How to Containerize WebSphere Application Server Traditional, and Why You Might Want To

David Currie @dcurrie
david_currie@uk.ibm.com

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Agenda

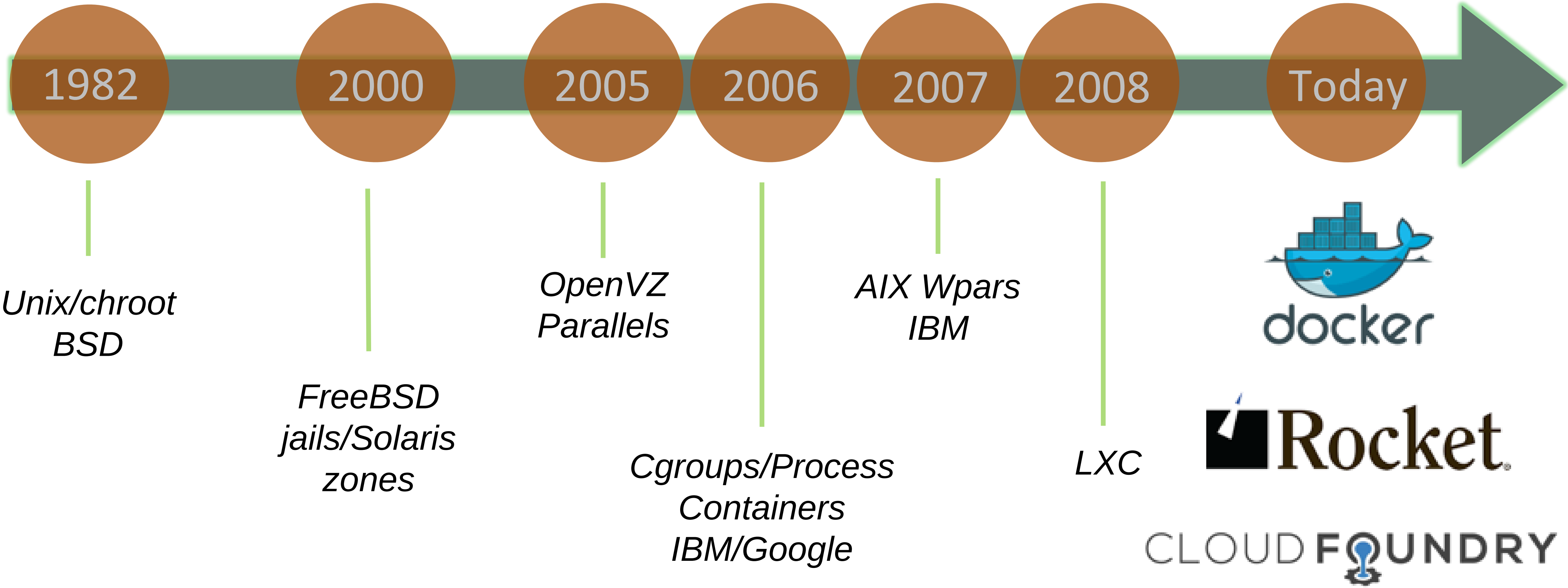
Overview of Containers and Docker

Use Cases for WAS traditional and Docker

Getting started with WebSphere Application Server traditional and Docker

Overview of Containers and Docker

