



PASS
MARATHON

Containers – You Better Get on Board

Anthony Nocentino, Centino Systems
Moderated By: Paresh Motiwala

Technical Assistance



If you require assistance during the session, type your inquiry into the question pane on the right side.



Maximize your screen with the zoom button on the top of the presentation window.



Please fill in the short evaluation following the session. It will appear in your web browser.

Immerse yourself

in the data community

Access deep-dive technical sessions,
learn best practices, and discover
new tips and tricks

Gain the technical skills and
connections to advance
your data career

Attend PASS Summit



PASS Summit is the largest conference for technical professionals who leverage the Microsoft Data Platform.

See everything PASS Summit has to offer at
PASSsummit.com

More info:





Anthony Nocentino

Enterprise Architect, Centino Systems



www.centinosystems.com



[/nocentino](https://www.linkedin.com/in/nocentino)



[@nocentino](https://twitter.com/nocentino)



aen@centinosystems.com

Founder and President of Centino Systems

Specialize in system architecture and performance

Computer Science, M.S. and B.S.

Microsoft MVP – Data Platform – 2017-2019

Friend of Redgate – 2015-2018

Linux Foundation Certified Engineer

Microsoft Certified Professional

Blog - www.centinosystems.com/blog

Pluralsight Author





PASS
MARATHON

Containers – You Better Get on Board

Anthony Nocentino, Centino Systems
Moderated By: Paresh Motiwala

Agenda

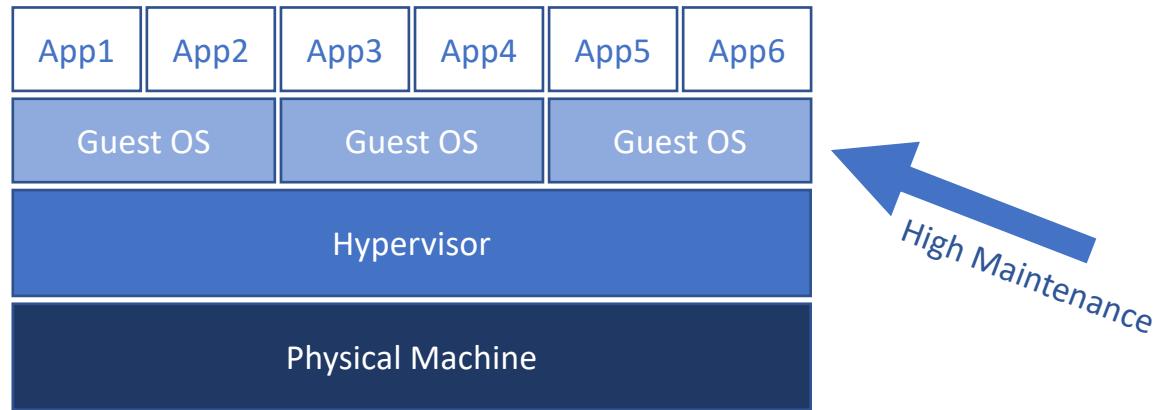
- Introducing Containers
- Containerizing Apps and Data Centers
- Running SQL Server in Containers
- The Container Universe
- Hands on with Containers
- Container Orchestration
- High Availability Container Scenarios

