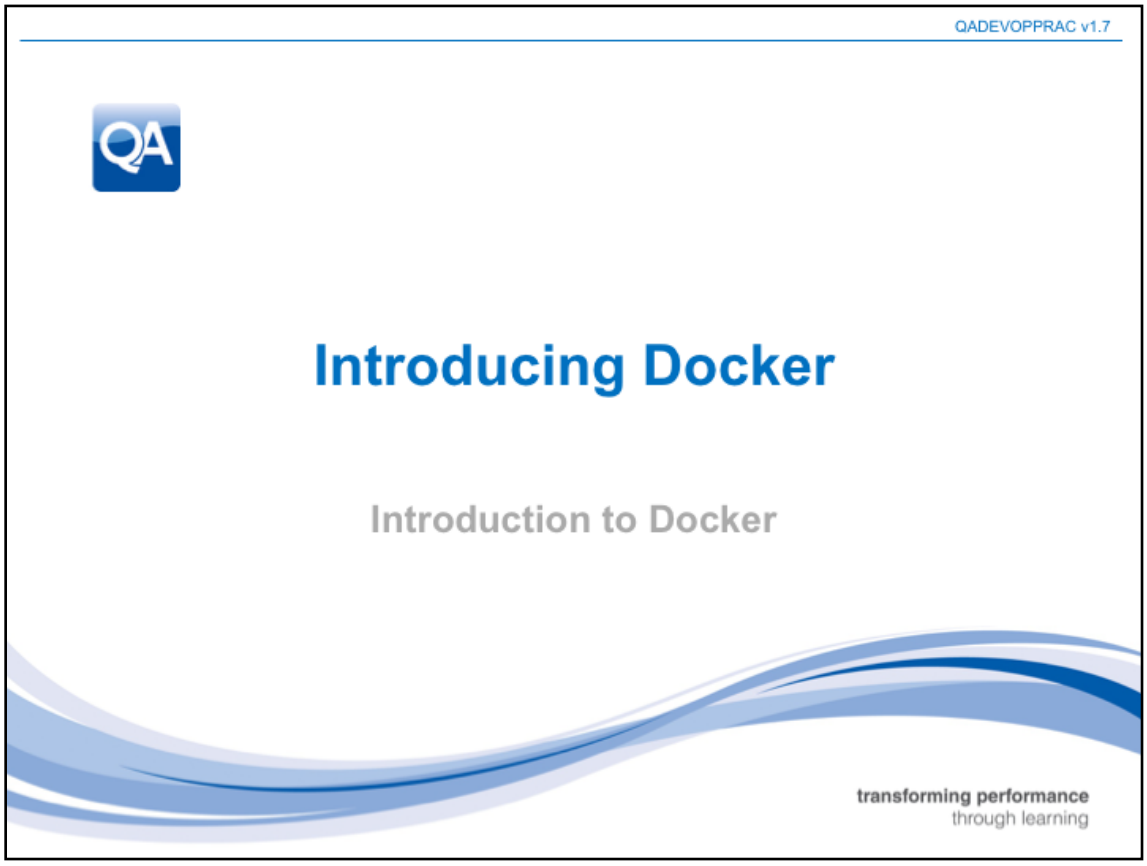
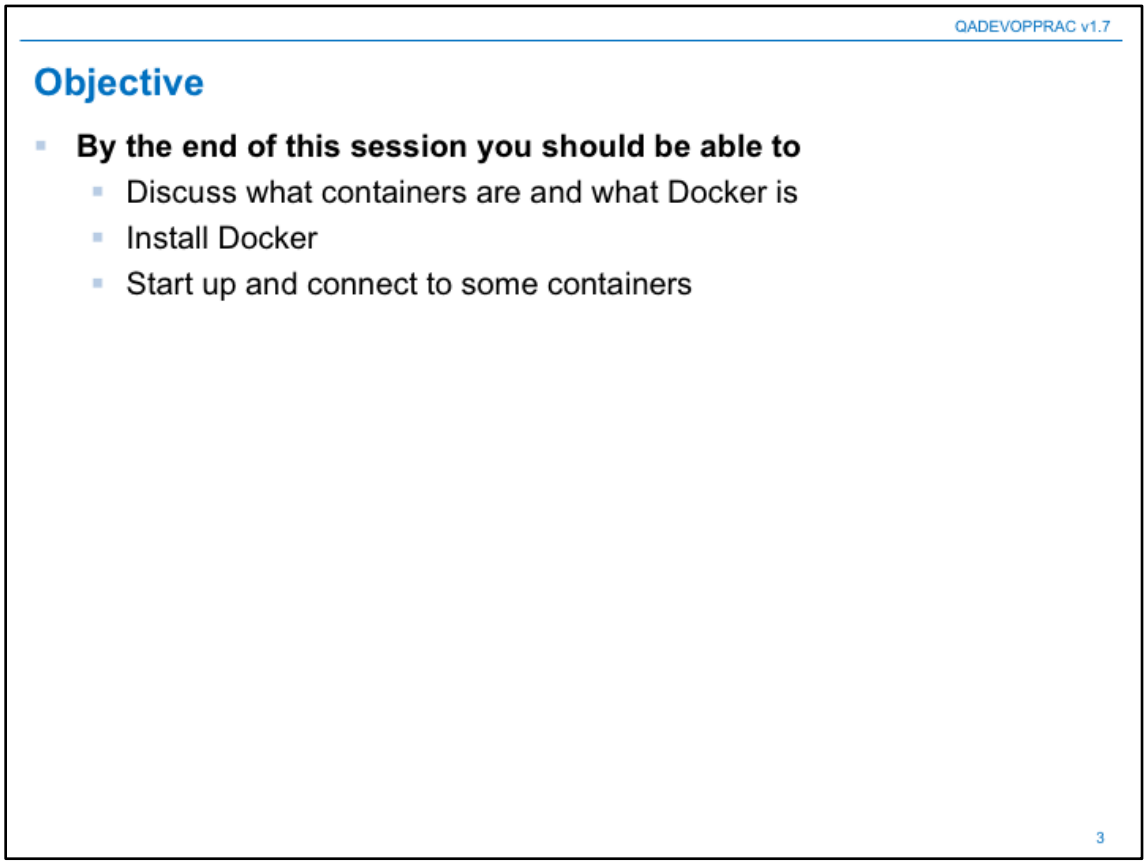