Container History



1982 — *Unix/chroot BSD*

2000 — *FreeBSD jails/Solaris zones*

2005 — *OpenVZ Parallels*

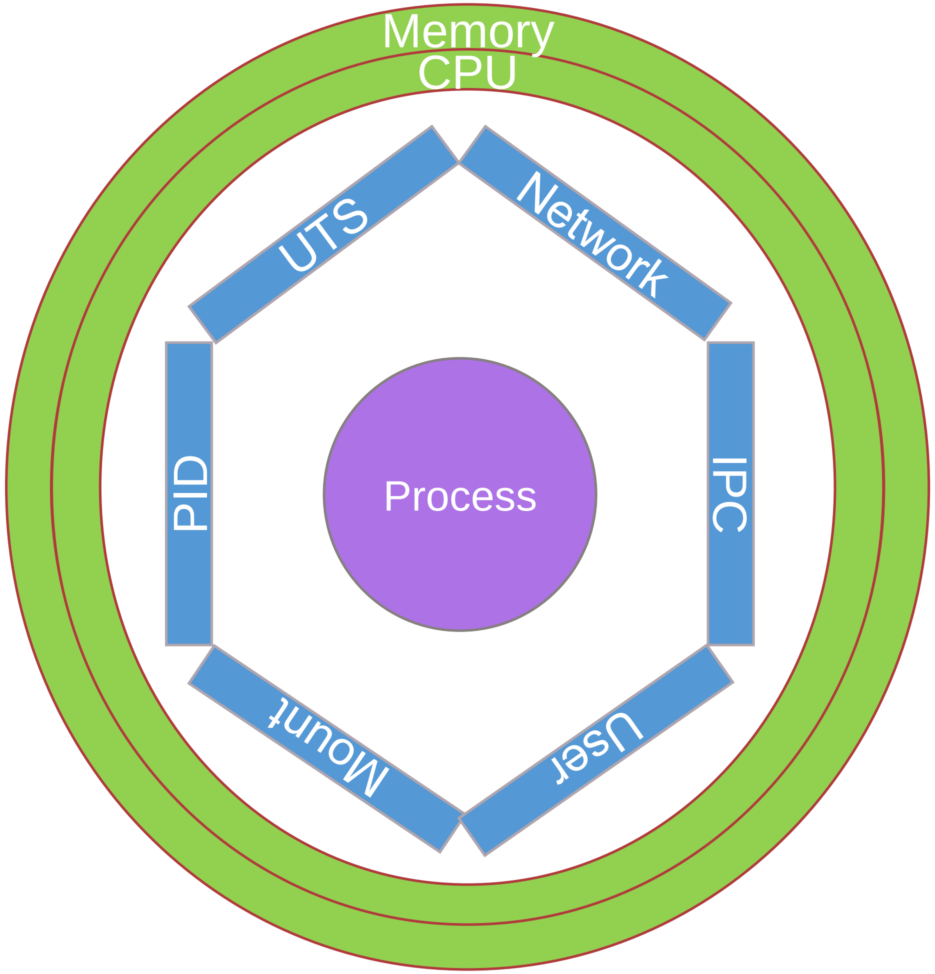
2006 — *Cgroups/Process Containers IBM/Google*

2007 — *AIX Wpars IBM*

2008 — *LXC*

Today — docker, Rocket, CLOUD FOUNDRY

Containers



🟦 = Namespaces for isolation

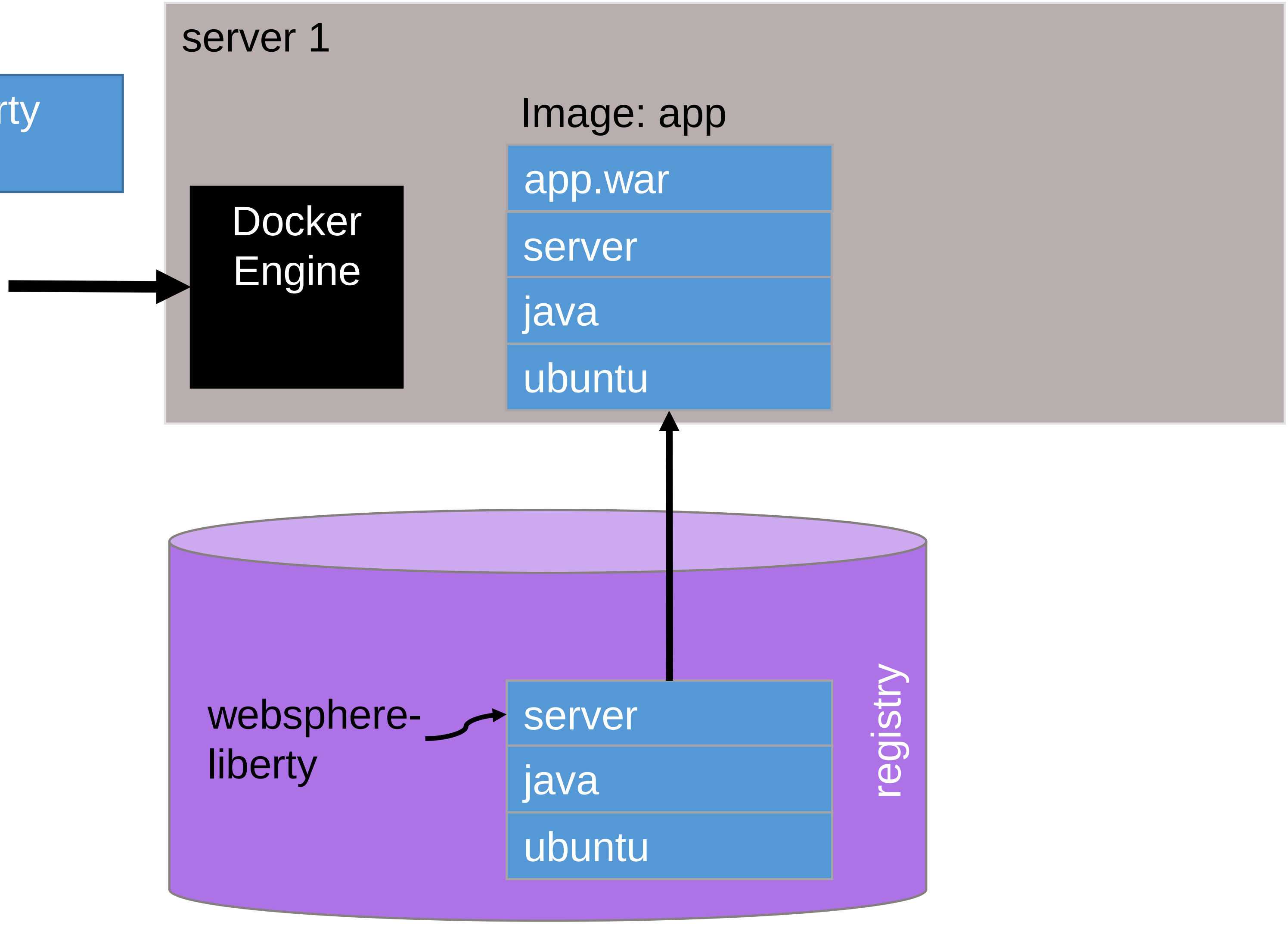
🟩 = Control groups for resource constraint