Introducing Containers

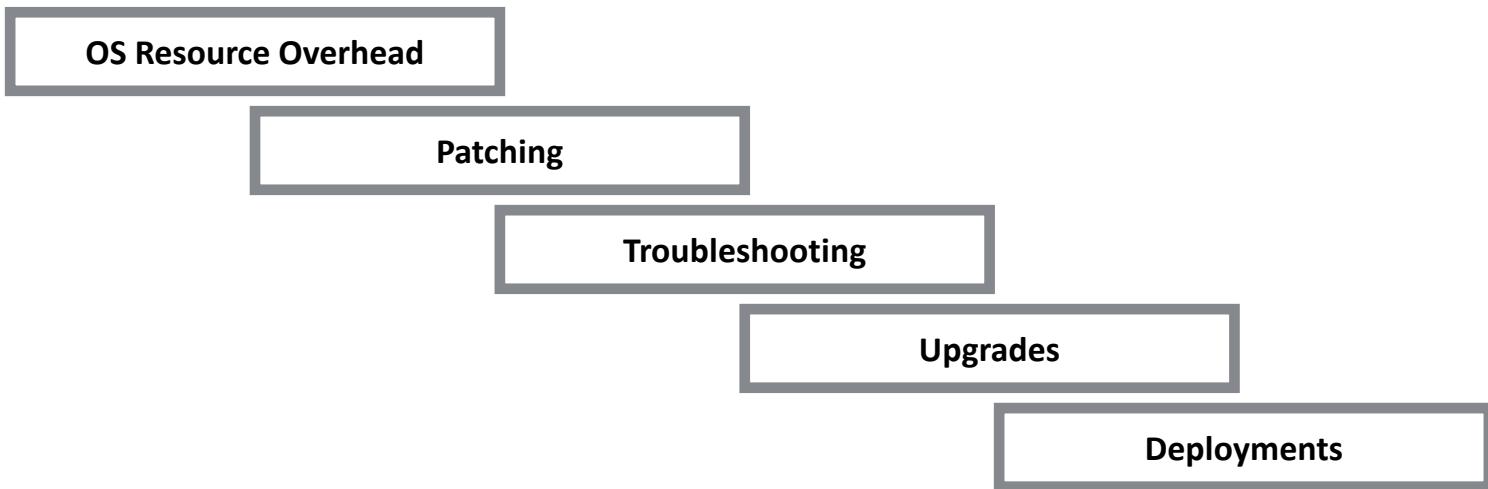
- Operating system virtualization
 - Shared kernel and system resources
- Container...contain...
 - Binaries, libraries and file system
- One app inside the container
 - This is the unit of work
- Containers are ephemeral
- Let's start off with a comparison...



Virtual Machines

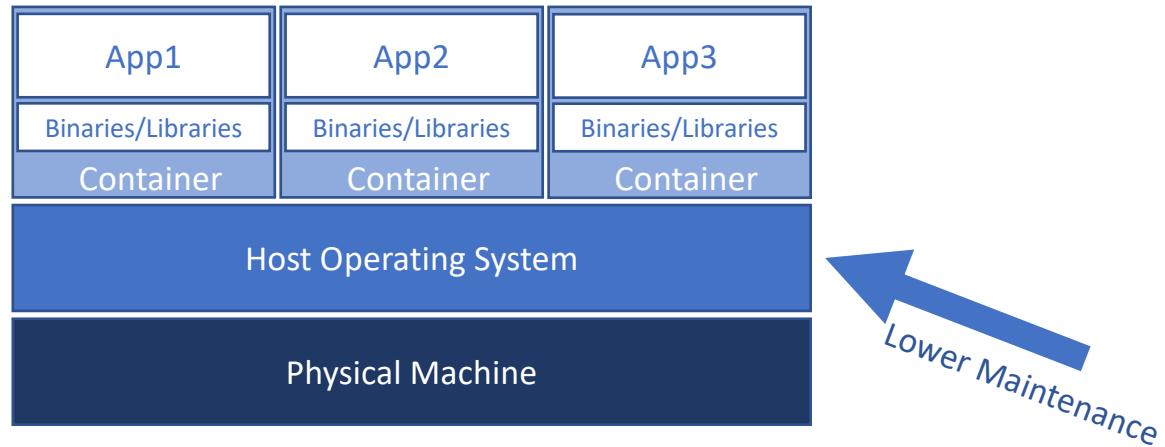


What's so Hard About Virtual Machines?



Does any of this move your business forward?

