Experiment-4

Docker

Prepared By

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Semester-7

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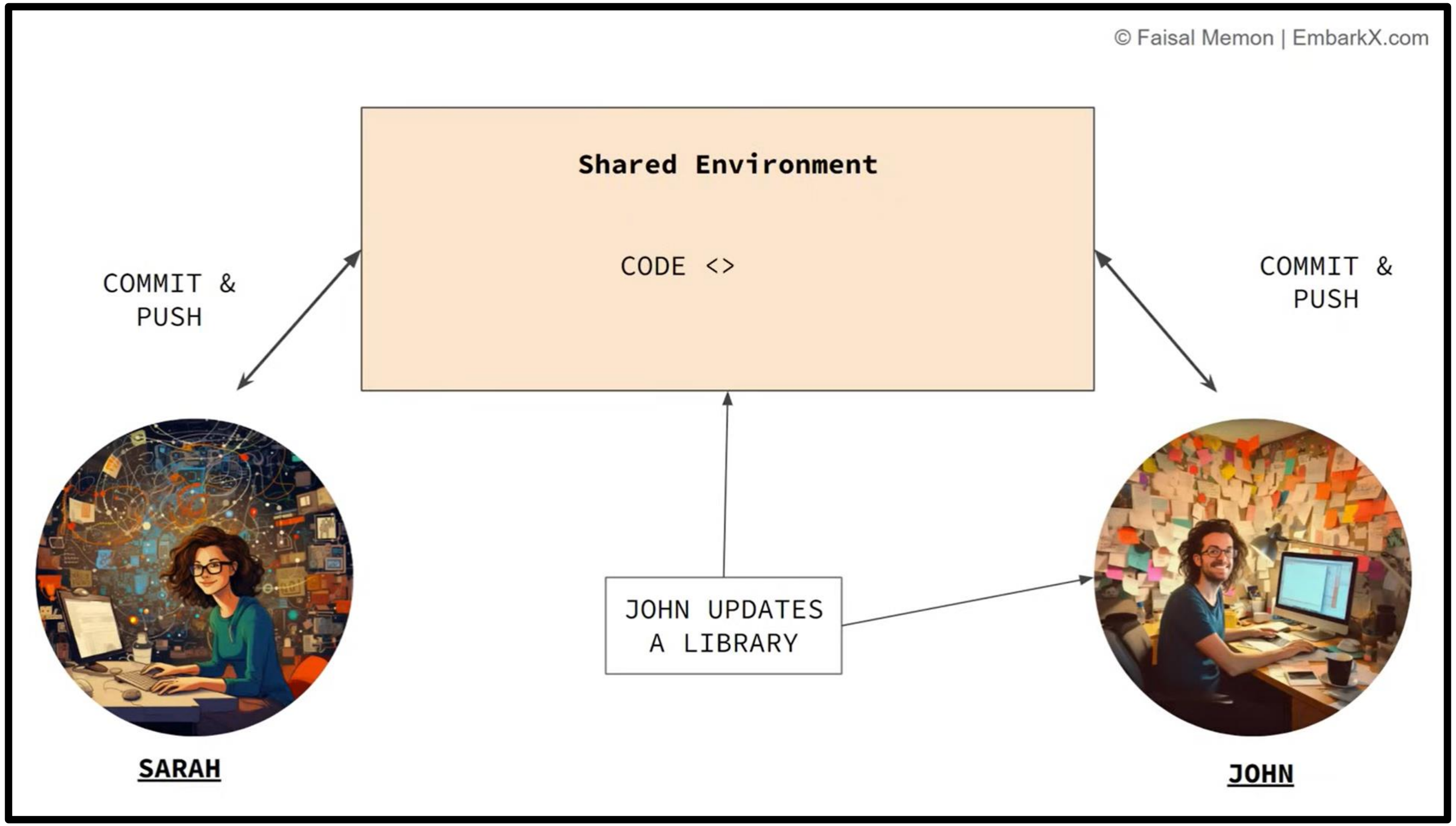
Why Docker?



2 Person are working on same code base and let say JOHN changes the Version of library used in shared Environment. Now, it is difficult to manage the version of different user in same shared environment.

Why Docker?

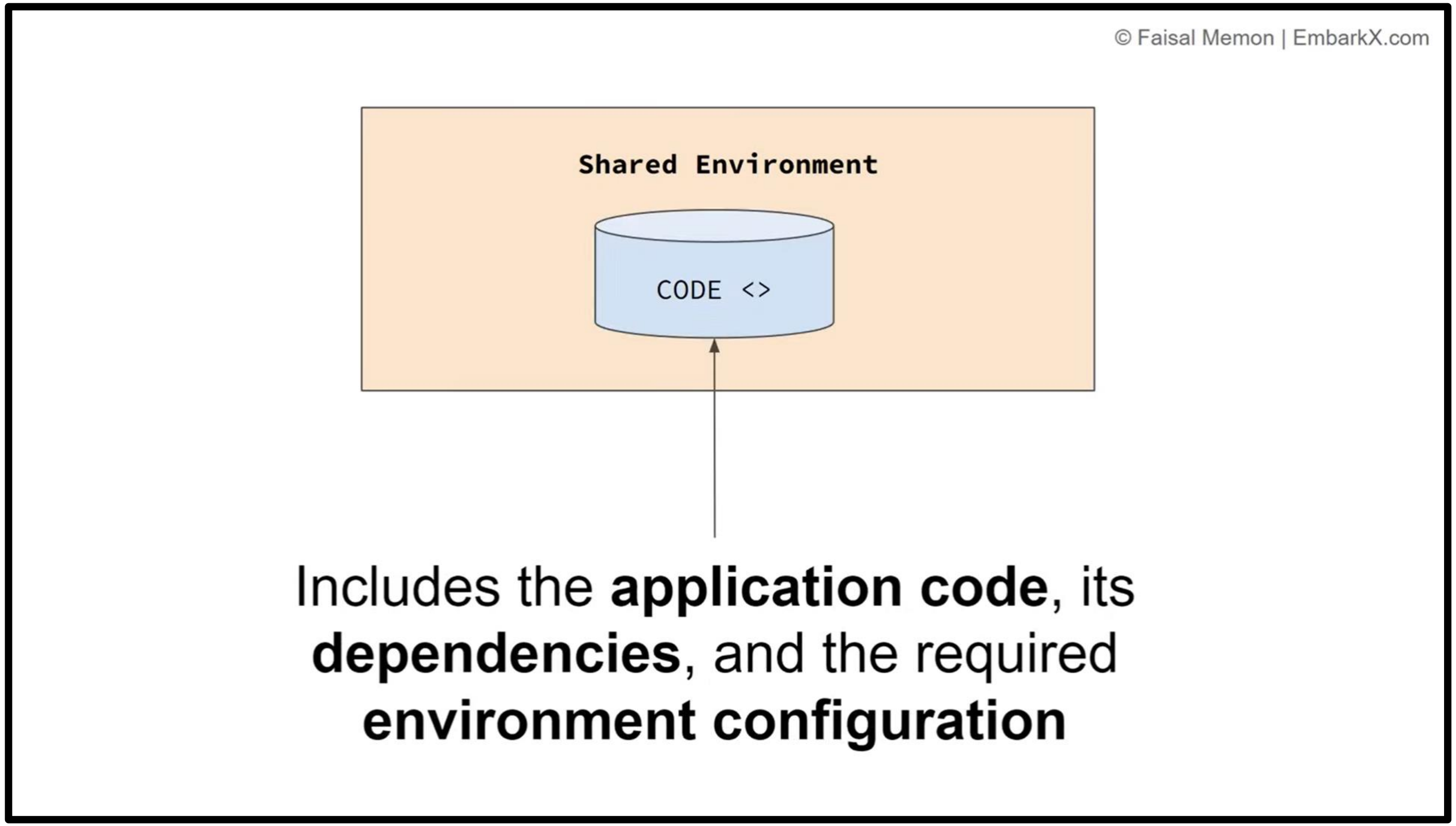
- It causes version conflict or compatibility problem.
- Which then causes the inconsistency in development.
- Application is working fine in one development environment but not in another developer environment.

