# Containers - You Better Get on Board!

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  - Specialize in system architecture and performance

  - Masters Computer Science

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- **Founding Organizer of EightKB** - www.eightkb.online
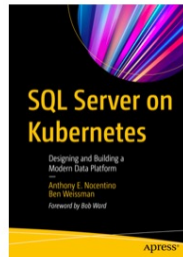
Agenda

- Introducing Containers
- Building and Running Apps in Containers
- The Container Universe
- Hands on with Containers
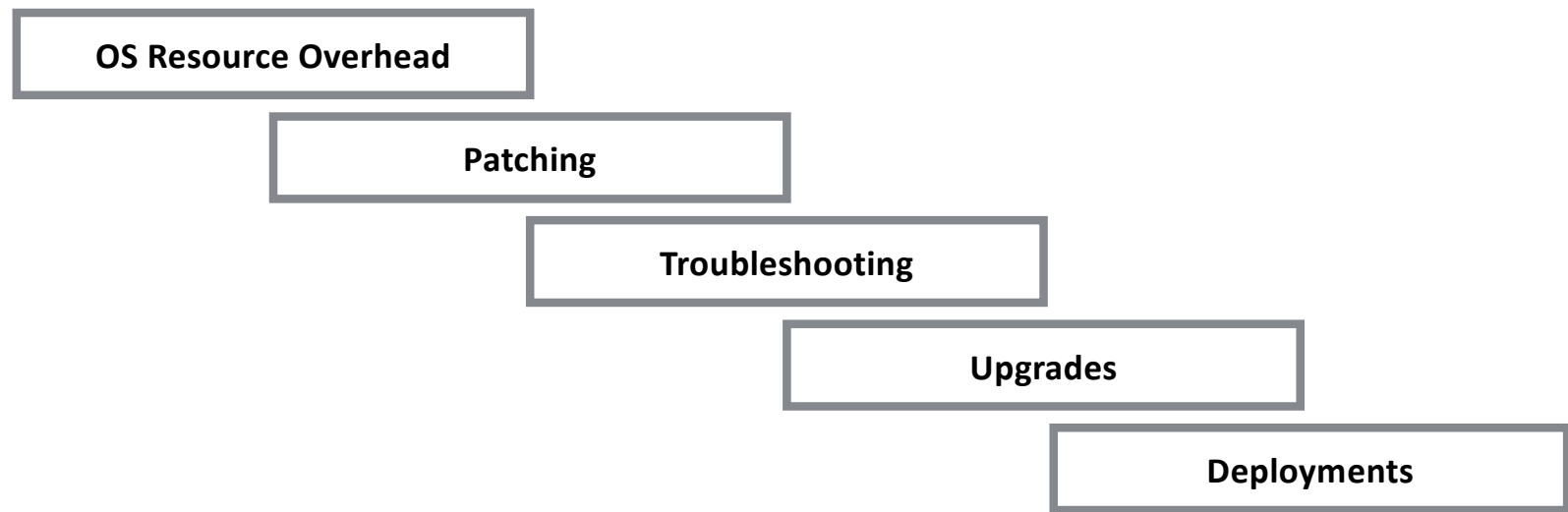- Container Orchestration and Kubernetes

Introducing Containers

- Operating system virtualization
  - Shared kernel and system resources
- Container…contain…
  - Binaries, libraries and file system
- One app inside the container
  - This is the unit of work
- Containers are ephemeral
- Let's start off with a comparison…

