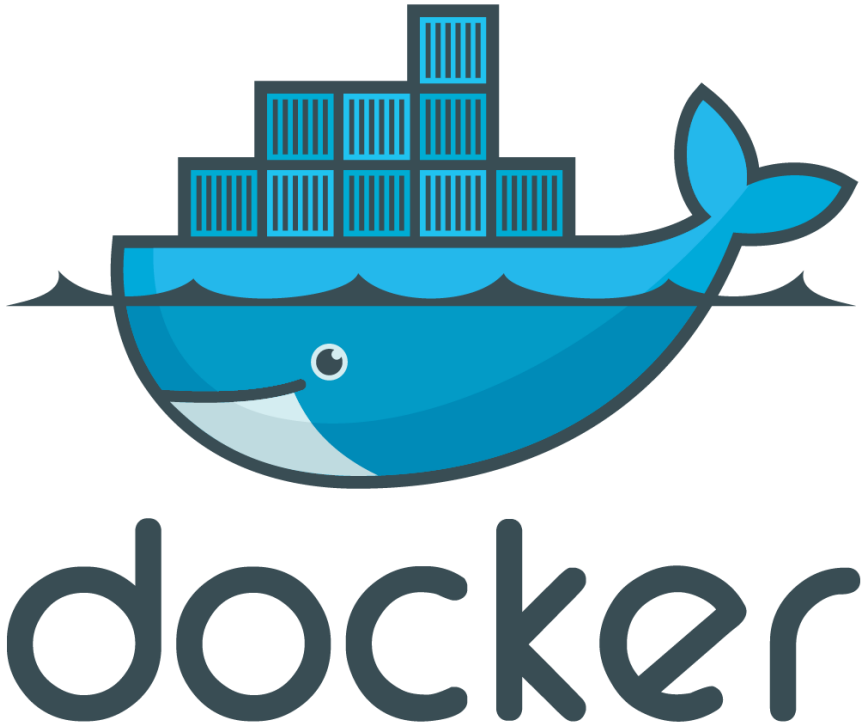

Introduction to Containers

SQL Server On Linux and Docker

PASS SQLSATURDAY SLOVENIA | 08 DEC 2018

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- Worked with SQL Server since 2001
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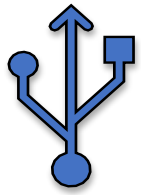
Agenda

- Session Aim
- What are containers?
- Containers vs Virtual Machines
- Images
- Docker Hub (mention)
- Getting Setup
- Volumes
- Dockerfile
- Multi-Container Applications

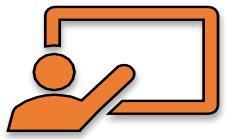
Not on the Agenda

- Docker-Machine
- Orchestration
  - Docker-Swarm
  - Kubernetes
- Containers / Orchestration in the Cloud
  - AWS Elastic Container Service (ECS)
  - Azure Container / Kubernetes Service (AKS)
- Networking and Linking

Session Aim



High(ish) level insight into containers and what you can do with them



Learn by example

- Demo's
- My Mistakes

Enough of a taste to get the container bug and start experimenting!

Well, it worked on my machine!

The Problem

Developers?

https://cdn.geekwire.com/wp-content/uploads/2012/02/nerd-bigstock_Extreme_Computer_Nerd_1520708.jpg

The Real Problem

- Adapting to changing markets
  - Mistakes under pressure
- Environmental:
  - Code
  - Tools
  - System libraries
  - Settings
  - Security

