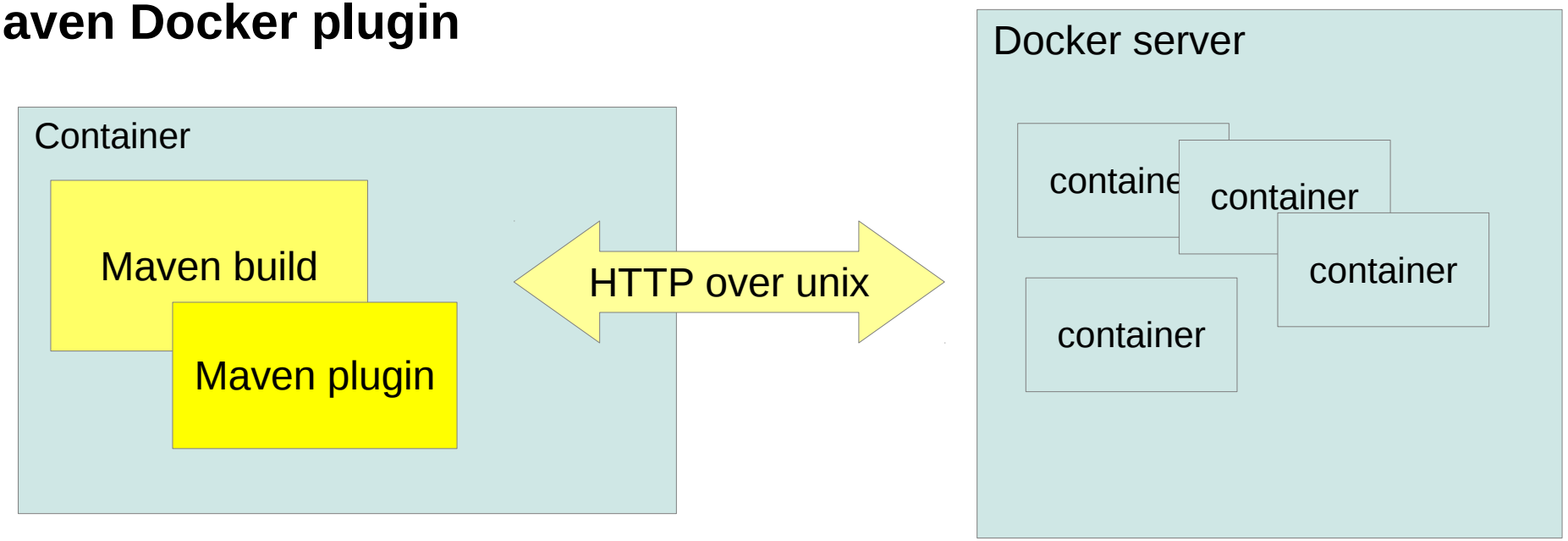


Maven Docker plugin



Standard Maven plugin declared in our Maven build file.

Uses HTTP over unix to communicate with The Docker server.

The Maven plugin does not know it is inside a container.

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Create your own base image

No version flag

```
FROM docker.io/fedora
    ….
    ….

    dnf install ...
    dnf install ...
```

If your container build just refers to a 3rd party image in the Docker registry, your builds will not repeatable.

The results of your build will depend on when the upstream image is updated.

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Using your own base image gives you control over the contents.

docker

Create your own base image

Version control of your base image means you know what is in it.

Firethorn/fedora-2.1.7 Specific versions

```
FROM docker.io/fedora:25
    ….
    ….

    dnf install ...
    dnf install ...
```

Firethorn/tomcat-2.1.7 Inheritance tree

```
FROM firethorn/fedora:2.1.7
    ….
    ….
```

Firethorn/webapp-2.1.7

```
FROM firethorn/tomcat:2.1.7
    ….
    ….
```

Inheritance tree

```
fedora:25
   +--fedora-2.1.7
       +--tomcat-2.1.7
           +--webapp-2.1.7
```

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docker

Fin

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Informal Docker interest group in the IVOA,
part of Grid&Web Services