| App1 |
| Binaries/Libraries |
| Container |
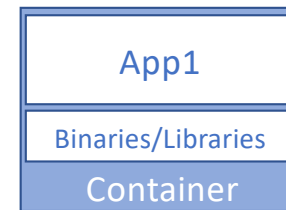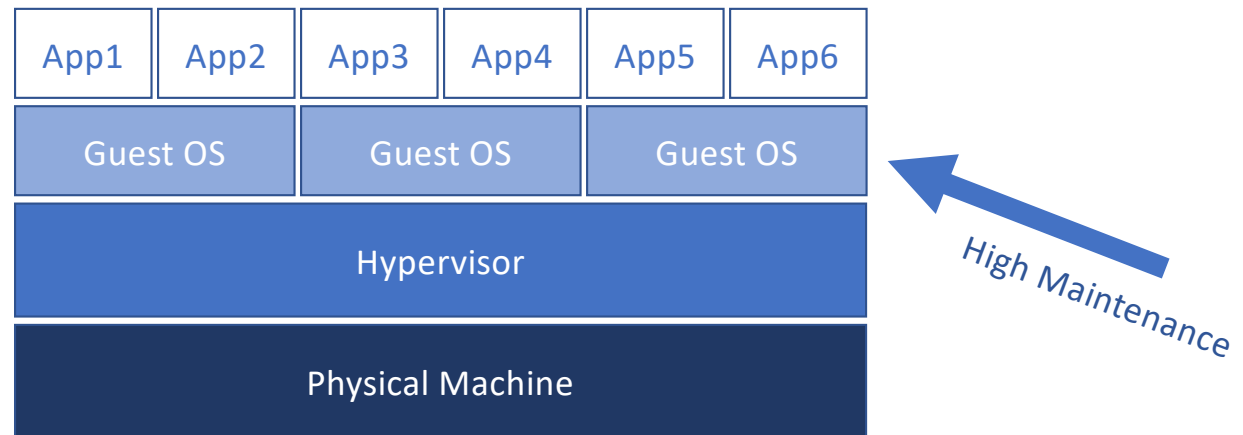
Virtual Machines

What's so Hard About Virtual Machines?

OS Resource Overhead

Patching

Troubleshooting

Upgrades

Deployments

Does any of this move your business forward?

Containers

App1	App2	App3
Binaries/Libraries	Binaries/Libraries	Binaries/Libraries
Container	Container	Container

Host Operating System

Physical or Virtual Machine

Lower Maintenance
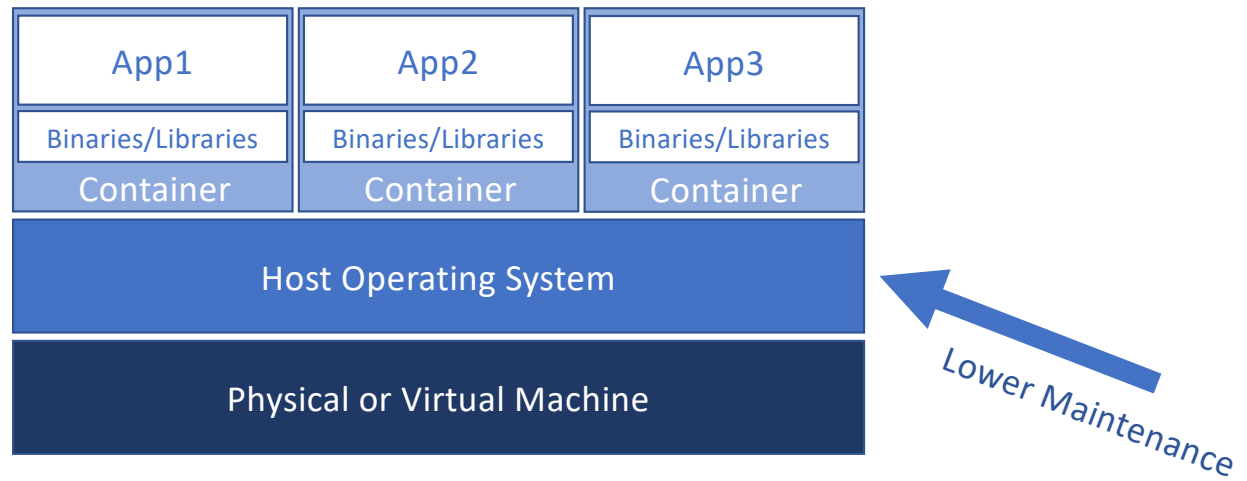
It's all about goin' fast!

What do Containers Bring to the Table?