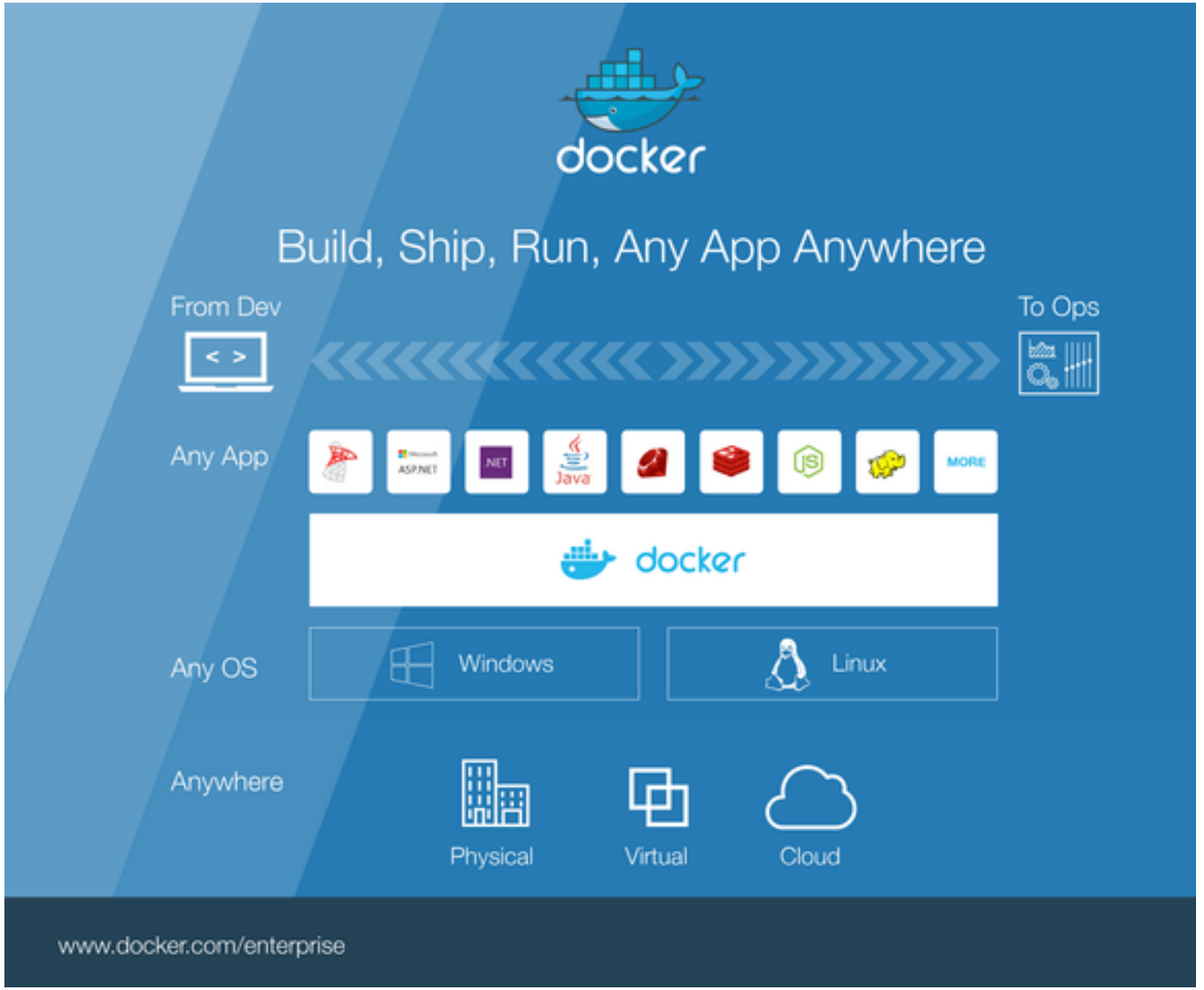
What are Containers

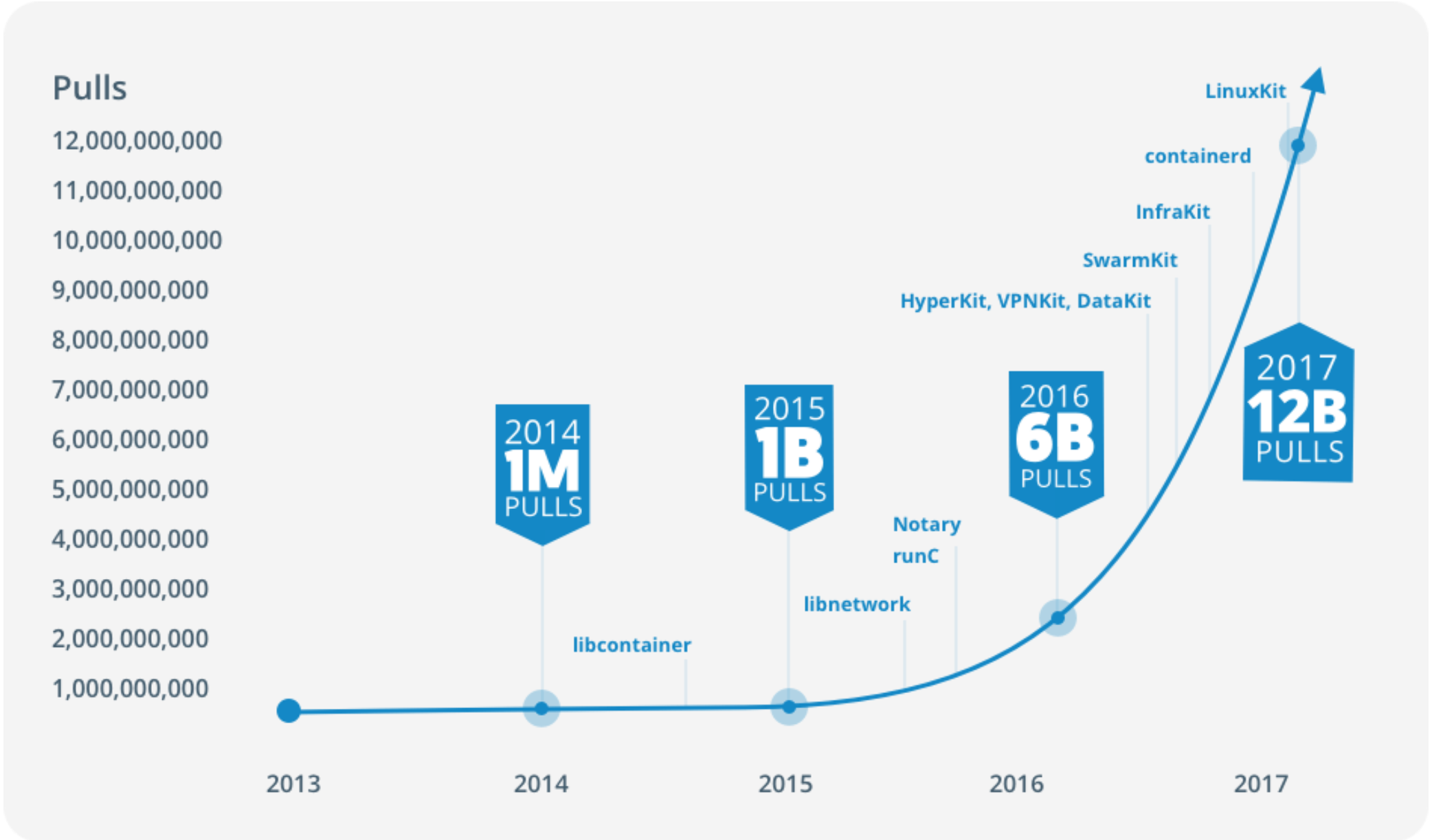
- Next evolution in virtualisation
- Lightweight, stand alone, executable package of a piece of software
  - Separation of applications or services on the same container host
  - Isolated, resource controlled, and portable operating environment
  - Containerized software will always run the same, regardless of the environment
- Enables true independence between applications / infrastructure / developers / IT ops