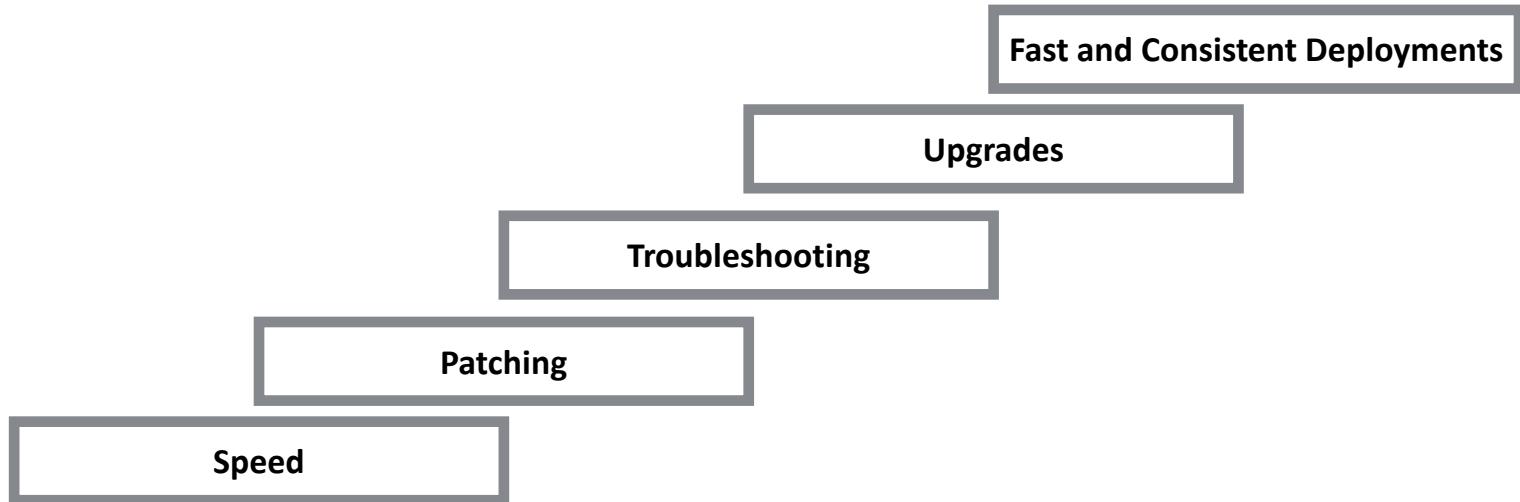
Containers





It's all about goin' fast!

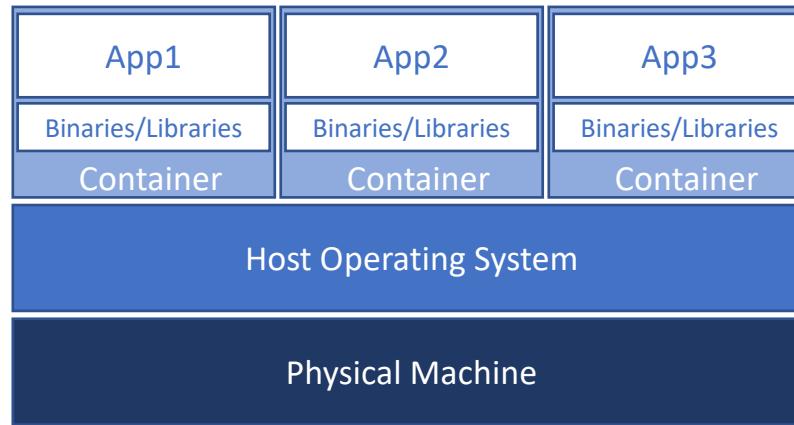
What do Containers Bring to the Table?



Services, we care about getting work done!