What is solution to this??

Docker

HOW??

How?



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Shared Environment

CODE <>

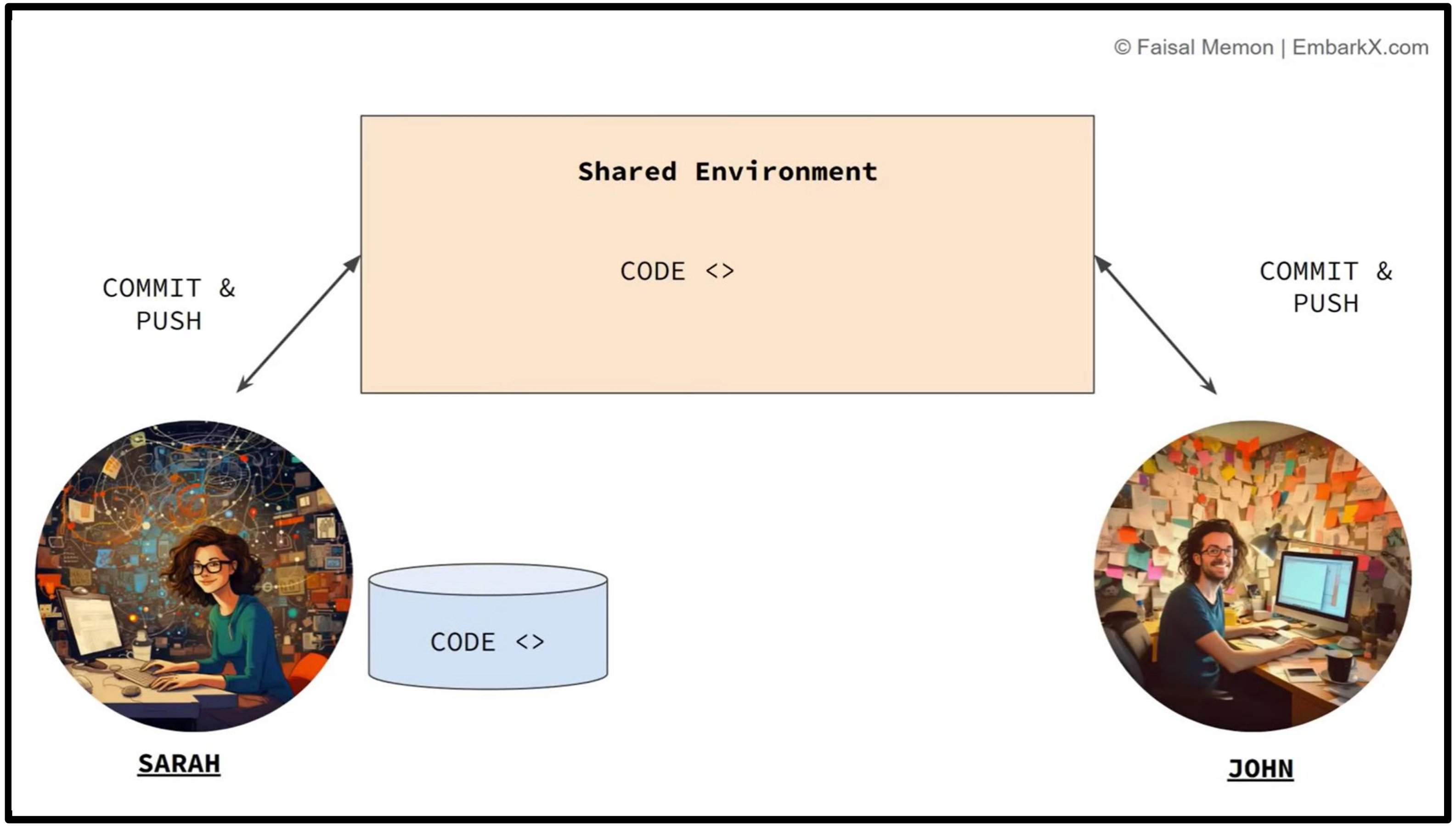
Includes the **application code**, its **dependencies**, and the required **environment configuration**

Containerized the application using **Docker.**

What does it means?

- Move codebase to container.
- Which includes **application code, dependencies, and the required environment configuration.**

How?

