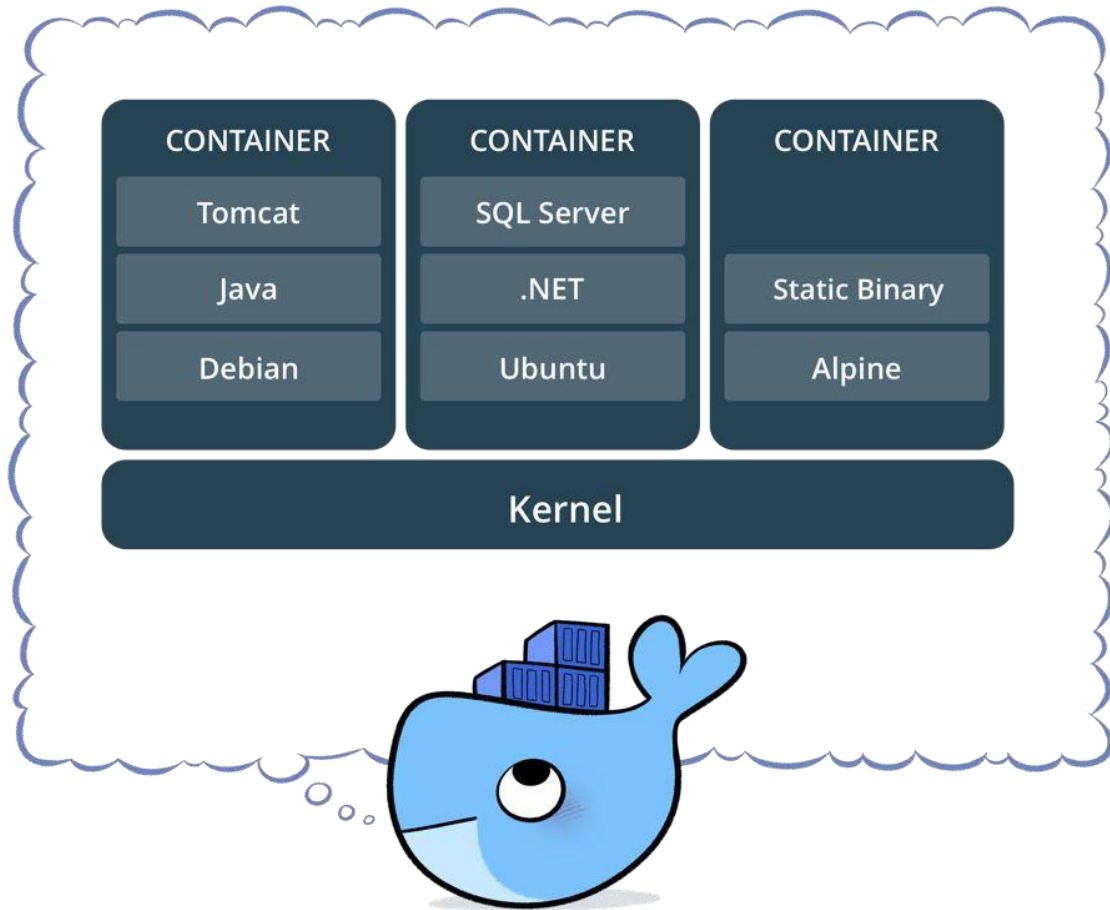# Docker

One of the most Popular Tool for Deployment

What is a container?

- Standardized packaging for software and dependencies
- Isolate apps from each other
- Share the same OS kernel
- Works for all major Linux distributions
- Containers native to Windows 10, server etc.

The Role of Images and Containers

Docker Image

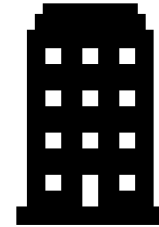Example: Ubuntu with Node.js and Application Code

Docker Container

Created by using an image. Runs your application.