Fast and Consistent Deployments

Upgrades

Troubleshooting
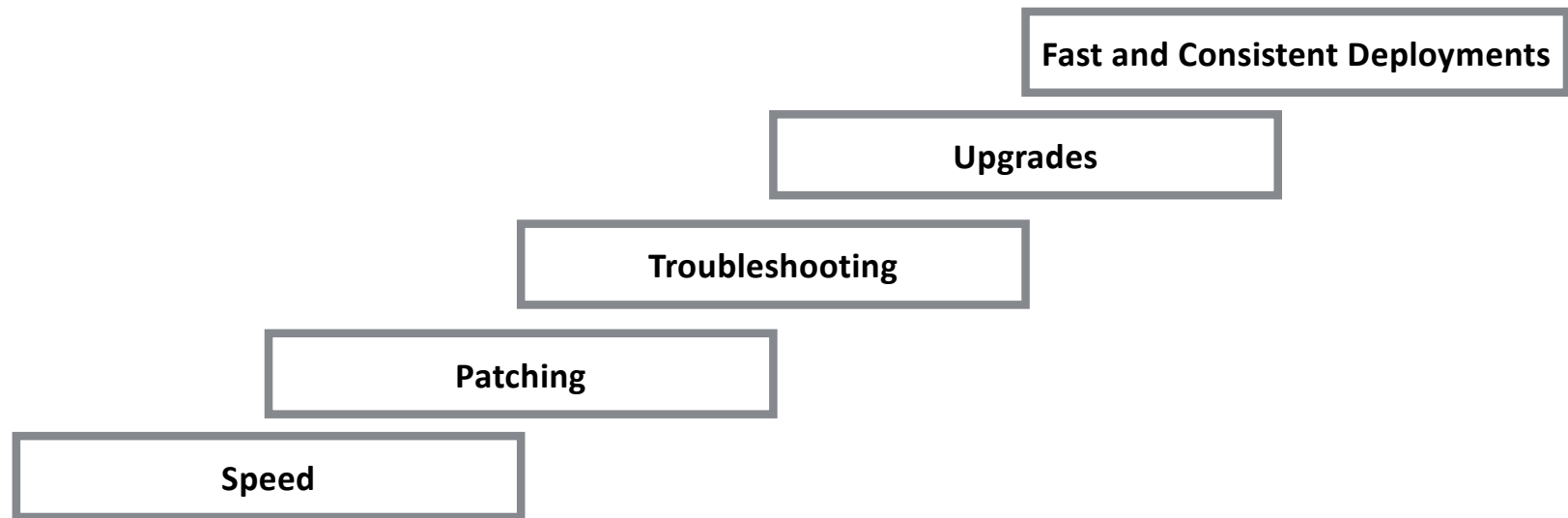
Patching

Speed

Services, we care about getting work done!

Containers

App1	App2	App3
Binaries/Libraries	Binaries/Libraries	Binaries/Libraries
Container	Container	Container

**Host Operating System**

Physical Machine
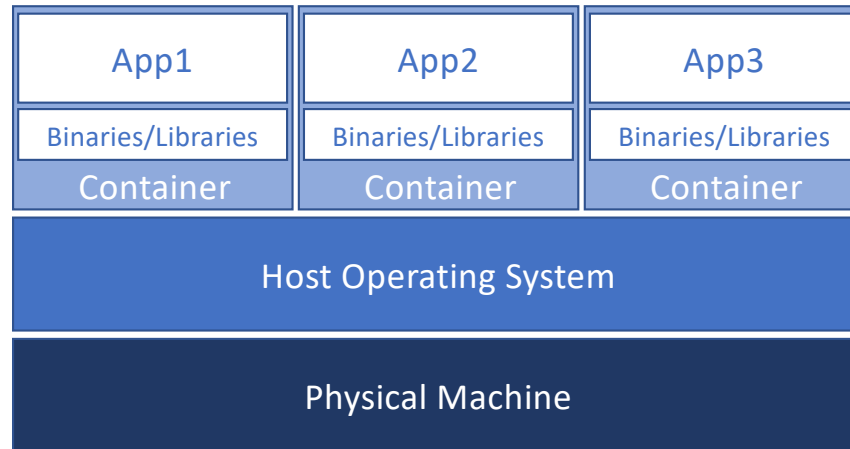
Containerizing Apps and Data Centers