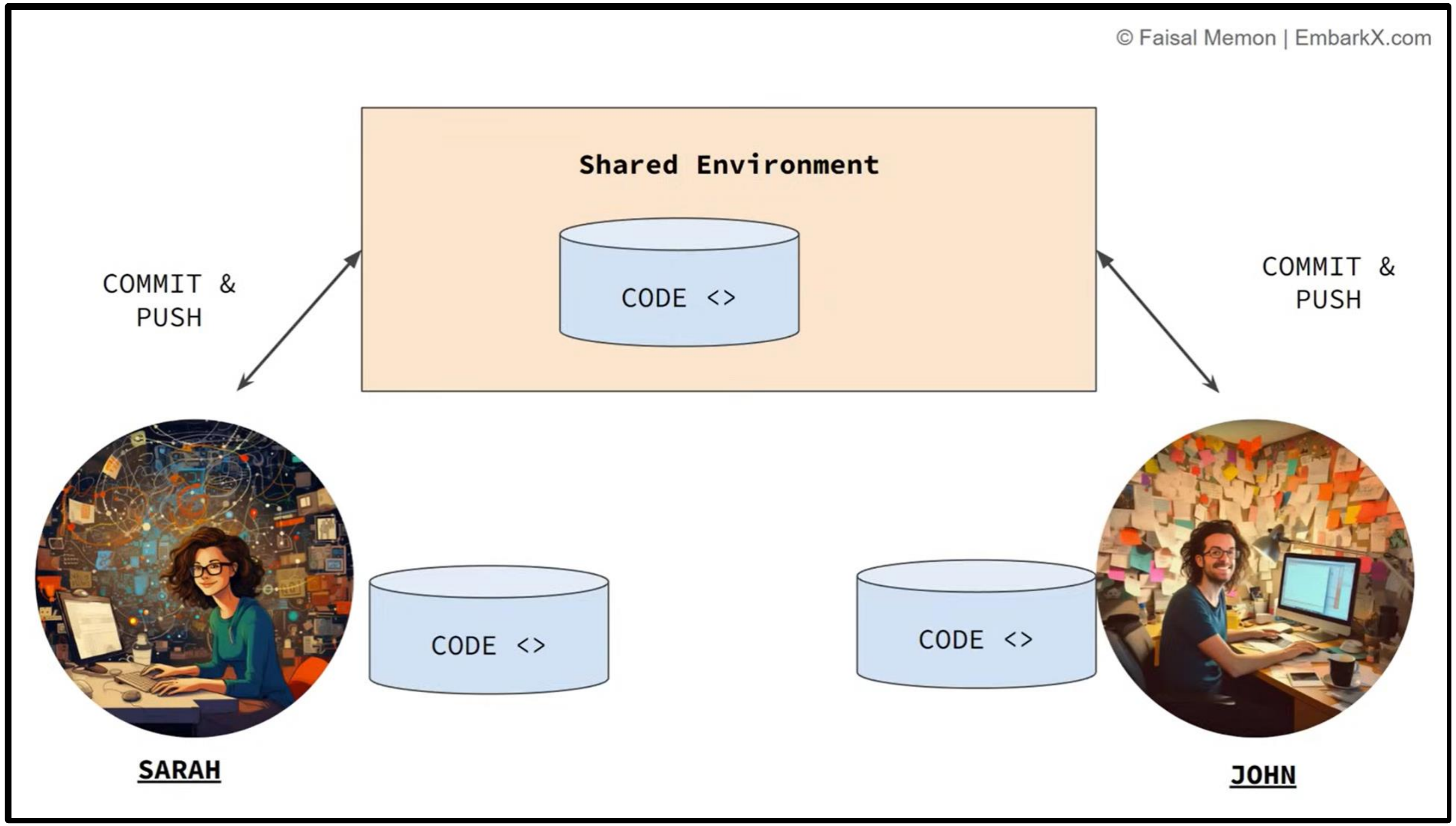


SARAH will use the Docker and has the container which contains all the required environment and application is running.

How?

- Now SARAH no need to worry about the conflicting versions or any other issues because of any versions conflicts.
- Now everybody in team of SARAH will upgrade to **Docker.**

How?



Now, isolated container Is shared between the team and this container has all the required item to run the application.

What **Docker** solves?

- Dependency Management.
- Compatibility issues.
- Environmental inconsistency.

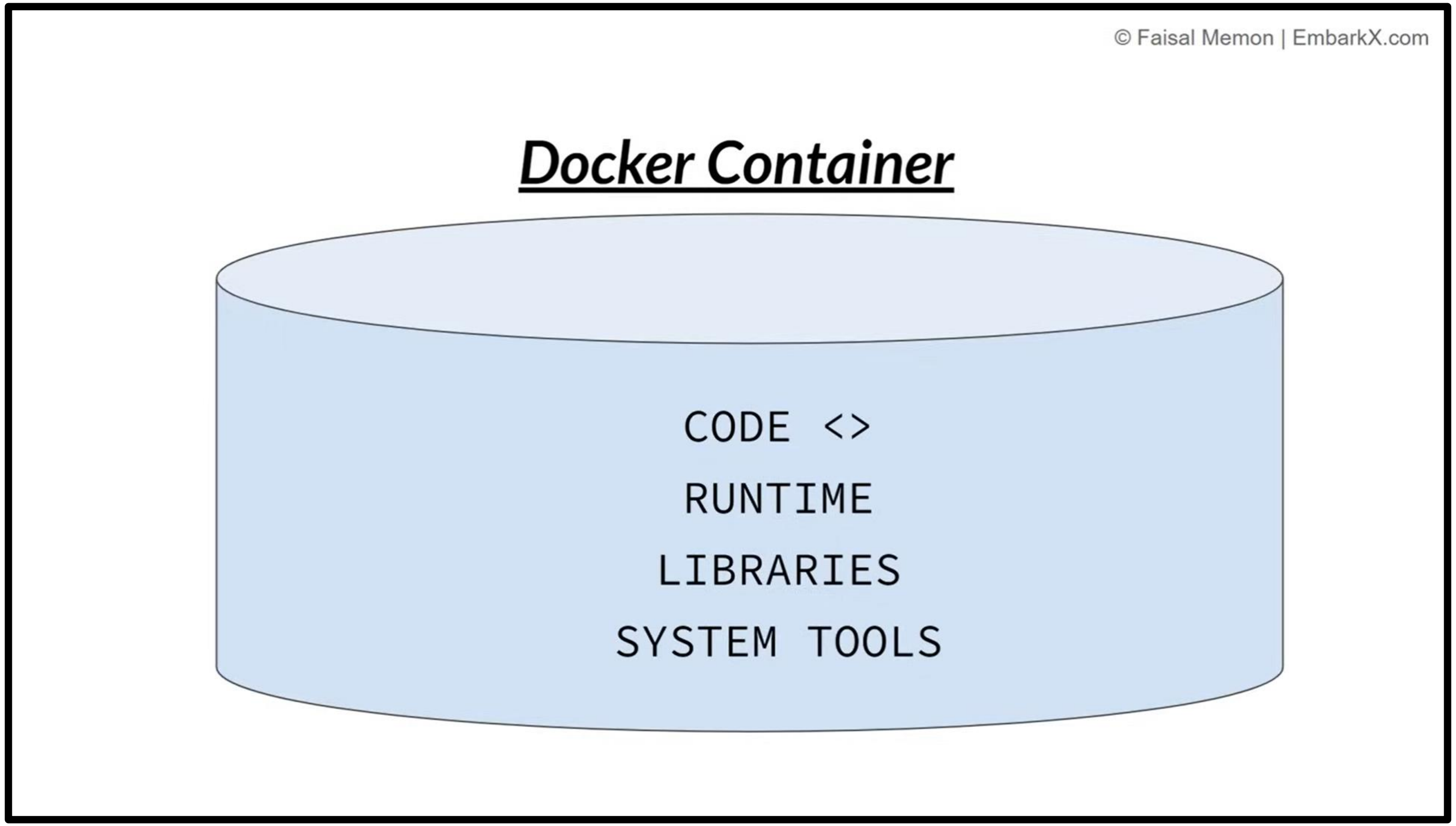
What is Docker?