Building a Docker image

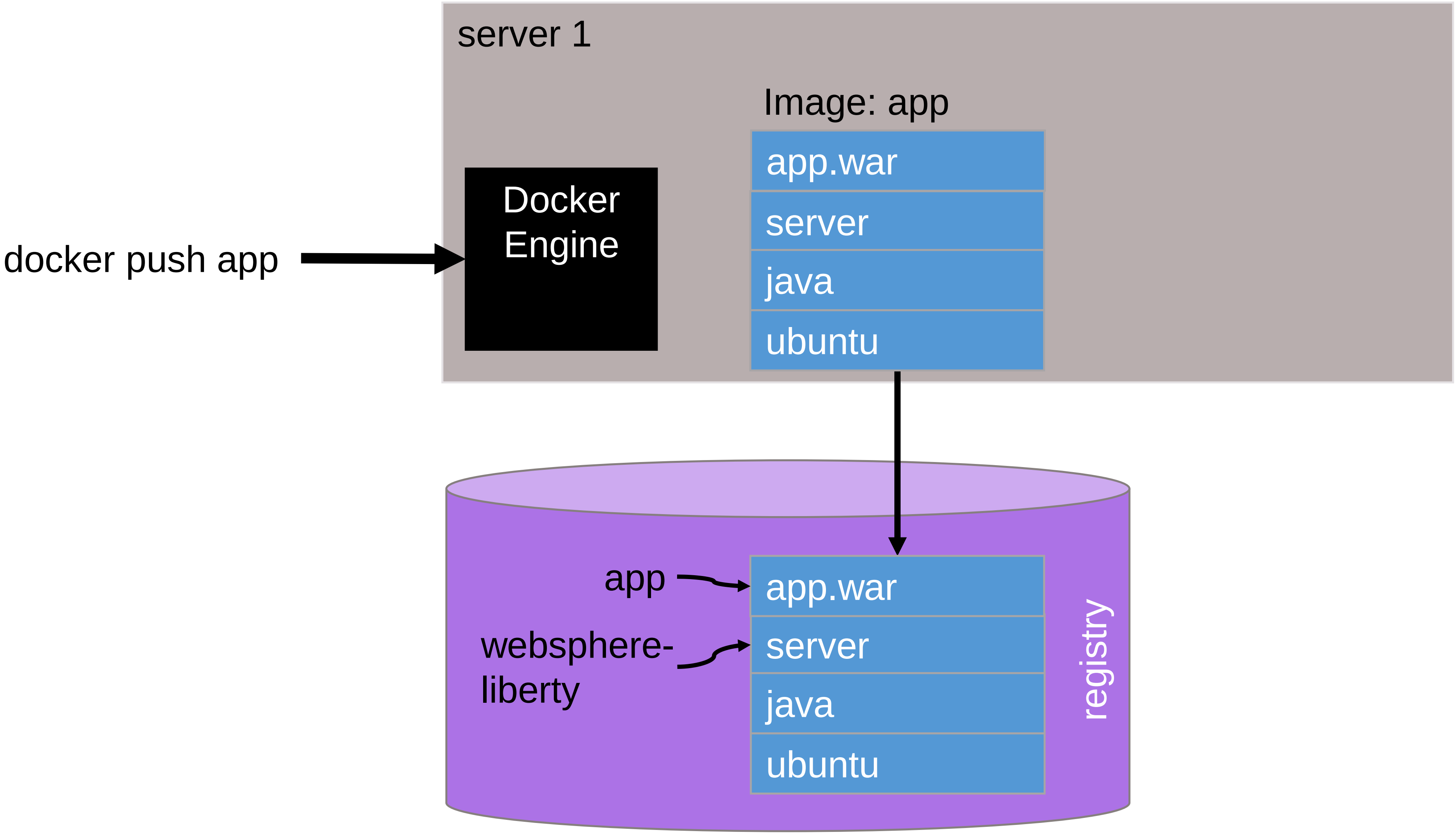
Dockerfile

```
FROM websphere-liberty
COPY app.war
```