"Basically, a container is an isolated place where an application can run without affecting the rest of the system, and without the system affecting the application."

https://docs.microsoft.com/en-us/virtualization/windowscontainers/quick-start/

What is Docker?





https://www.docker.com/what-container

Container Terminology – The Basics

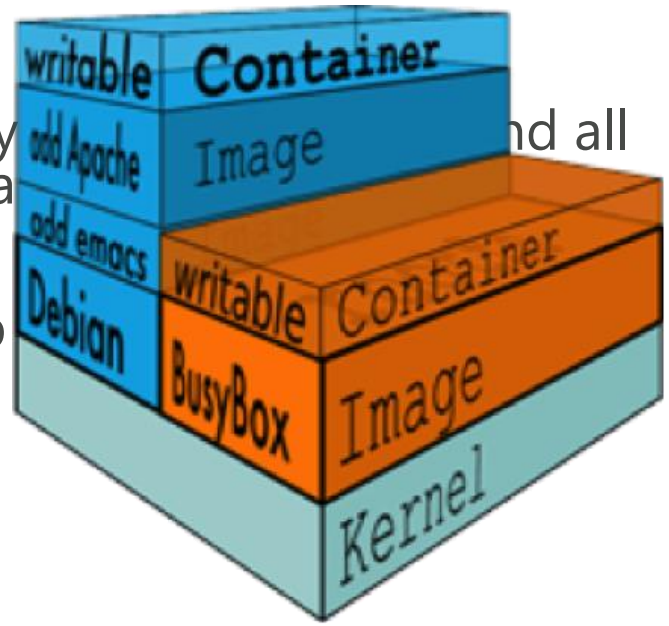
Container Host

Physical or Virtual computer system configured with the Windows Container feature.