http://neyto.blogspot.co.uk/?view=magazine – summary for docker commands

Outline

- **Containerisation**
  - What is containerisation
  - What are its advantages
  - Different options
- **Introducing Docker**
  - How does Docker work
  - Advantages to Docker
- **Using Docker**
  - Install
  - Start a new container
  - Stop a container
  - Connect to the terminal
  - Logs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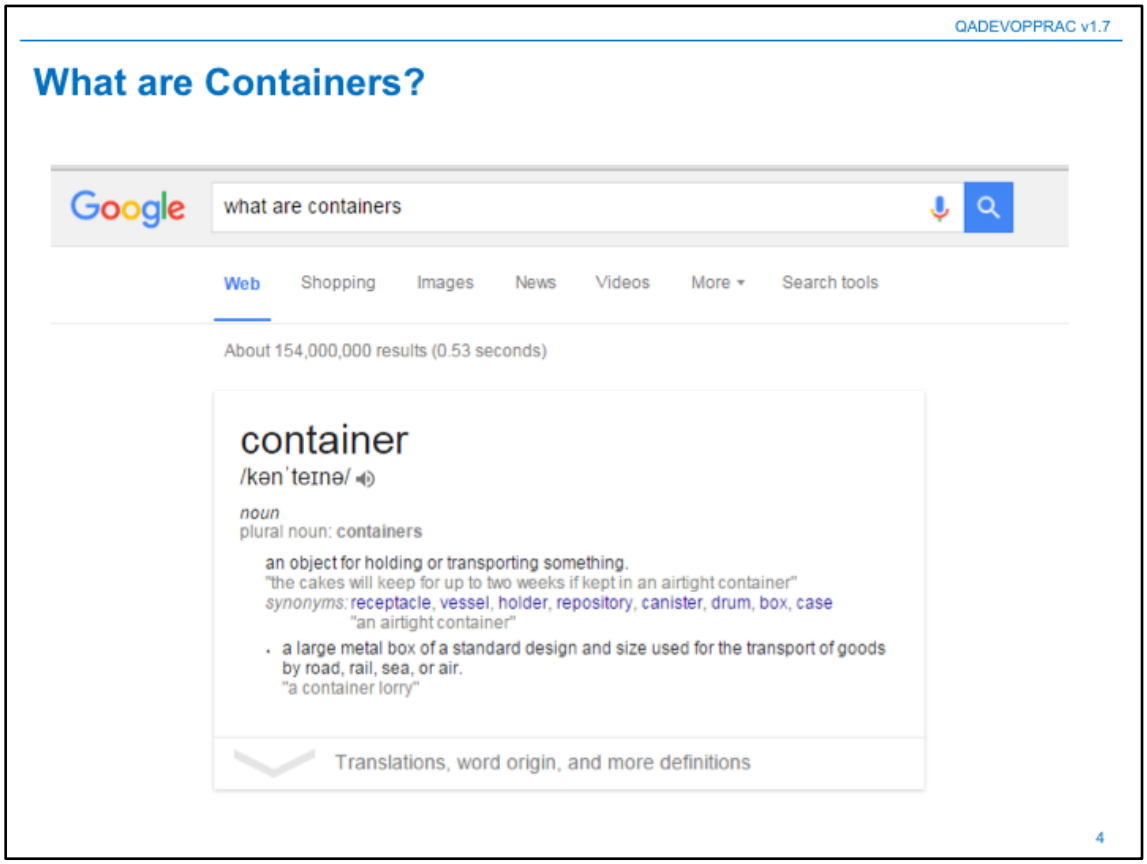
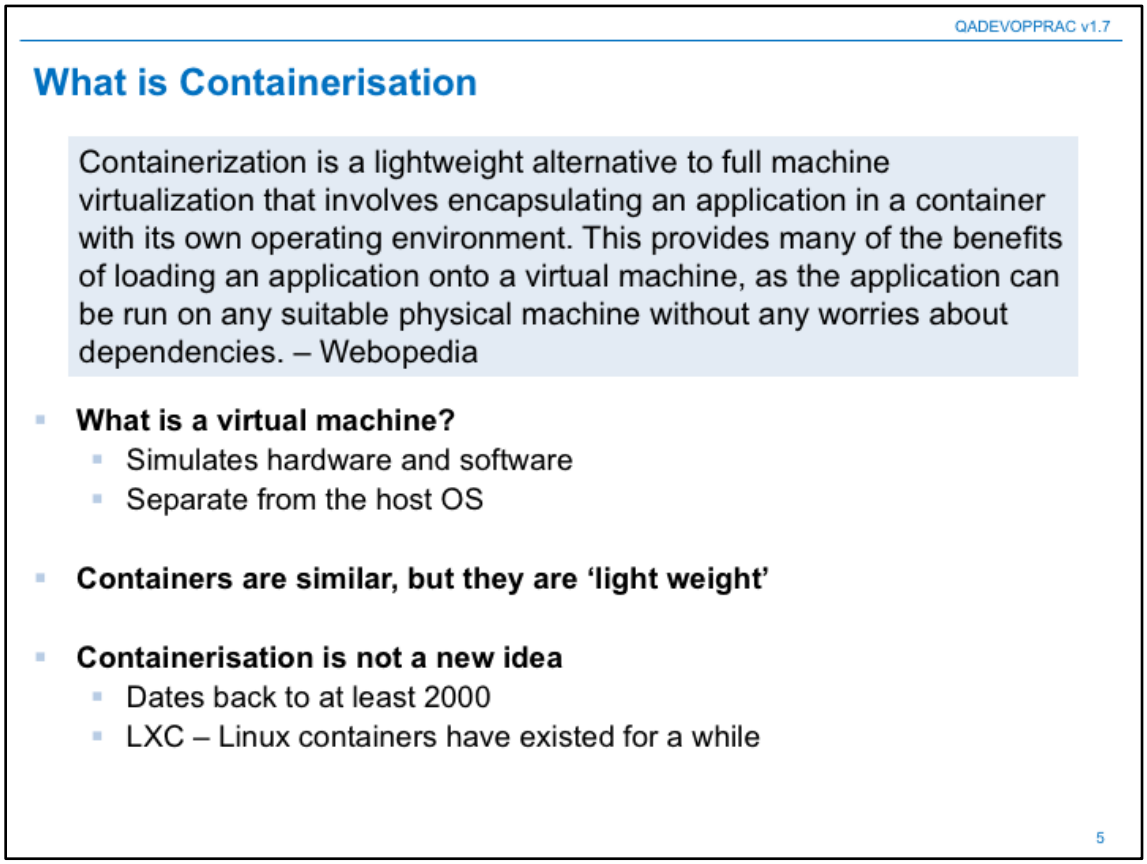
Objective
By the end of this session you should be able to
Discuss what containers are and what Docker is
Install Docker
Start up and connect to some containers
3