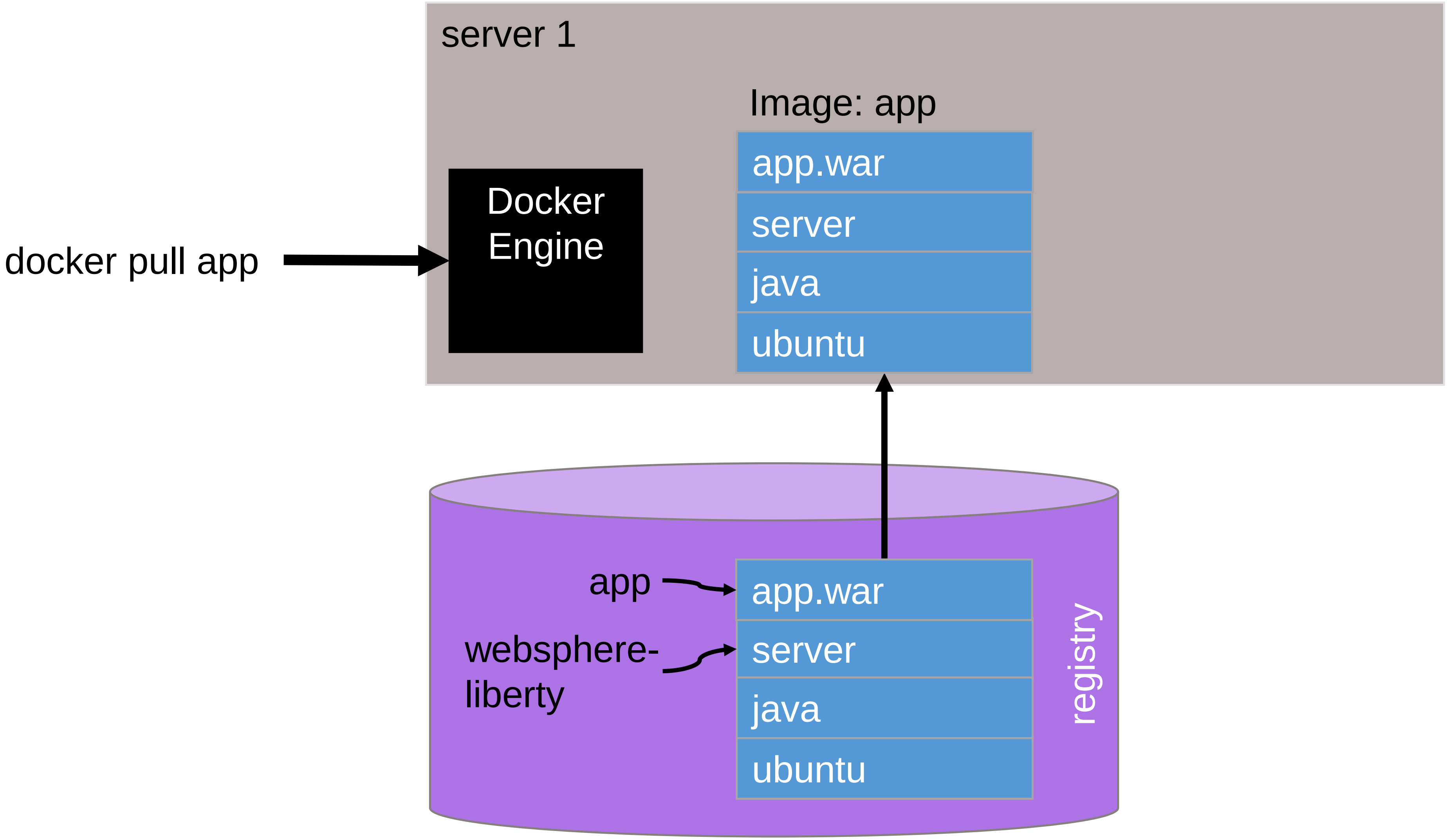
```
docker build --tag app
.
```



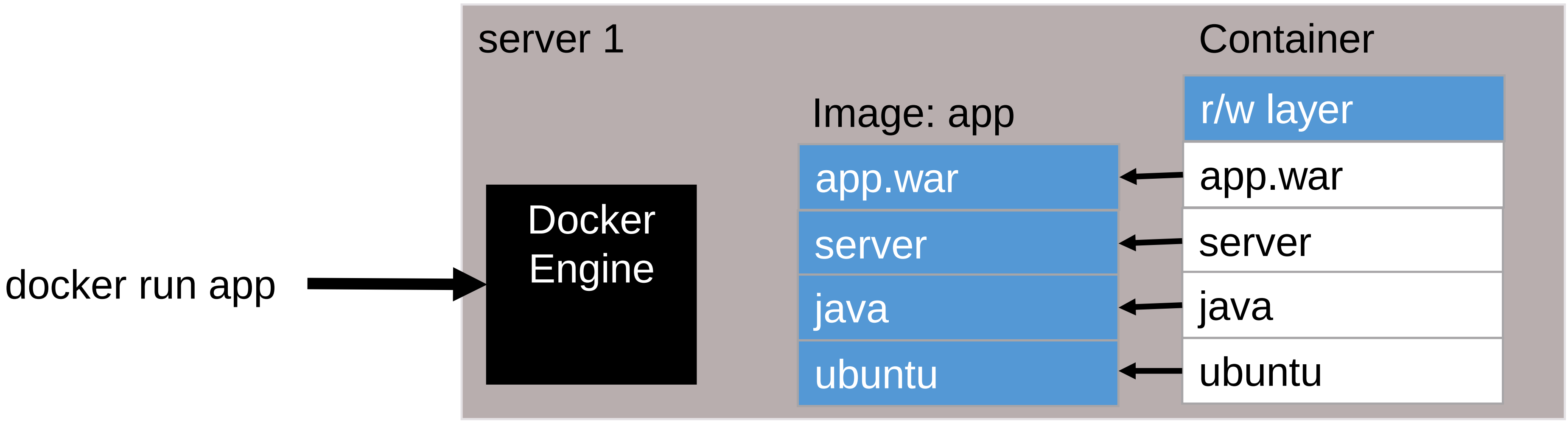
Pushing to a Registry



Pulling from a Registry



Running a Container



docker run app

server 1

Docker Engine

Image: app

app.war

server

java

ubuntu

Container

r/w layer

app.war

server

java

ubuntu

Getting started with WAS traditional and Docker

Docker Quick Start

Linux – run natively e.g. on Ubuntu

```
# From apt.dockerproject.org/repo
sudo apt-get install docker-engine
```

Docker for Windows / Mac

‘Native’ applications running Docker engine in Hyper-V / xhyve VM

Docker Machine

Create VM with Docker installed

```
docker-machine -d virtualbox dev
docker-machine -d openstack … test
docker-machine -d softlayer … prod
```

Set environment variables to configure docker CLI to use machine

```
eval $(docker-machine env dev)
```