Containers

Patching/Deployments/Whatever

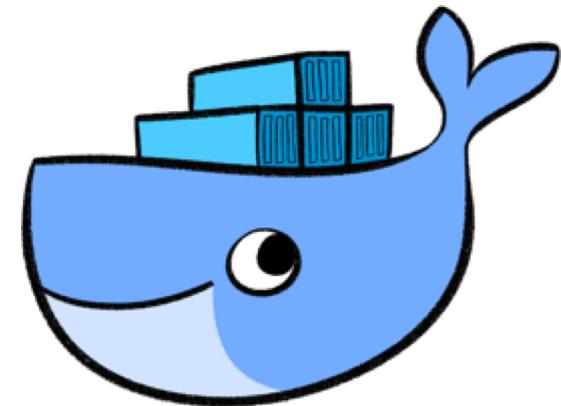


Containerizing Apps and Data Centers

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

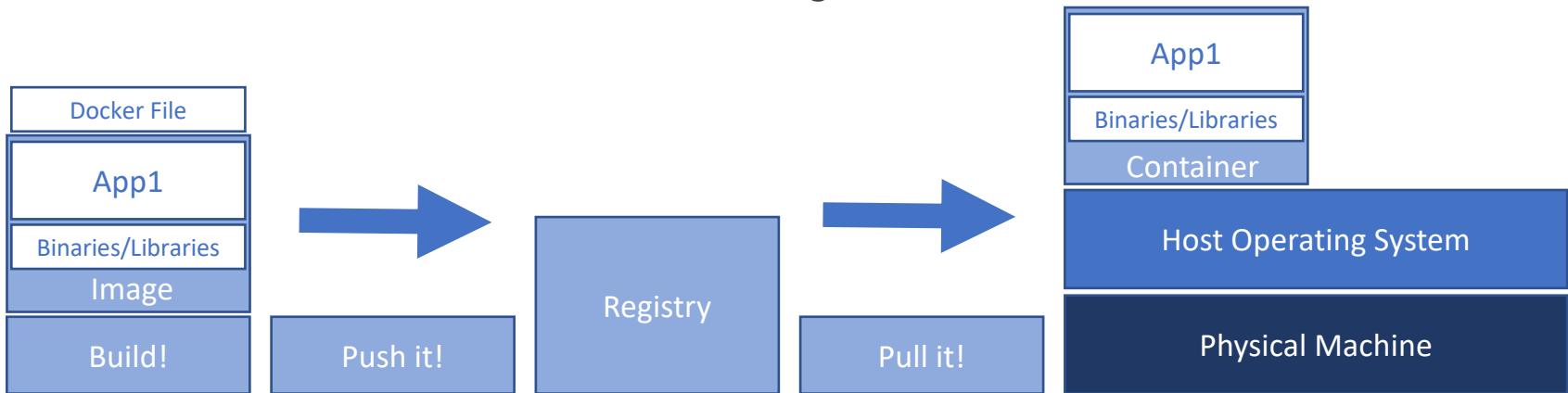
The Container Universe

- Docker
 - Linux
 - Windows
 - Mac
- Docker Inc.
- Other Container Engines
 - rkt
 - CoreOS
 - Windows
 - chroot...chwhat?



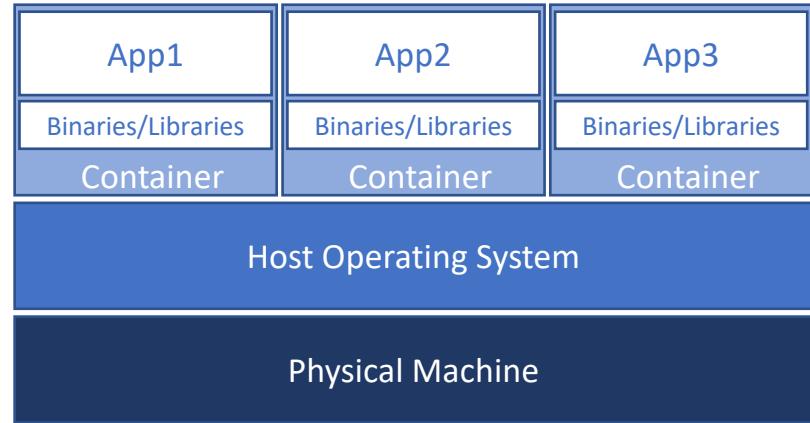
Getting Containers

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



Container Internals

- Shared OS
- Resource isolation
 - Namespaces
 - Process Isolation - PID
 - File System – MNT
 - Network – NET
 - Interprocess Communication - IPC
 - Kernel Isolation - UTS
 - Resource governing
 - cgroups
 - Union file system

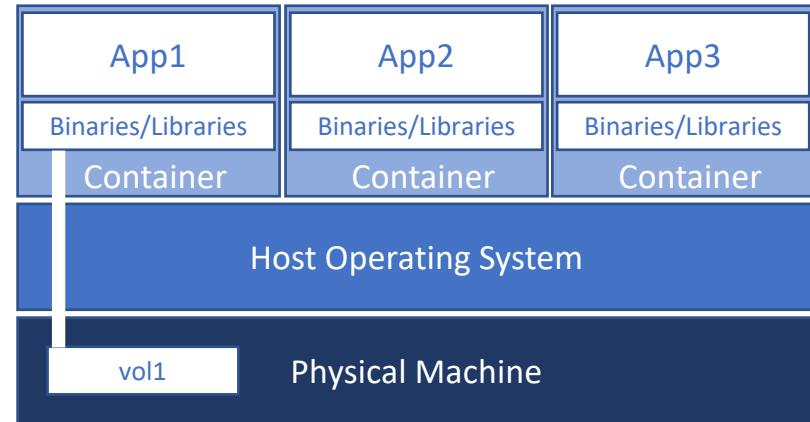


Data Persistence in Containers

- But containers are ephemeral, what about my data?