Docker is an open-source platform that allows you to automate the deployment, scaling and management of applications using containerization.

What is Containerization?

- lightweight virtualization technology
- package an application along with its dependencies that is needed for an application to run

Docker Container



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Docker Container

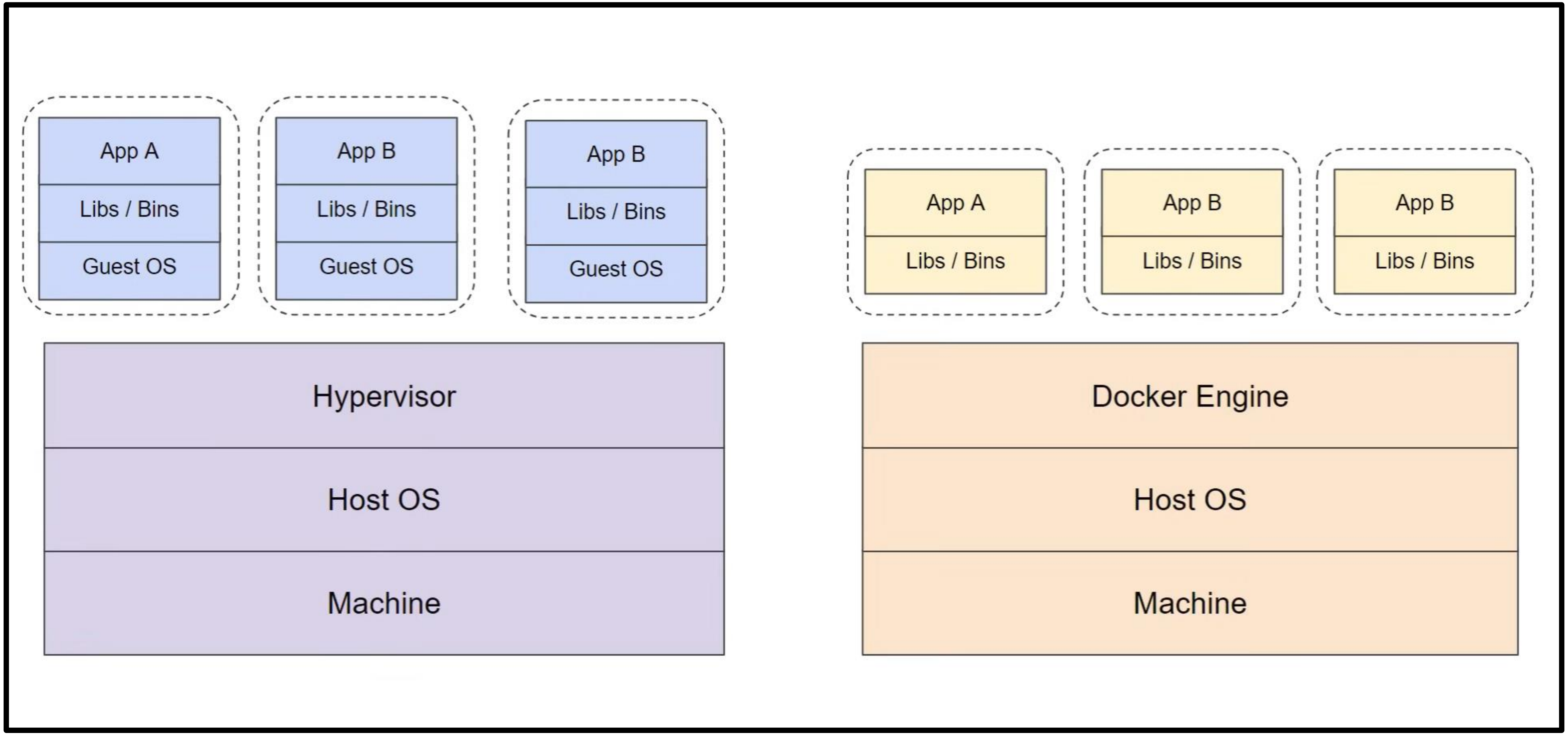
CODE <>

RUNTIME

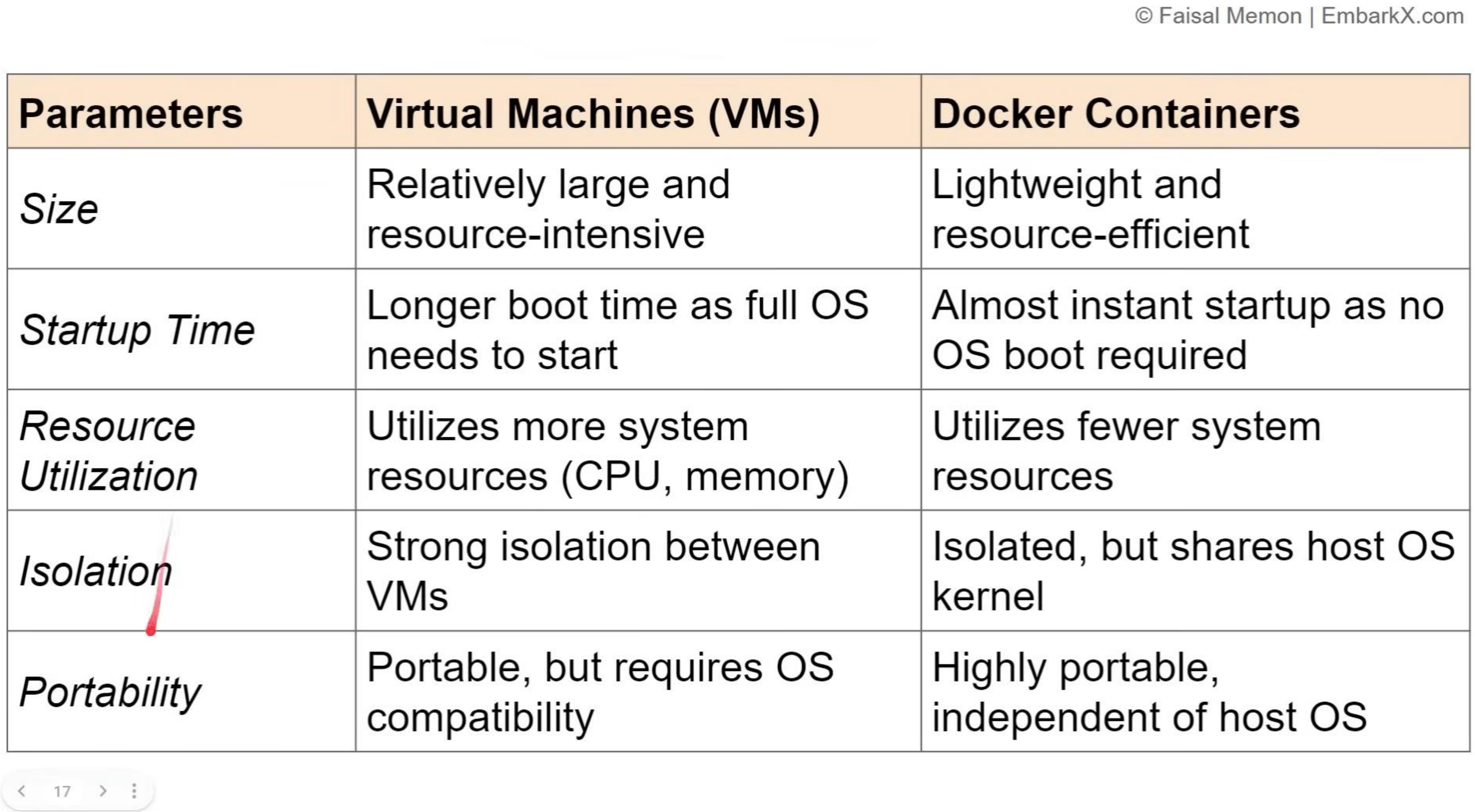
LIBRARIES

SYSTEM TOOLS

Docker over VM's



Docker over VM's



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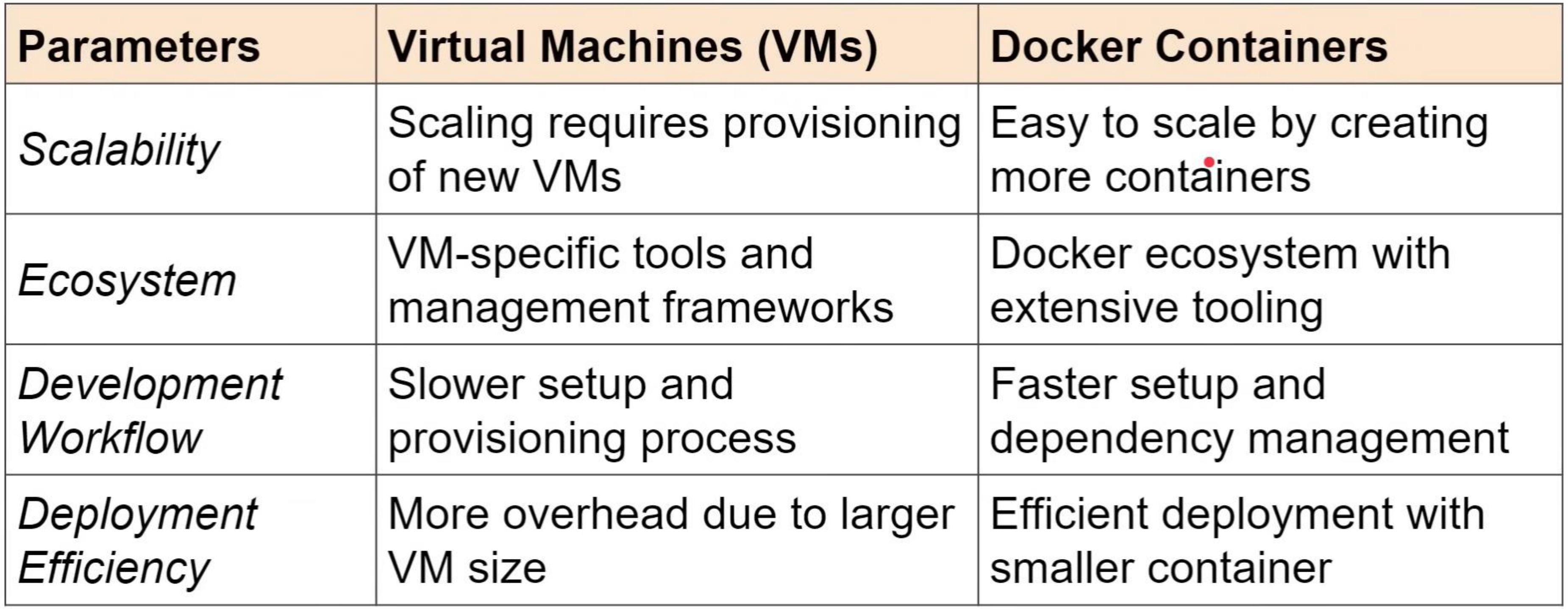
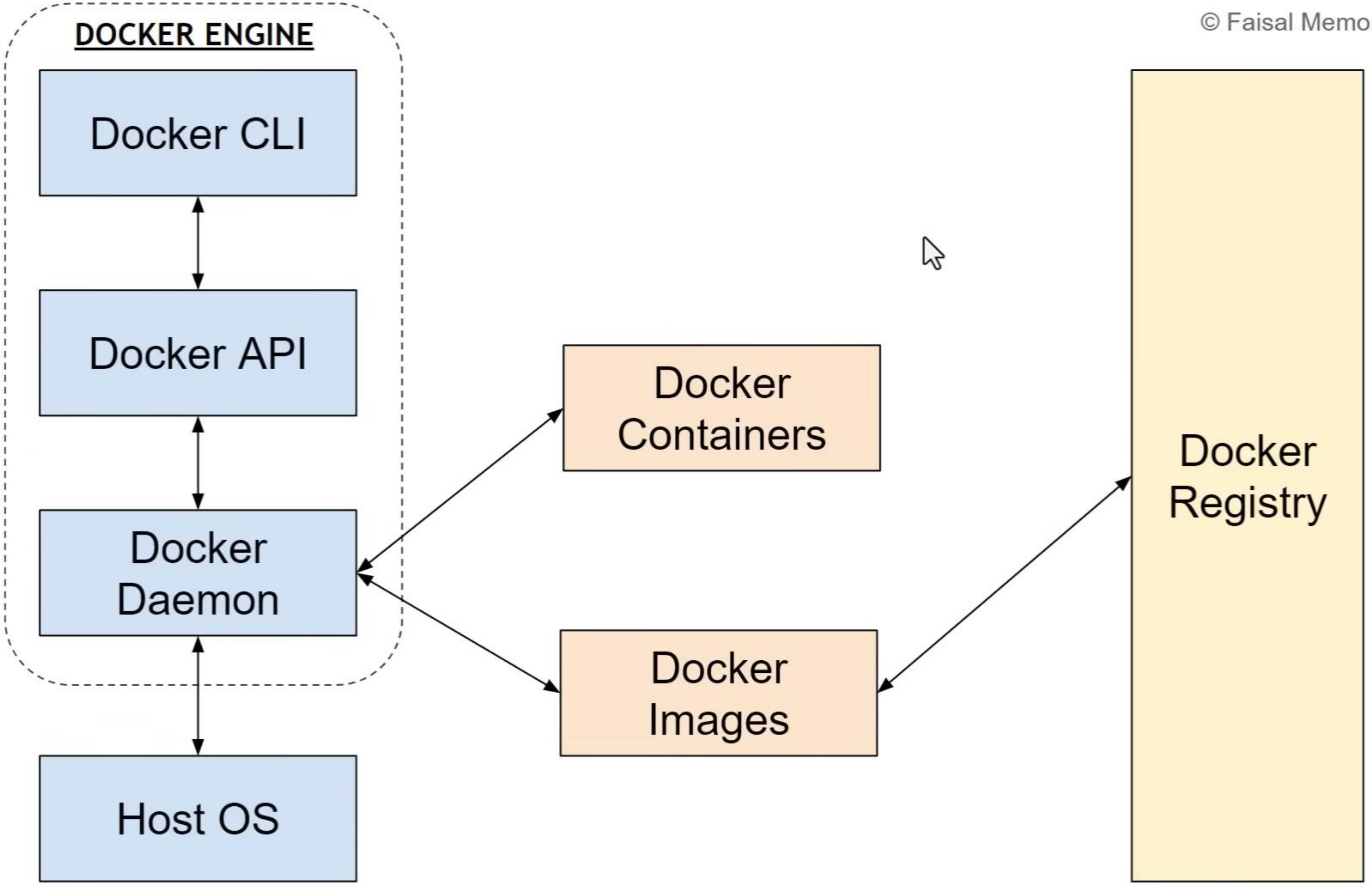
Parameters	Virtual Machines (VMs)	Docker Containers
Size	Relatively large and resource-intensive	Lightweight and resource-efficient
Startup Time	Longer boot time as full OS needs to start	Almost instant startup as no OS boot required