Container Image

Containers are deployed from images.

Union of layered filesystems, contains the base operating sy nd all application dependencies needed to quickly deploy a conta



Container OS Image

OS image is the first layer in potentially many that make up provides the operating system environment.

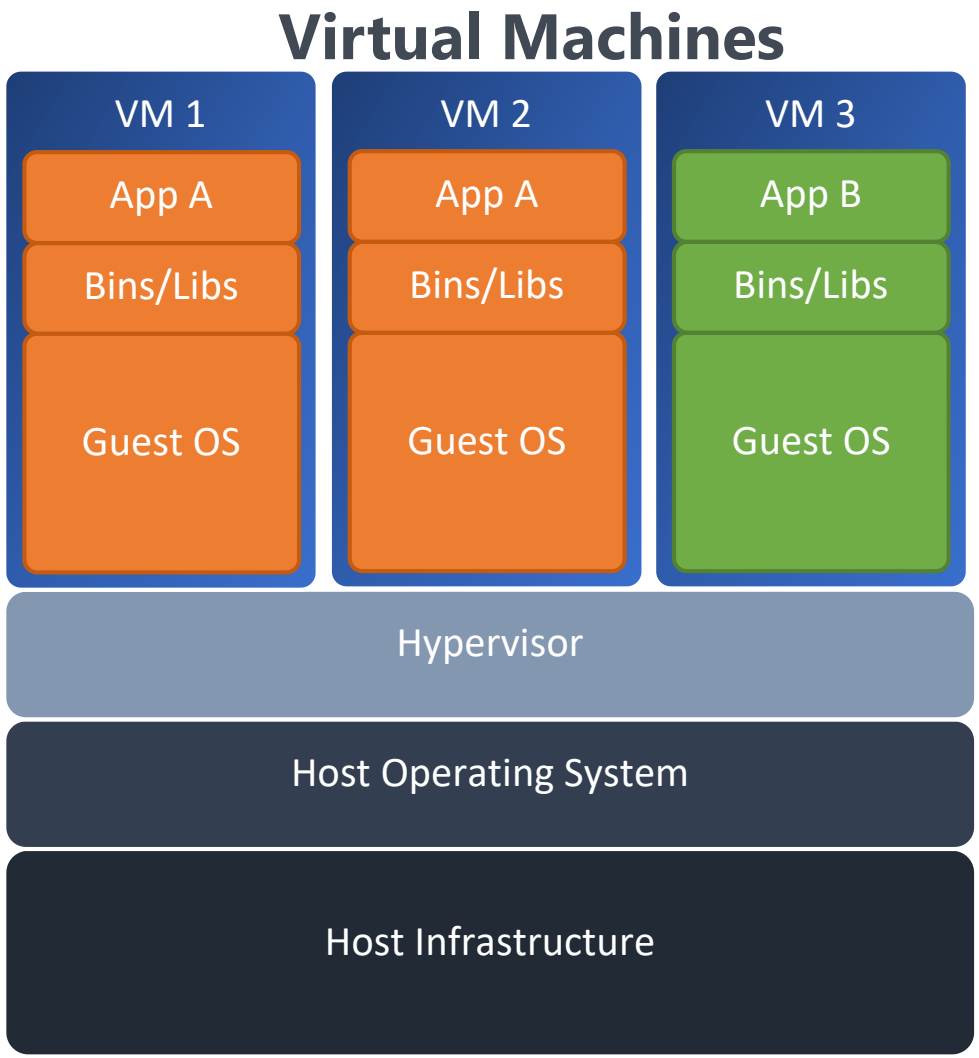
Container Registry

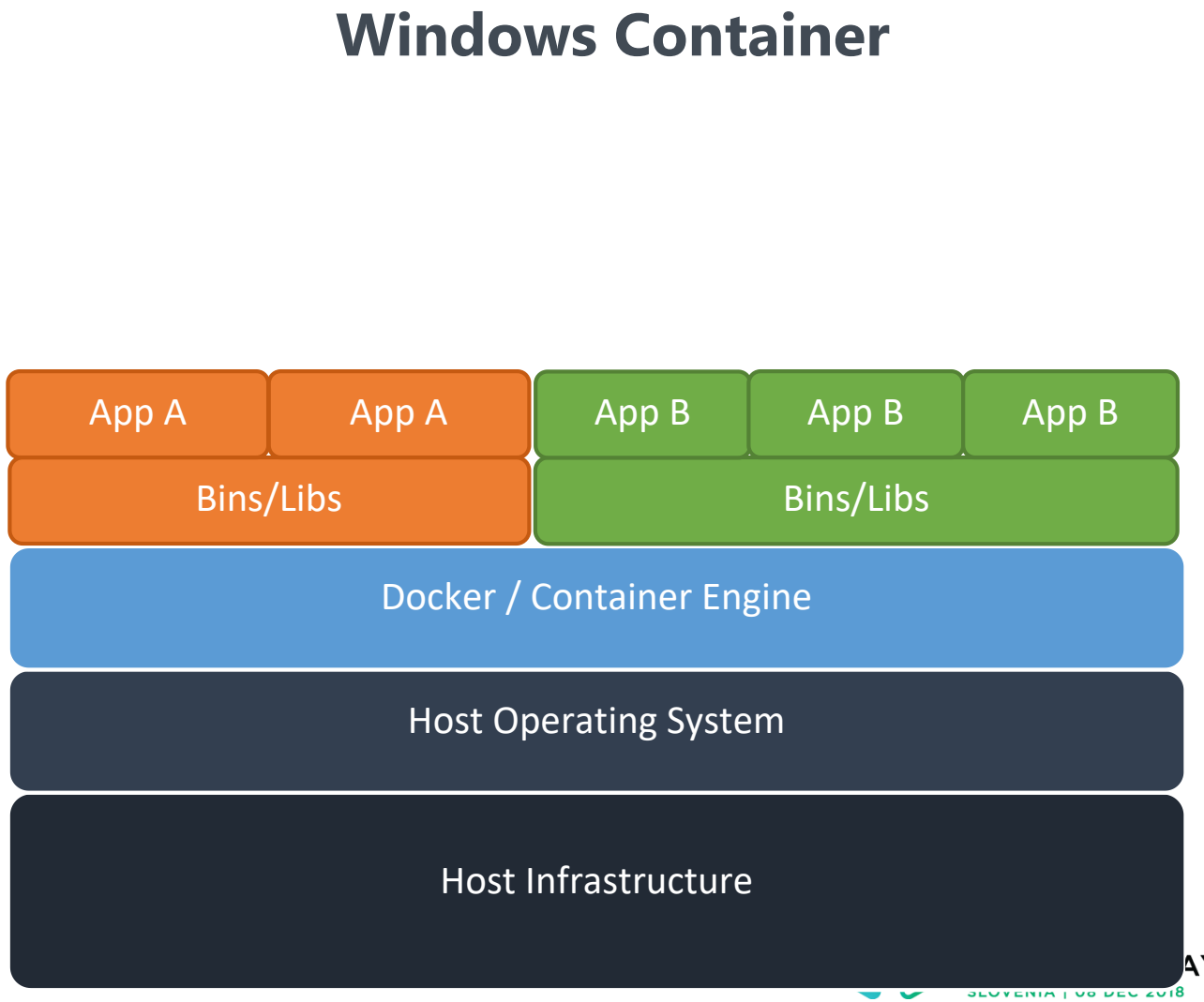
A hosted service containing repositories (set) of images.