Data Persistence in Containers

- If your container is alive so is your data, don't delete the container
- Docker Data Volumes
 - Docker managed resource
 - Independent of the container
- Host mounted Data Volumes
 - Bind mounts
 - Outside the container
 - On the host file system
- <https://docs.docker.com/storage>
- <https://docs.docker.com/engine/security/security>



Running SQL Server on Containers

- Why run SQL Server on a Container?
- Same reasons...
 - Deployments, upgrades, patching, speed...agility
 - What is the unit of persistency IS the database...NOT the Server!
- Windows and Linux is available
 - <https://github.com/Microsoft/mssql-docker>
- Non-production on Windows
- Production on Linux, but no Windows auth...but that's OK, right?

Demo!

- Pull an Image
- Run a Container
- Access our application
- Connect to the Container
- Persisting data with a Container

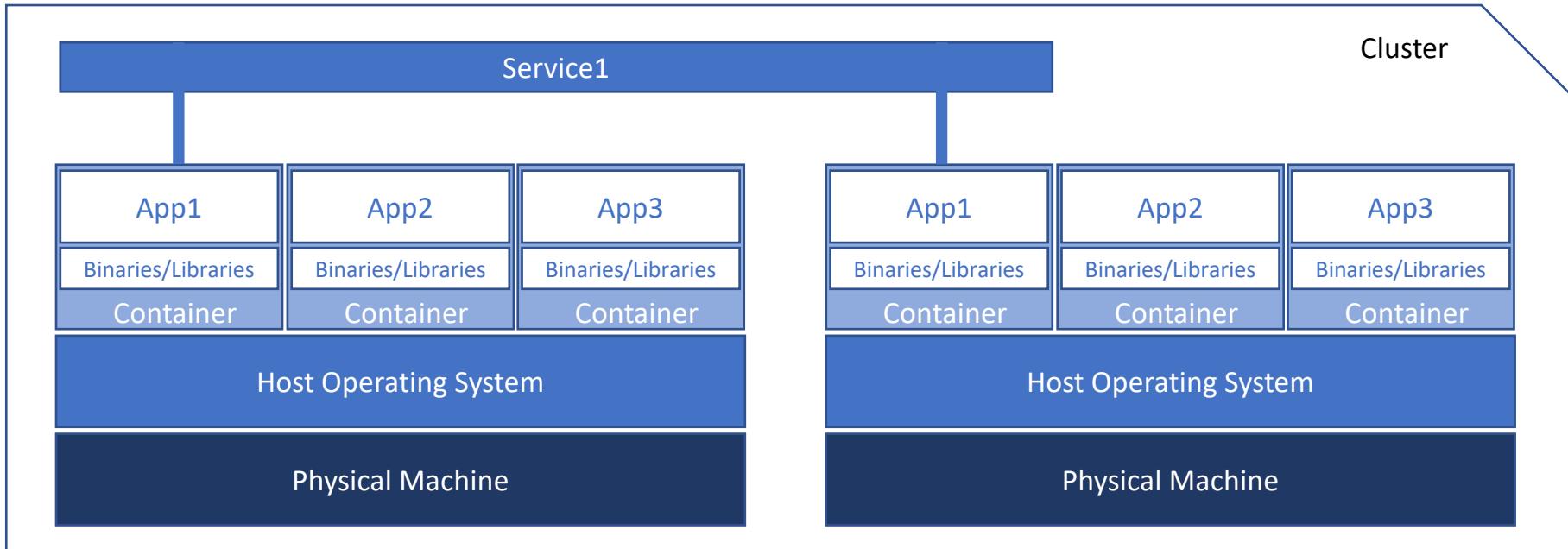
Container Orchestration

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

Container Orchestrators

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

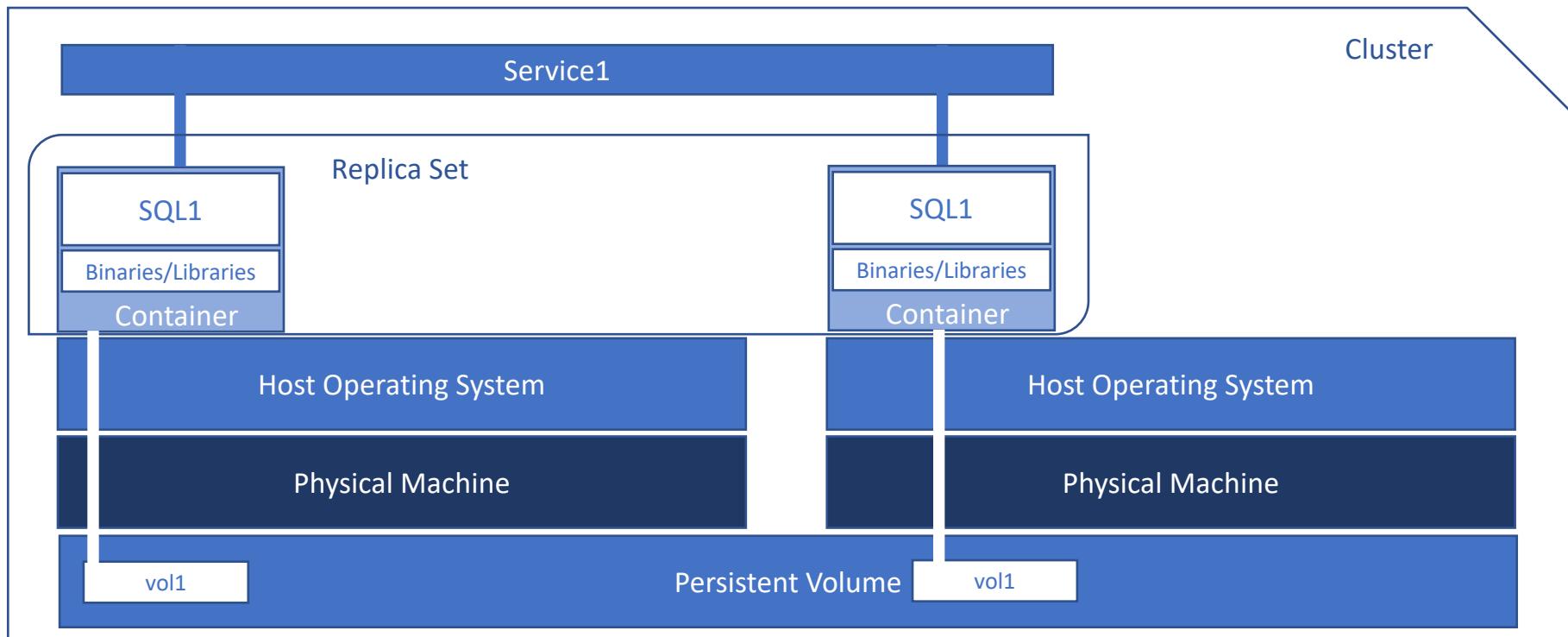
Container Orchestration - Services



Container Orchestrators

- That's cool...but what about persistent data in a cluster?!?!

Container Orchestration – High Availability



What's Next?

- Production?
- Are containers perfect...no!
- But what about moving data around...clones, storage snapshots, volumes?

Resources

- Installing Docker
 - <https://docs.docker.com/docker-for-windows/install>
 - <https://docs.docker.com/install/linux/docker-ce/centos>
- Running Docker
 - <https://docs.docker.com/get-started>
 - <https://docs.docker.com/storage>
 - <https://docs.docker.com/engine/security/security>

A photograph of a man and a woman sitting at a wooden table, both looking down at their laptops. The man on the left has a beard and is wearing a light blue denim shirt. The woman on the right has long brown hair and is wearing a white top. In the foreground, there are large, stylized question mark graphics in various colors: red, orange, green, purple, and blue. These graphics overlap the bottom right corner of the image.

Questions?



Coming up next...

Data Delivery Using Database Clones with SQL Server Containers

Paul Stanton



Thank you for attending

Learn more from Anthony Nocentino

 @nocentino

 aen@centinosystems.com



@sqlpass #sqlpass



PASScommunity



*PASS
MARATHON