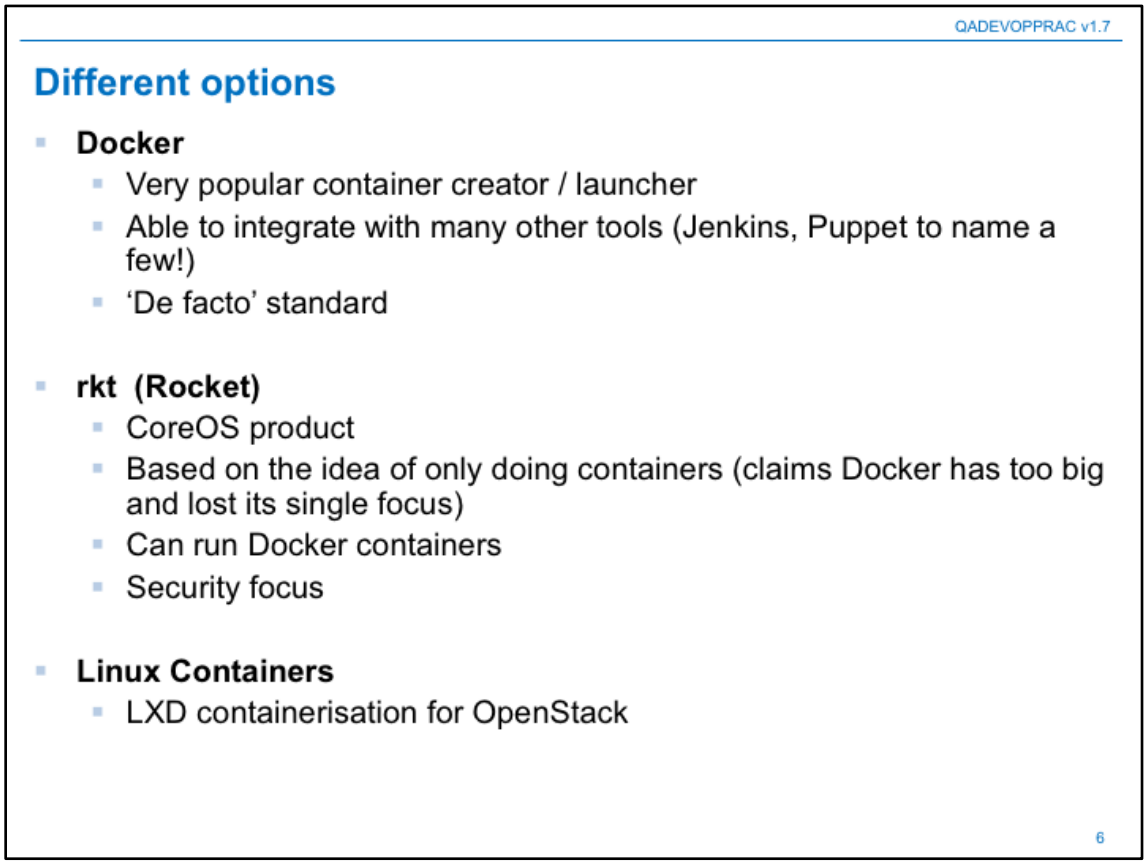


It does not matter what is in the container, the container is always the same size and shape

It does not matter what is in the container - loading and unloading process is the same



http://www.webopedia.com/TERM/C/containerization.html - Link accessed 16/6/2015



Docker is not only one option for the containerization (there are some different options):

Docker is popular because of the linux containers. It was done many years ago as apart of Linux OS

Docker has taken this idea and gived nice front end. And it giver ability to integrate with many tools out there.

It becomes 'de facto" standard in the world

Main alternative is Rocket:

It the CoreOS project

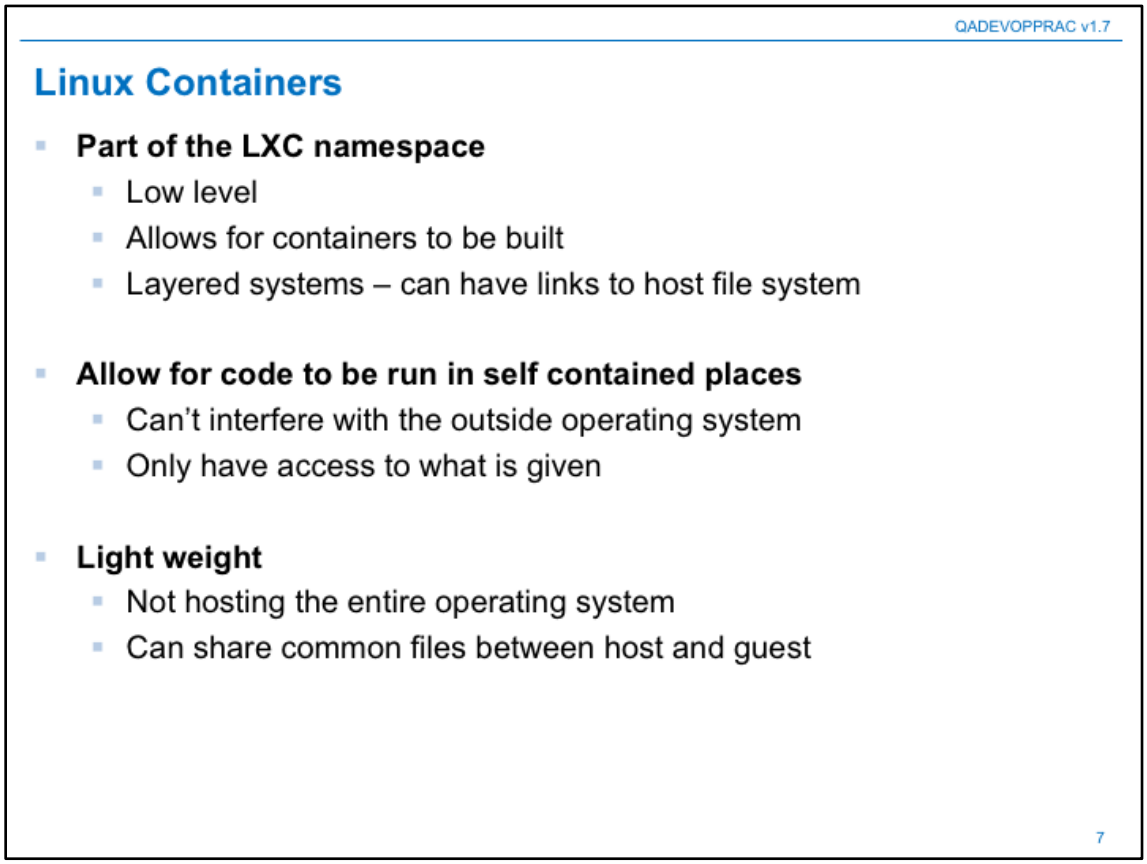
Based on the idea of only doing containers

It based on the security (base principle)

Its doing only single thing and it dos it very well

Open container initiative has meant that all containerisation engines has sign up to use the same standards.

In the future you will be able to export docker into rocket and vice versa, rocket to windows etc.



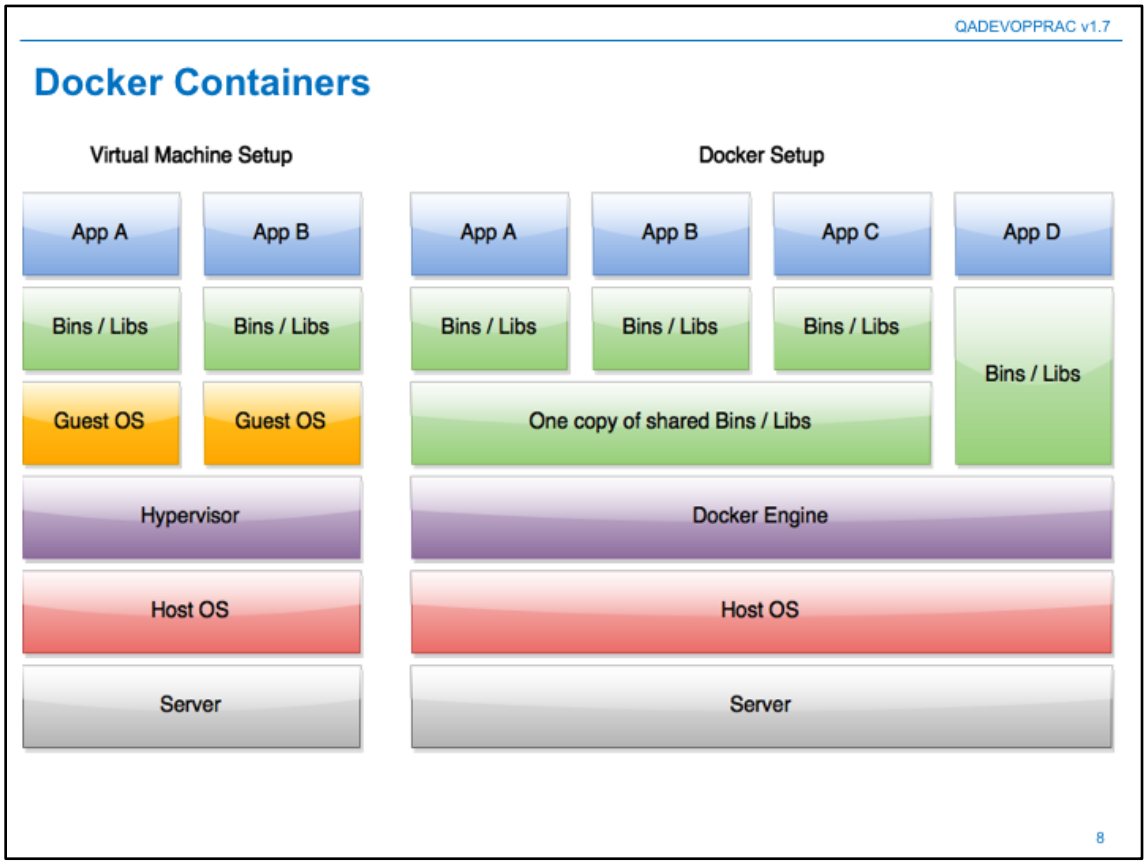
See https://linuxcontainers.org/ for more information

We can run any kind of software, in a self contained environments with its own set of info, own set of resources and it only has access to what ever is given. Your code can cross over something else, it cant to brake it out of this 'jail' what has been given.

Light weight - Its not a virtual machine. On VM you need to simulate your hardware, memory etc.

Containers are only concerned about files. Its all about the file system being changed. Concerns only changes from one file system to the next.