Dockerfile

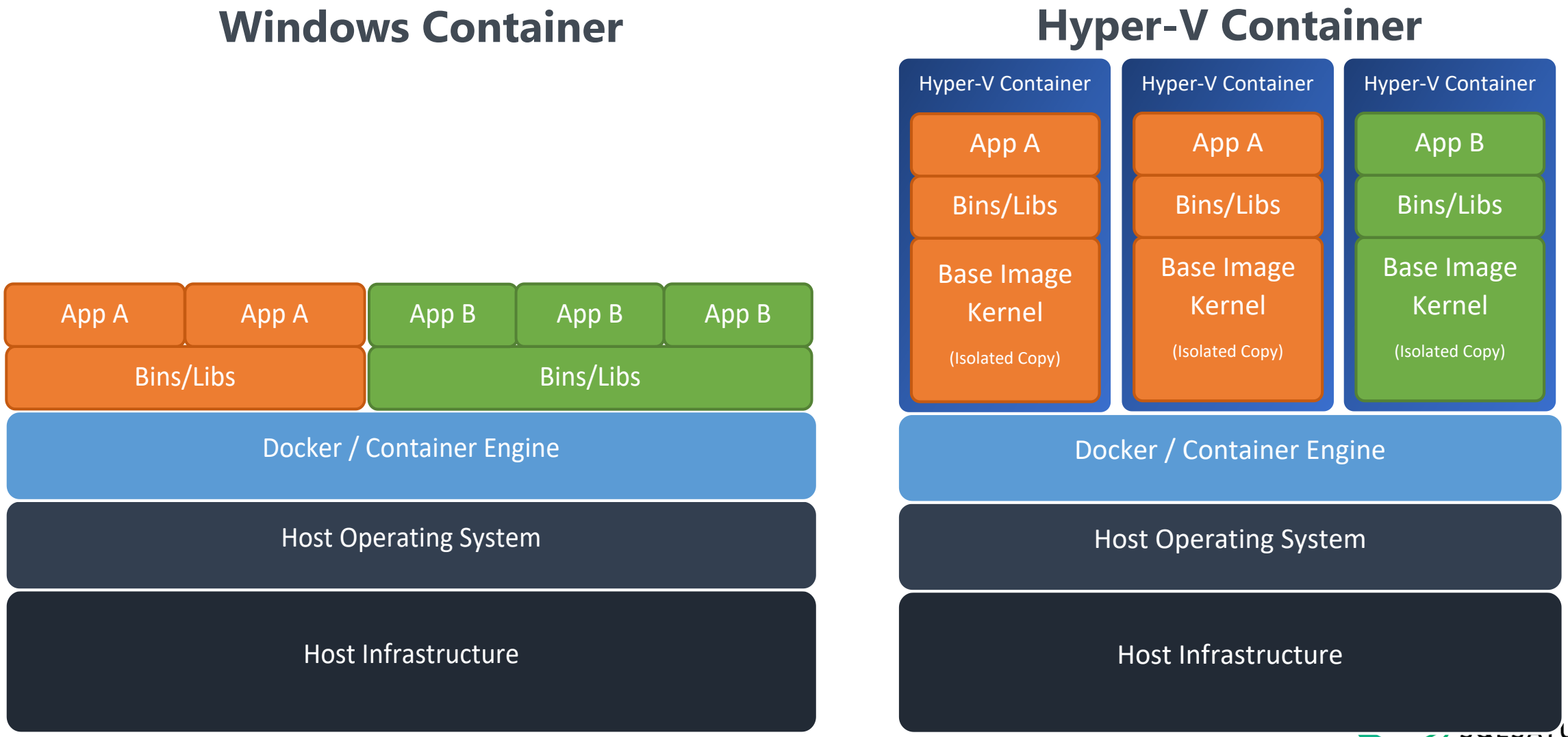
Dockerfile's are used to automate the creation of container images.