- Reducing development time
- Deployment automation – speed and consistency
- Enables DevOps and CI/CD scenarios
- Orchestration
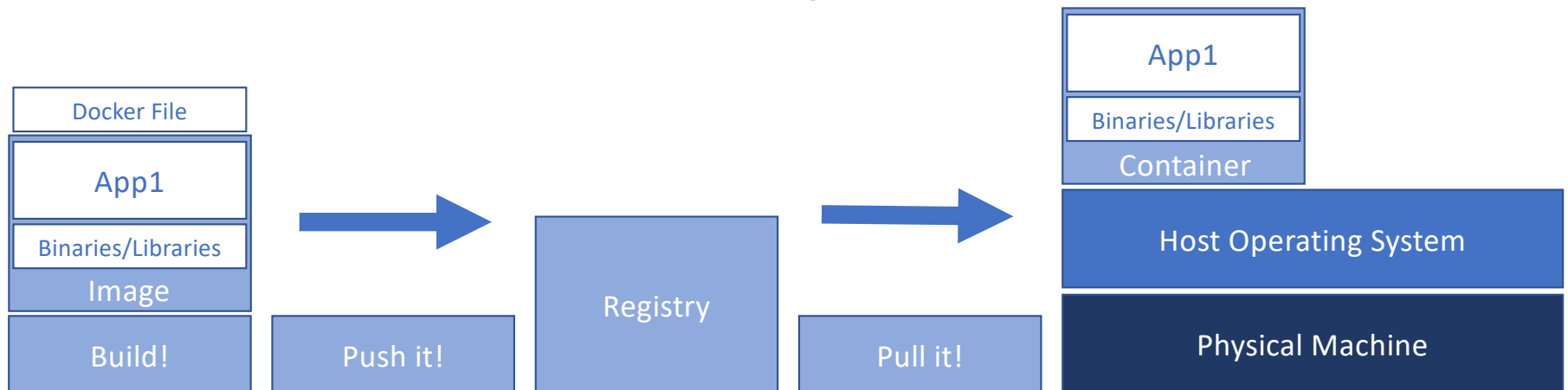- Rethink how you deploy - it's the **service**, not the server

The Container Universe

- Docker
  - Linux
  - Windows
  - Mac
- Docker Inc.
- Other Container Runtimes
  - Containerd
  - CoreOS
  - Podman
  - Windows
  - chroot…chwhat?
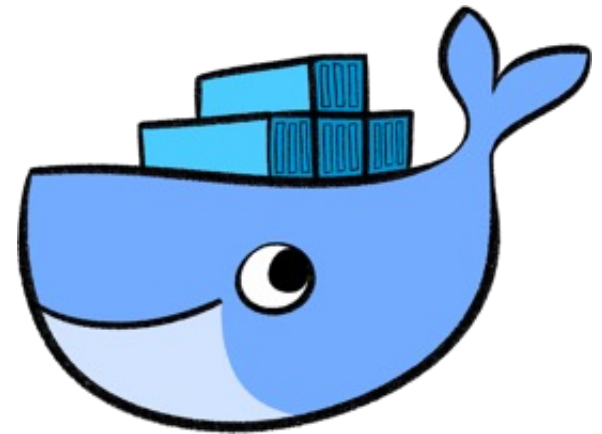
Getting Containers

- **Images** – code, runtimes, libraries, environment variables
- **Registries** – where images live. Docker Hub, Azure Container Registry, internal
- **Docker Files** – defines the container image

Docker File
App1
Binaries/Libraries
Image
Build!

→

Registry
Push it!

→

App1
Binaries/Libraries
Container
Host Operating System
Physical Machine

Pull it!

Demo!