Resource Utilization	Utilizes more system resources (CPU, memory)	Utilizes fewer system resources
Isolation	Strong isolation between VMs	Isolated, but shares host OS kernel
Portability	Portable, but requires OS compatibility	Highly portable, independent of host OS

Docker over VM's



Parameters	Virtual Machines (VMs)	Docker Containers
Scalability	Scaling requires provisioning of new VMs	Easy to scale by creating more containers
Ecosystem	VM-specific tools and management frameworks	Docker ecosystem with extensive tooling
Development Workflow	Slower setup and provisioning process	Faster setup and dependency management
Deployment Efficiency	More overhead due to larger VM size	Efficient deployment with smaller container

Docker Architecture


DOCKER ENGINE
Docker CLI
Docker API
Docker Daemon
Host OS
Docker Containers
Docker Images
Docker Registry

Docker Engine

It contains:

1. Docker CLI
2. Docker API
3. Docker Daemon

Docker Engine

Docker CLI

- It’s a client that allows users to interact with Docker
- It is used to communicate with the Docker.
- It will interact with Docker Daemon.

Docker Engine

Docker Daemon

- Runs on Host OS.
- Responsible for building docker images & managing containers.

Docker Images

- Blueprint for creating a container.
- From one image we can create multiple image.
- Templates that define the container and dependencies
- Image are base on which container is build.

Docker Containers

- Light weight
- Running instance of Docker image.

Dockerfile

- Instruction to build a Docker Image.

Docker Hub

- Registry that has the vast collection of Docker images.

Docker Registry

- It stores docker images.
- Images can be public or private.
- Repo of all the images.

Docker Registry

Docker Registry

- Store docker images with different version.