You can share info as long as your file are the same and keep it secure.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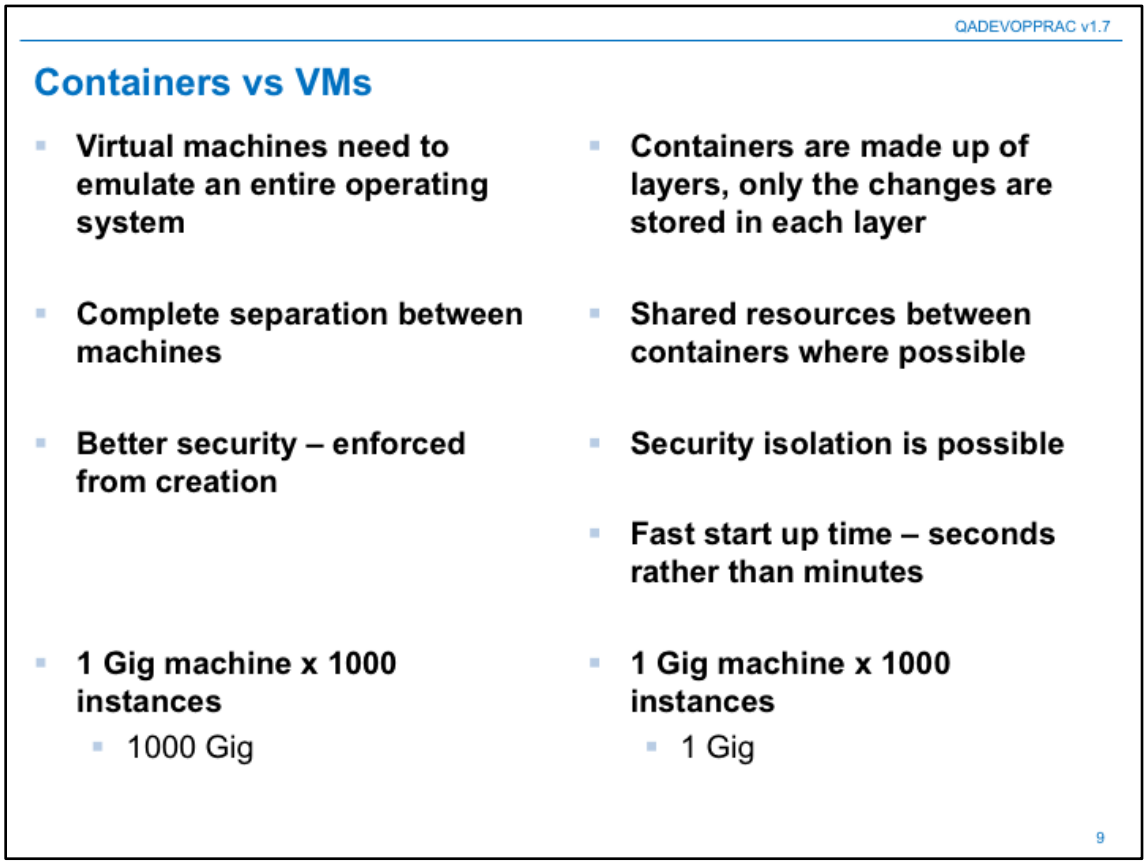
Docker Containers
Virtual Machine Setup
App A
App B
Bins / Libs
Bins / Libs
Guest OS
Guest OS
Hypervisor
Host OS
Server
Docker Setup
App A
App B
App C
App D
Bins / Libs
Bins / Libs
Bins / Libs
Bins / Libs
One copy of shared Bins / Libs
Docker Engine
Host OS
Server
8



http://www.slideshare.net/Flux7Labs/performance-of-docker-vs-vms has some details comparing the numbers between the two systems

Light weight - Its not a virtual machine. On VM you need to simulate your hardware, memory etc.

Containers are only concerned about files. Its all about the file system being changed. Concerns only changes from one file system to the next.