- Pull an Image
- Run a Container
- Access our application
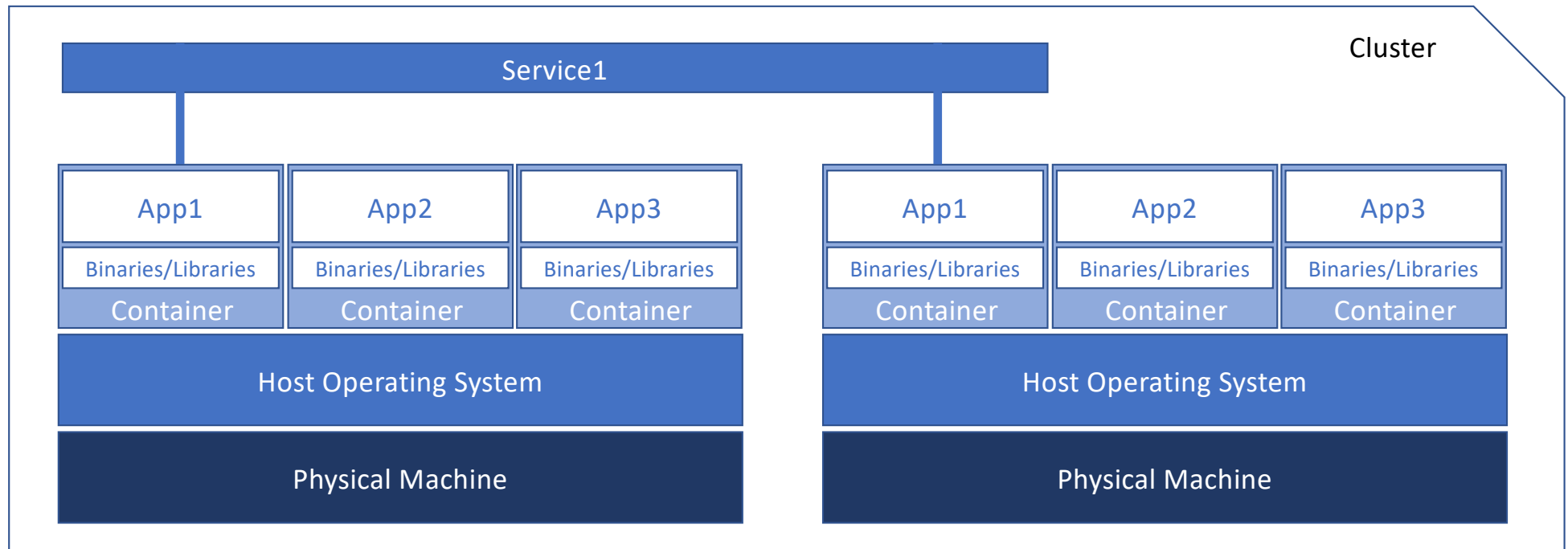
Container Orchestration

- Workload placement
- Managing state, starting things up and keeping things up
- Load balancing for services
- Networking
- Persistent storage
- Declarative model

Container Orchestrators

- Kubernetes
- Red Hat OpenShift
- VMware Tanzu
- Azure Kubernetes Services (AKS)
- Google Kubernetes Engine (GKE)
- Amazon Elastic Container Service for Kubernetes (EKS)

Container Orchestration - Services

Demo!

- Deploying applications in Kubernetes

Review

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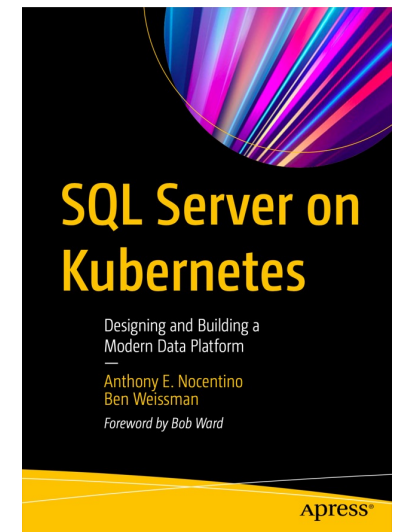- Container Orchestration and Kubernetes

Need more data?

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  - **Book:** SQL Server on Kubernetes

- **Pluralsight**
  - Linux
  - Kubernetes
  - Azure
  - Hit me up to get free access to this content

Resources

- Installing Docker
    - https://docs.docker.com/desktop/windows/install/
    - https://docs.docker.com/engine/install/centos/
- Running Docker
    - https://docs.docker.com/get-started
    - https://docs.docker.com/storage