Docker Hub images

WAS 8.5.5 developer licensed images

WAS 9.0 try/buy licensed images

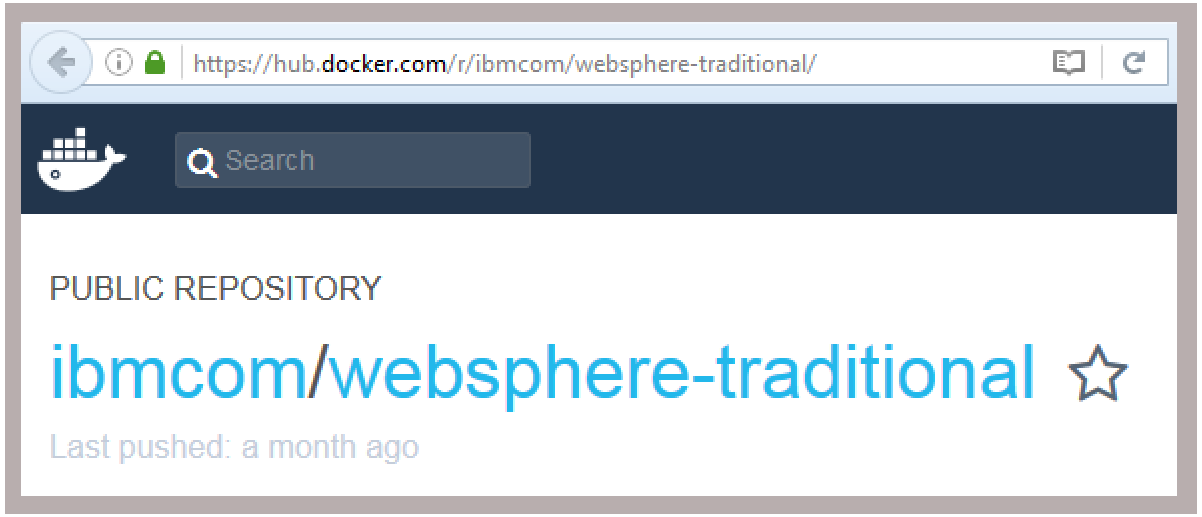
Start server and monitor PID file:

```
$ docker run -p 9043:9043 -p 9443:9443 -d \
    --name=ws ibmcom/websphere-traditional
```

Optionally add -e UPDATE_HOSTNAME=true

Retrieve password for admin console:

```
$ docker exec ws cat /tmp/PASSWORD
```



https://hub.docker.com/r/ibmcom/websphere-traditional/

PUBLIC REPOSITORY

ibmcom/websphere-traditional ☆

Last pushed: a month ago

Profiles

Images with the ‘profile’ tag (and ‘latest’) have a profile pre-created

Images with the ‘install’ tag defer profile creation to container startup allowing profile, node, cell and hostname to be overridden

```
$ docker run --name test -h test
  -p 9043:9043 -p 9443:9443 -d
  -e HOST_NAME=test
  -e PROFILE_NAME=AppSrv02
  -e CELL_NAME=DefaultCell02
  -e NODE_NAME=DefaultNode02
  ibmcom/websphere-traditional:install
```

A profile from the host or a Docker volume can also be mounted at container startup

Combined with the ‘swinging profiles’ capability in WAS this allows you to move a profile from an image at one fixpack level to another

Building your own Base or Developer Image

1. Obtain Installation Manager and WAS binaries from Fix Central and developerWorks or Passport Advantage
2. Host binaries on an HTTP/FTP server
3. Use Dockerfile.prereq to build prereq image
4. Run prereq image to output a TAR file containing the product install
5. Use Dockerfile.install to build install image from TAR file
6. Optionally use Dockerfile.profile to add profile to image

Final image size is around 1.7 GB

https://github.com/WASdev/ci.docker.websphere-traditional

Configuration and Data

For development, use admin console, remote tools support or wsadmin for application configuration and deployment

For production, wsadmin script deployment of application and build in to image

- Use *-conntype NONE* so that server does not have to be running

Expectation is that WAS traditional containers are long-lived (may be started/stopped multiple times)

May still be desirable to persist certain files/directories outside of the container e.g. transaction logs, message stores or logs

Building ND Images

- Build an install image as for base/developer but using ND binaries
- Create a Deployment Manager image with a dmgr profile
- Create a managed node image
  - Runs a node agent and application server
  - Federates to the deployment manager on start-up

- Application server (and application) may be configured in to image at build time (e.g. used as template for cluster member) or created at runtime via deployment manager
- Some configuration (e.g. SIBus cluster members) must be configured via deployment manager

Creating an ND Topology

Create a multi-host overlay network (or use host-level networking)