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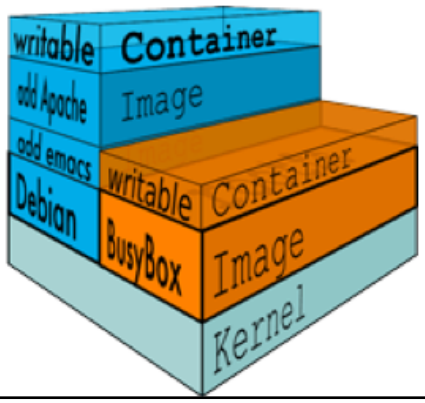
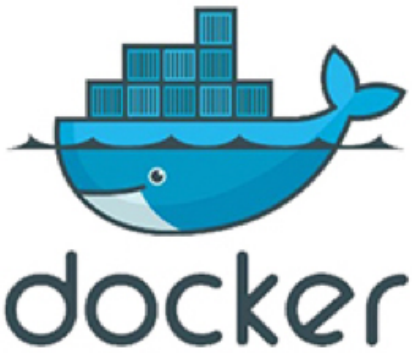
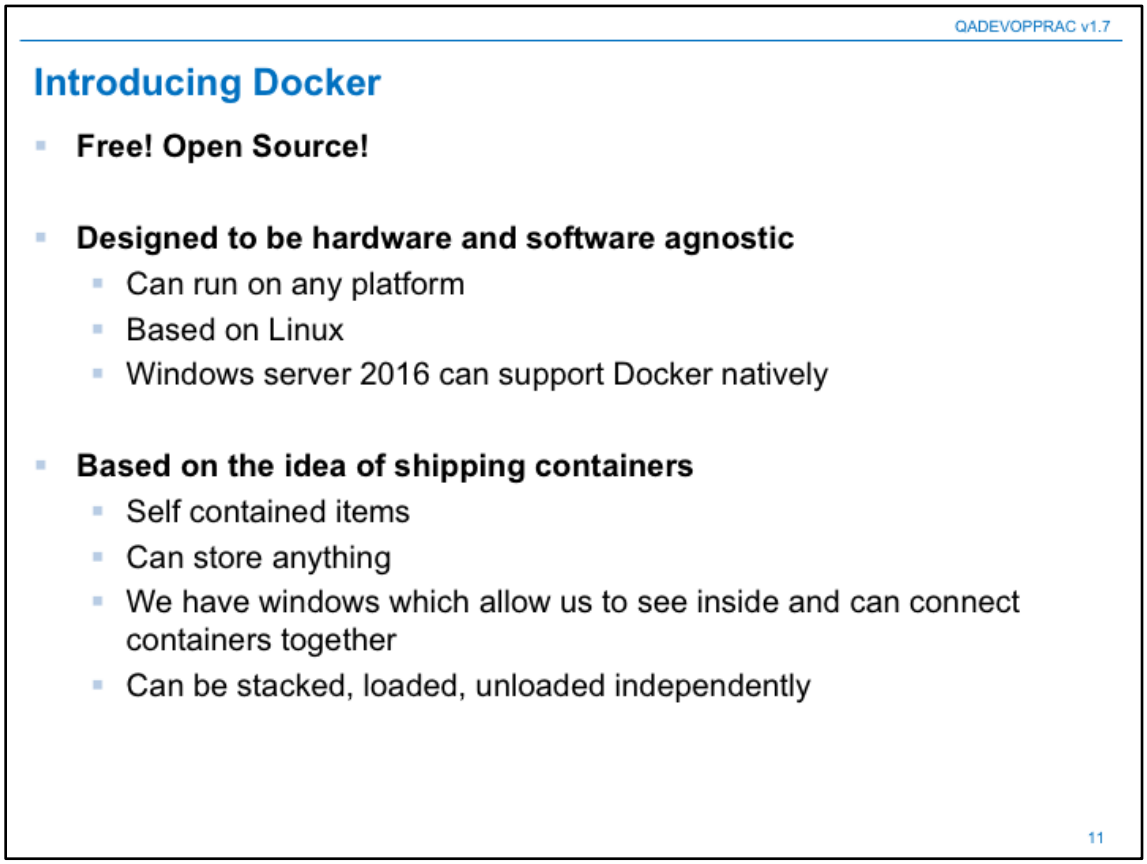
What is Docker?

- **"A person employed in a port to load and unload ships."**
- **"Docker containers wrap up a piece of software in a complete filesystem that contains everything it needs to run: code, runtime, system tools, system libraries – anything you can install on a server. This guarantees that it will always run the same, regardless of the environment it is running in."**





10



http://azure.microsoft.com/blog/2014/10/15/new-windows-server-containers-and-azure-support-for-docker/

Why is it popular

- **Fast to set up and start new containers**
  - Uses caching to avoid repeated steps of compilation / setup
- **Avoids hardware emulation**
  - Less overhead compared to traditional virtual machines
- **Sharing common layers**
  - Docker images are created in layers
  - Two or more applications can share the files from the same layer
  - Only need to separate out the changes made
  - More efficient than hypervisors
- **Standardisation in containers**
  - You can build a docker container on any OS and then still run it on any other OS.

Installing Docker

- **Ubuntu**

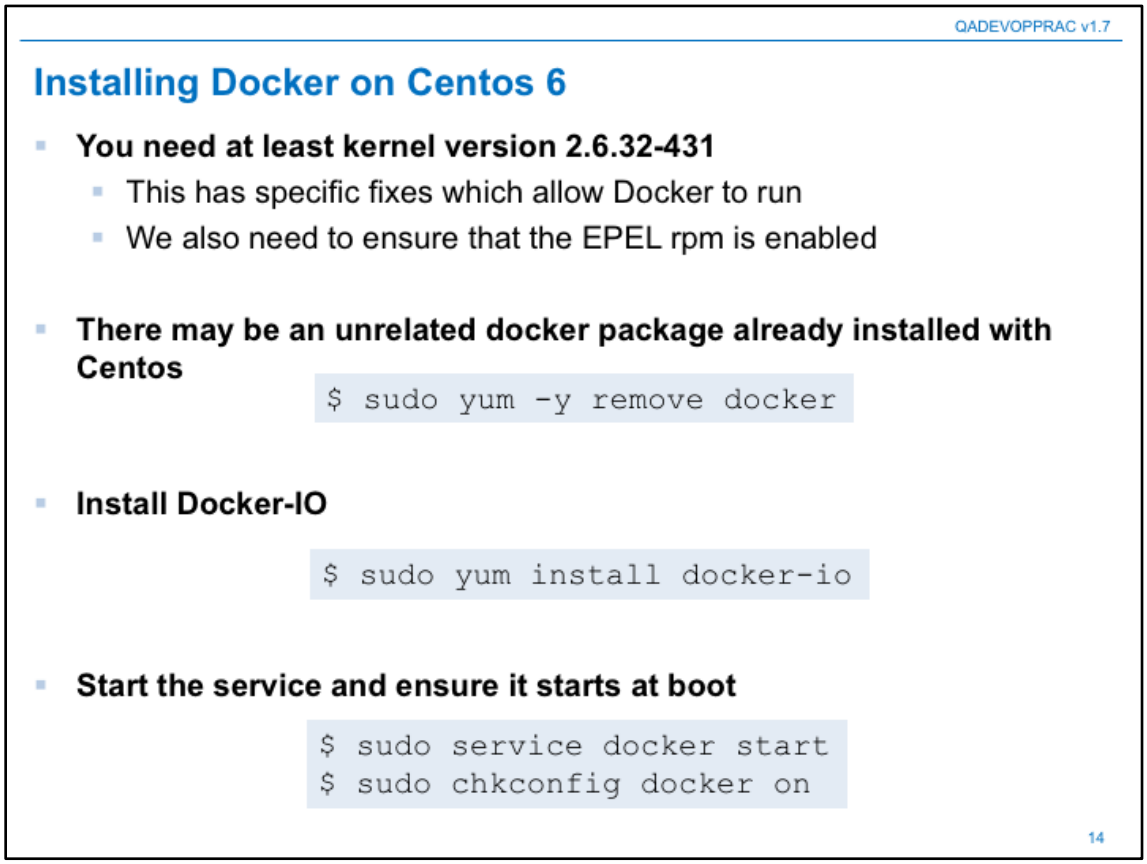
```
$ wget -qO- https://get.docker.com/ | sh
```