Virtual Machine vs Windows Container

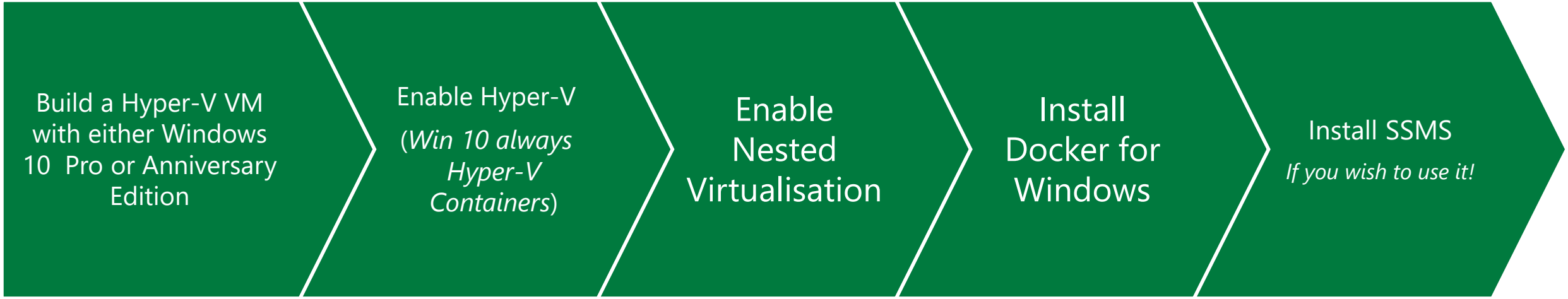




Windows vs Hyper-V Containers



Hyper-V Setup – Windows 10 Pro



SQL on Linux Container DEMO

Conclusion

Good

- Docker provides a facility to quickly provision environments
- Consolidation and Resource savings can be exceptional
  - www.docker.com/roicalculator
- Docker Hub has 10000's of publicly available repositories / images

Not so good

- Storage fiddly / not user friendly
- Lack of monitoring via Docker
  - TP tools available – cAdvisor/datadog
- Platform Independency still in its infancy
  - Windows Docker Service

Summary

- Session Aim
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- Images
- Docker Hub (mention)
- Getting Setup
- Volumes
- Dockerfile
- Docker Compose

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Questions?

Links

SQL Server on Linux:

SQLPAL: https://blogs.technet.microsoft.com/dataplatforminsider/2016/12/16/sql-server-on-linux-how-introduction/

Getting Started:

Docker 101: https://www.slideshare.net/Docker/docker-101-nov-2016?next_slideshow=2Docker 101 - Nov 2016

https://www.simple-talk.com/sysadmin/virtualization/working-windows-containers-docker-basics/

Simple Hello World on nanoserver:

https://docs.microsoft.com/en-us/virtualization/windowscontainers/quick-start/quick-start-windows-10

Links

Introduction:

Docker introduction

General:

https://blog.sixeyed.com/windows-containers-and-docker-5-things-you-need-to-know/

Licensing:

https://blog.docker.com/2017/01/docker-windows-server-image2docker/

Installing:

https://mathaywardhill.com/2017/04/12/installing-sql-server-vnext-on-linux-using-docker-on-windows-10/

SQL On Linux:

https://docs.microsoft.com/en-us/sql/linux/sql-server-linux-setup-docker

https://roadtoalm.com/2017/01/06/running-a-linux-sql-server-in-a-docker-container/

Connecting to SQL via sqlcmd:

http://searchsqlserver.techtarget.com/tip/Use-these-commands-to-deploy-SQL-Server-Docker-containers

Links

Nested Virtualisation (for VMs):

https://www.youtube.com/watch?v=ycCK1EyJG6Y (nested virtualisation)

Windocks:

https://www.windocks.com/blog-2/Windows-Containers-at-Work

Performance:

https://sabin.io/blog/sql-server-container-performance/

https://facility9.com/2017/01/how-do-i-update-my-sql-server-docker-container/

Error pushing image (add collaborators):

http://stackoverflow.com/questions/41984399/denied-requested-access-to-the-resource-is-denied-docker/42403423

Terminology:

http://itproguru.com/expert/2016/10/docker-create-container-change-container-save-as-new-image-and-connect-to-container/

Volumes:

http://paper.li/e-1483951345?read=http%3A%2F%2Fthedatafarm.com%2Fdata-access%2Fmashup-sql-server-on-linux-in-docker-on-a-mac-with-visual-studio-code%2F

http://www.tricksofthetrades.net/2016/03/14/docker-data-volumes/

https://www.richard-banks.org/2017/03/connecting-to-sql-on-docker.html

Links

Hyper-V containers:

- https://www.simple-talk.com/sysadmin/virtualization/working-windows-containers-docker-stride/?utm_source=simpletalk&utm_medium=pubemail&utm_content=20170512-slota2&utm_term=simpletalkmain
- https://hyper-v.nu/archives/hvredevoort/2015/05/nested-hypervisor-in-windows-server-vnext/
- https://blogs.technet.microsoft.com/uktechnet/2016/01/11/windows-containers-what-they-are-and-how-they-work/
- Windows Server and Docker - The Internals Behind Bringing Docker and Containers to Windows by Taylor Brown and John Starks

Tutorials:

- Docker Container Tutorial #1 Containers vs Images - Focuses on Ubuntu
- Learn Docker in 12 Minutes
- Learn Docker in 20 Minutes