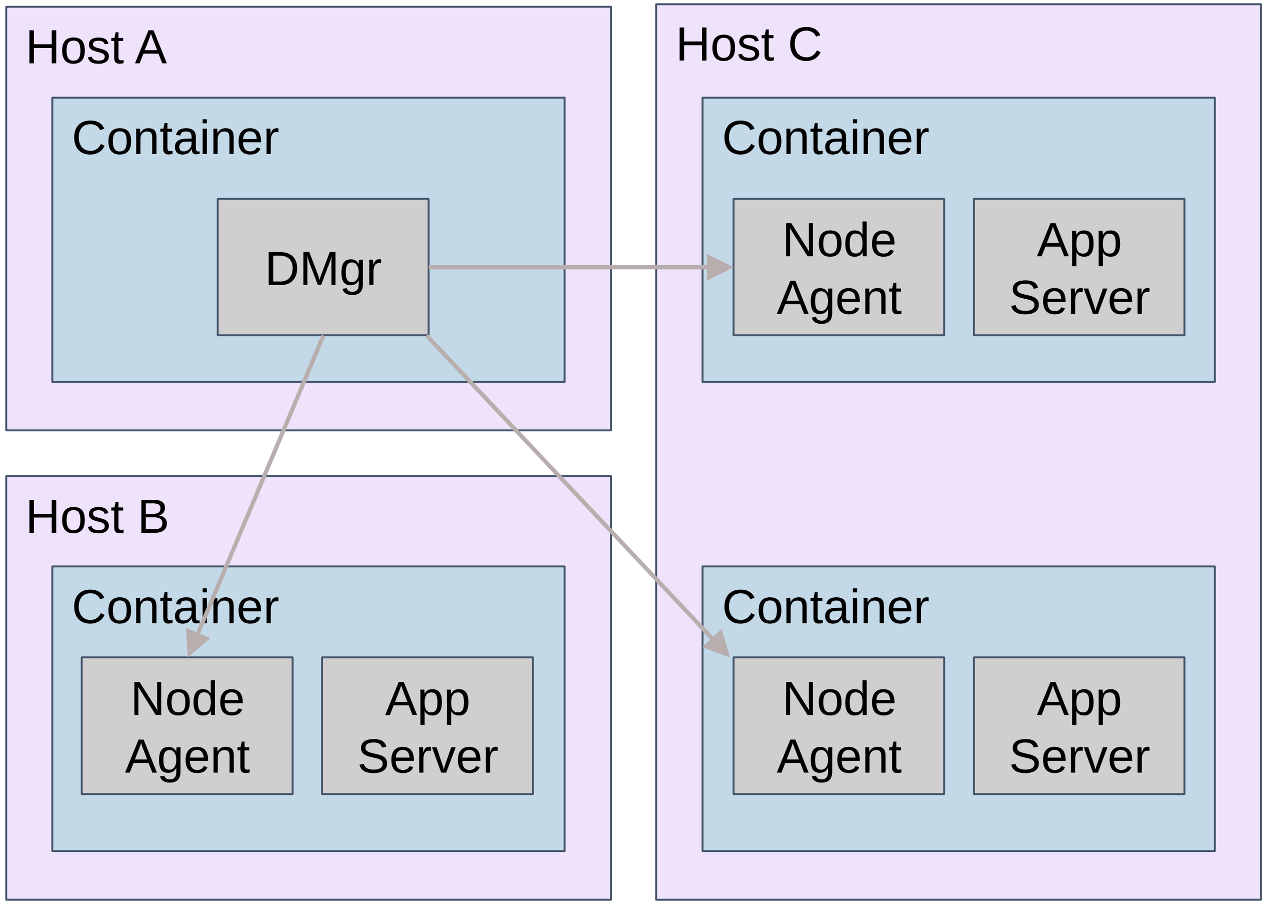
```
$ docker network create cell
```

Run deployment manager

```
$ docker run --name dmgr -h dmgr
    --net=cell -p 9060:9060 -d dmgr
```

Run application server image that federates to dmgr

```
$ docker run --name server1 -h server1
    --net=cell -p 9080:9080 -d appserver
```



Use Cases for WAS traditional and Docker

Developer productivity

Containers as lightweight virtual machines

Single container platform for existing and new workloads

Evolving to microservices via the Strangler Pattern

Questions?

Summary

Overview of Containers and Docker

Use Cases for WAS traditional and Docker

Getting started with WebSphere Application Server traditional and Docker

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