- **Centos 7 & the Amazon Linux AMI**

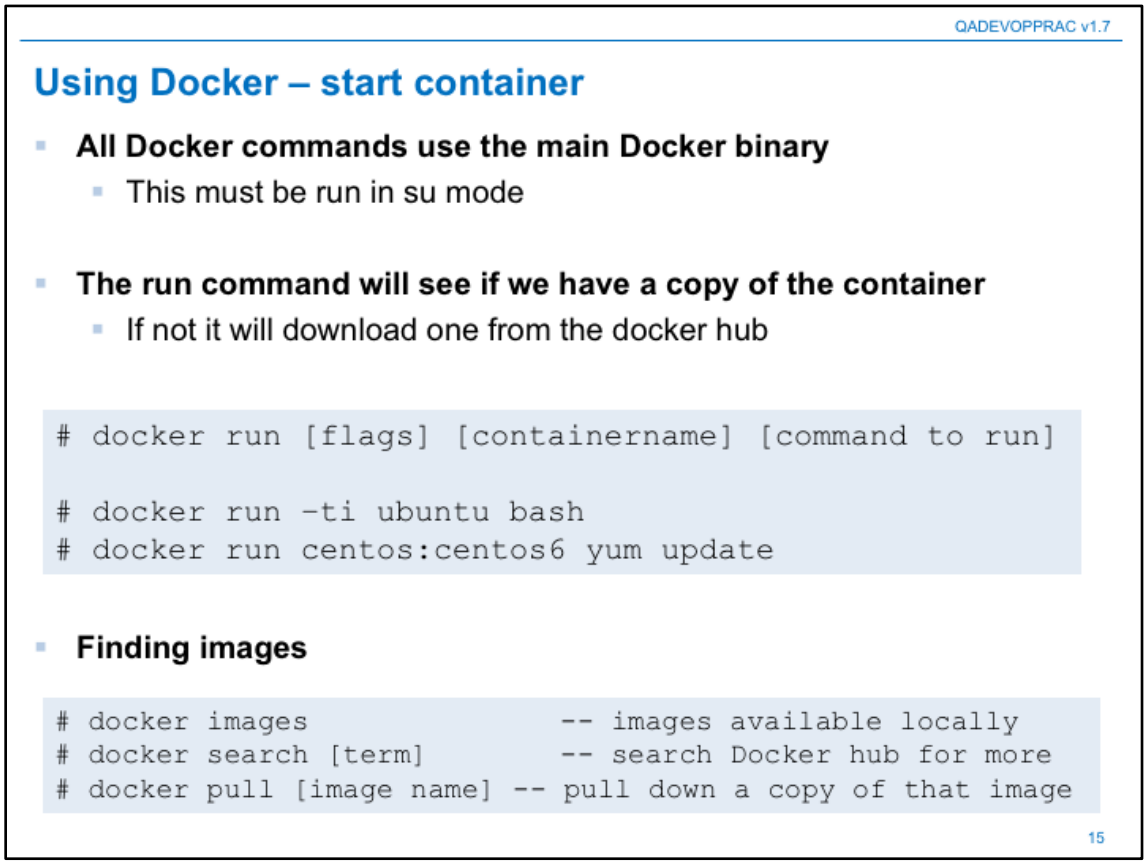
```
$ sudo yum install -y docker
```

- **Docker installs as a service so we need to remember to start it**

```
$ sudo service docker start
```