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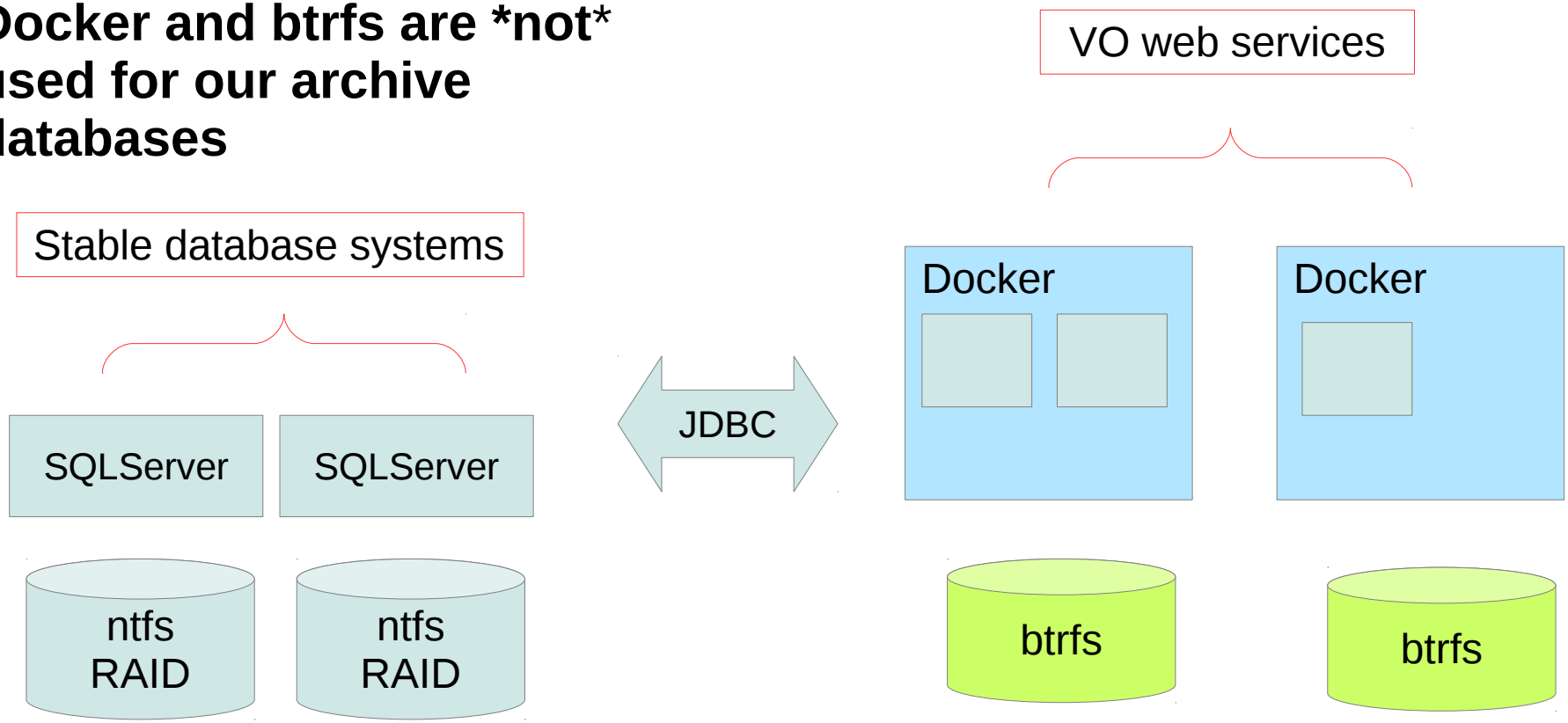
Docker and btrfs are *not* used for our archive databases



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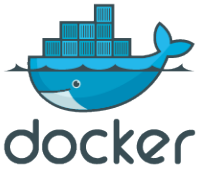

Btrfs filesystem

If you are concerned that btrfs is not stable enough …. why are you using Docker ?

Btrfs

- Started in 2007
- Marked as stable in 2014

Docker

- Started in 2013
- Not totally stable yet

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