Importance of Docker Registry

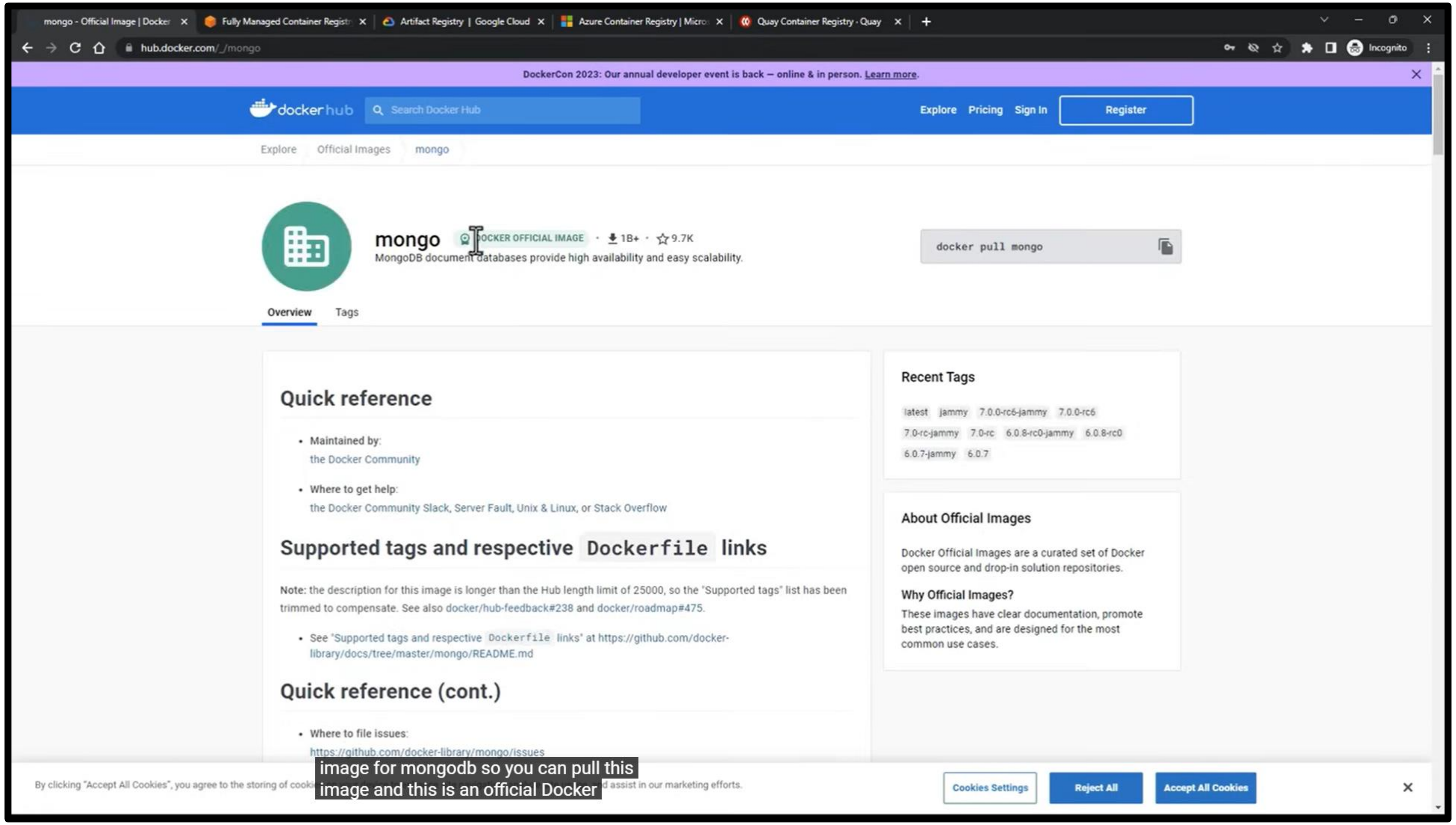
- Centralized Resource.
- Easy Versioning.
- Share your Docker Image.

Available Docker Registry

- https://hub.docker.com
  - Default registry used by Docker CLI and most of the docker tool.
- https://aws.amazon.com/ecr/
- https://cloud.google.com/artifact-registry
- https://azure.Microsoft.com/en-in/product/container-registry
- https://quay.io

Available Docker Registry

- Mongo image (https://hub.docker.com)


mongo - Official Image | Docker
Fully Managed Container Registr
Artifact Registry | Google Cloud
Azure Container Registry | Micro
Quay Container Registry · Quay
hub.docker.com/_/mongo
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mongo

MongoDB document databases provide high availability and easy scalability.

```
docker pull mongo
```

Quick reference

- Maintained by:
  the Docker Community
- Where to get help:
  the Docker Community Slack, Server Fault, Unix & Linux, or Stack Overflow

Supported tags and respective `Dockerfile` links

Note: the description for this image is longer than the Hub length limit of 25000, so the "Supported tags" list has been trimmed to compensate. See also docker/hub-feedback#238 and docker/roadmap#475.

- See "Supported tags and respective `Dockerfile` links" at https://github.com/docker-library/docs/tree/master/mongo/README.md

Quick reference (cont.)

- Where to file issues:
  https://github.com/docker-library/mongo/issues

Recent Tags

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About Official Images

Docker Official Images are a curated set of Docker open source and drop-in solution repositories.

Why Official Images?

These images have clear documentation, promote best practices, and are designed for the most common use cases.

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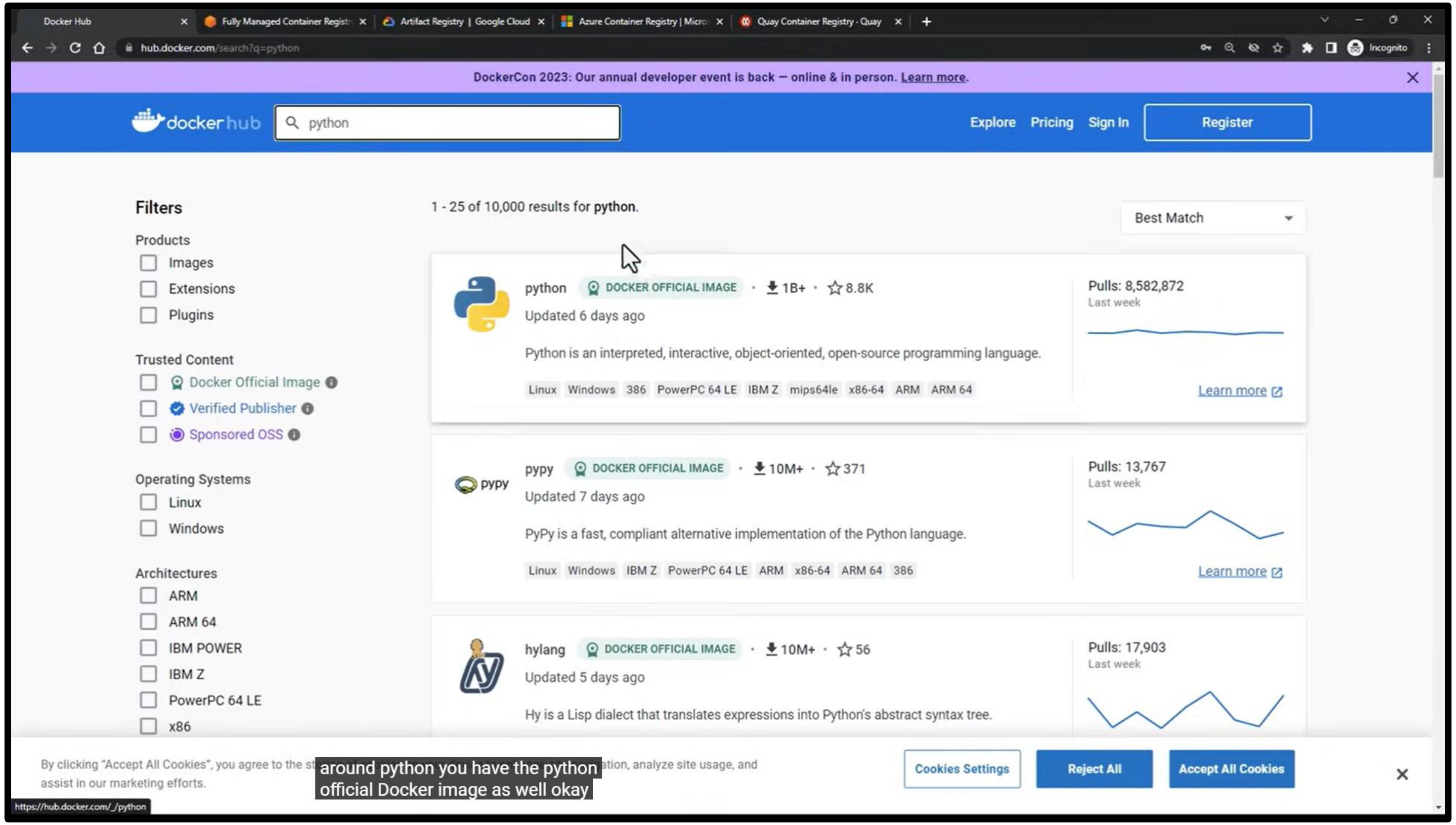
image for mongodb so you can pull this
image and this is an official Docker