On Centos 7 we can just install “Docker” this also works on the Linux AMI in EC2

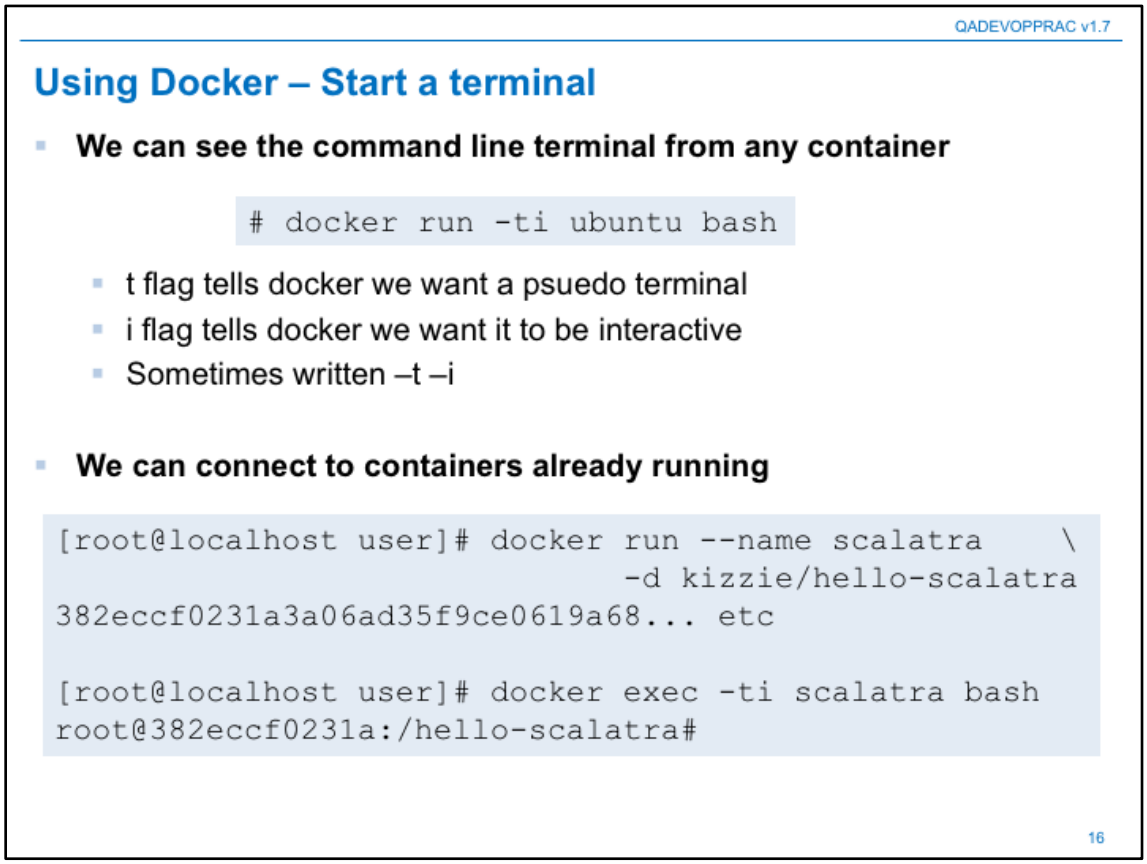


Add docker to maven

http://www.alexecollins.com/docker-maven-plugin/

Interracting with running container:

1. Docker attach containerID – drops into the foreground of container but there is no way to go out (ctrl + c only) and it shuts down
2. Docker exec -it containerID command_bash – executes command_bash as a thread inside the container (-I – interactive; -t – sudo terminal); to EXIT is 'exit'
3. Docker logs containerID – shows the outputs of the container



docker run –d –p 80:8080 jenkins

run the container

-d – runs as detached process in the background (reather then foreground without –d)

-p map port

port of the host machine : port of inside the container (internally)

jenkins program is running

docker pd – shpws this immage as running

docker run –d –p 80:8080 –name team1 jenkins - gives team1 name instead of random setted

The training repositories are used by Docker's own tutorial set

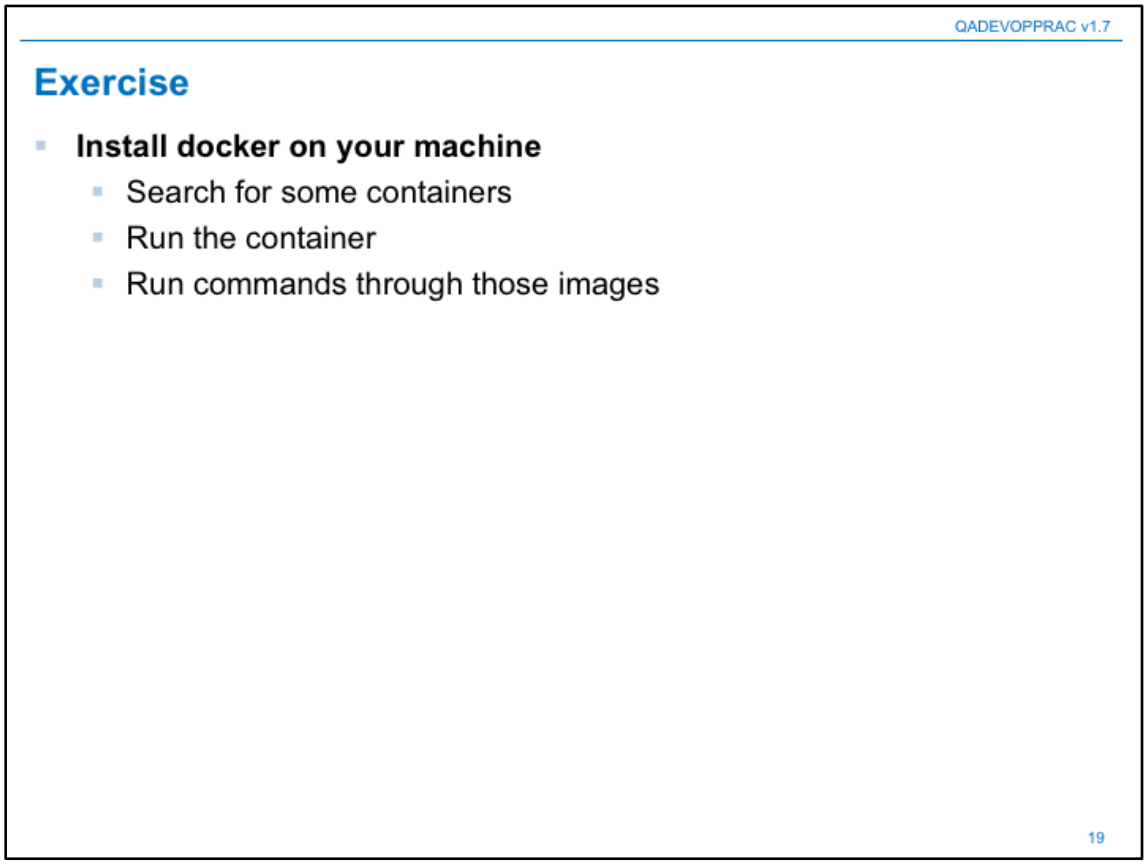
`docker ps – shows currently running containers (docker ps -a – shows all existing containers)`

`Docker search jenkins – searches for the images in dockerHub`

Using Docker - Logs

- **The Docker Logs command can be used to debug containers**
  - Shows what is being generated and displayed by the terminal
  - -f flag tells it to stay alive and update
  - This is often better than having a bash terminal alive as you can accidently close down the container

```
# docker logs [flags] [name]
# docker logs scalatra
```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Exercise
Install docker on your machine
Search for some containers
Run the container
Run commands through those images
19

To read more about Docker

Books:

- Mastering Docker - Second Edition (2017. link: https://www.safaribooksonline.com/library/view/mastering-docker-/9781787280243/)
- Docker Orchestration (2017. link: https://www.safaribooksonline.com/library/view/docker-orchestration/9781787122123/)

Tutorials:

- https://docker-curriculum.com/
- https://www.tutorialspoint.com/docker/

Video:

- https://www.youtube.com/watch?v=pGYAg7TMmp0

Summary

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