Available Docker Registry

- python image (https://hub.docker.com)



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Azure Container Registry | Micro
Quay Container Registry · Quay
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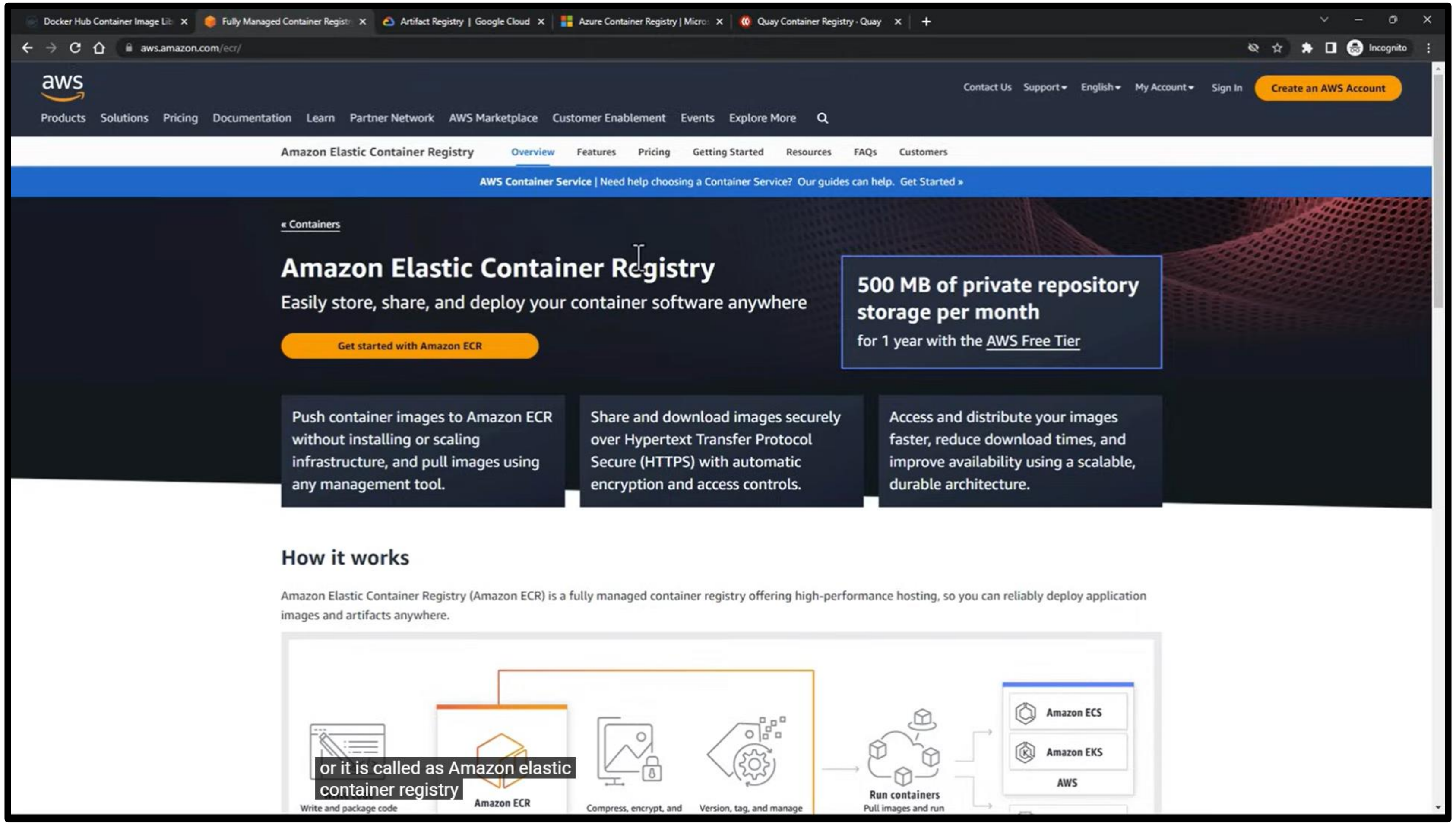
Available Docker Registry

- (https://aws.amazon.com/ecr/)



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« Containers

Amazon Elastic Container Registry

Easily store, share, and deploy your container software anywhere

500 MB of private repository storage per month

for 1 year with the AWS Free Tier

Push container images to Amazon ECR without installing or scaling infrastructure, and pull images using any management tool.

Share and download images securely over Hypertext Transfer Protocol Secure (HTTPS) with automatic encryption and access controls.

Access and distribute your images faster, reduce download times, and improve availability using a scalable, durable architecture.

How it works

Amazon Elastic Container Registry (Amazon ECR) is a fully managed container registry offering high-performance hosting, so you can reliably deploy application images and artifacts anywhere.

or it is called as Amazon elastic container registry

Thank You