Docker containers are NOT VMs

- Easy connection to make
- Fundamentally different architectures
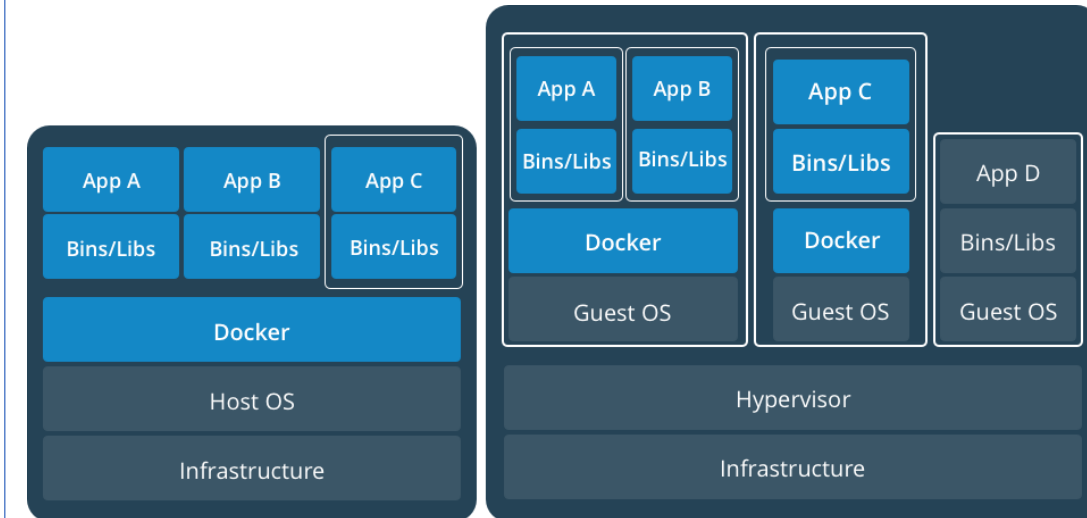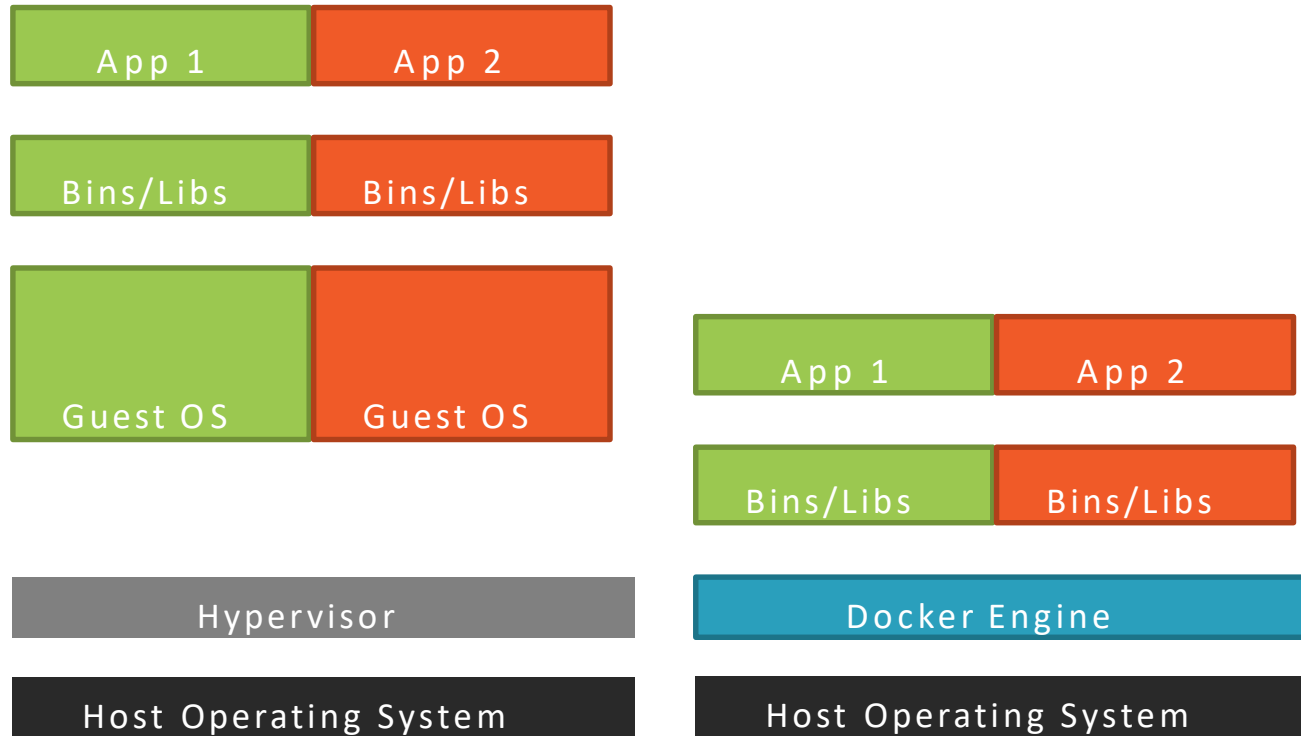- Fundamentally different benefits

Maquina Virtual

Contenedores

Docker Containers Versus Virtual Machines

App 1	App 2

Bins/Libs	Bins/Libs

Guest OS	Guest OS

Hypervisor

Host Operating System

Virtual Machines

App 1	App 2

Bins/Libs	Bins/Libs

Docker Engine

Host Operating System

Docker Containers

App A	App B	App C
Bins/Libs	Bins/Libs	Bins/Libs

Docker

Host OS

Infrastructure

App A	App B		App C		App D
Bins/Libs	Bins/Libs		Bins/Libs		Bins/Libs
Docker			Docker		Guest OS
Guest OS			Guest OS		

Hypervisor

Infrastructure

Using Docker: Build, Ship, Run Workflow
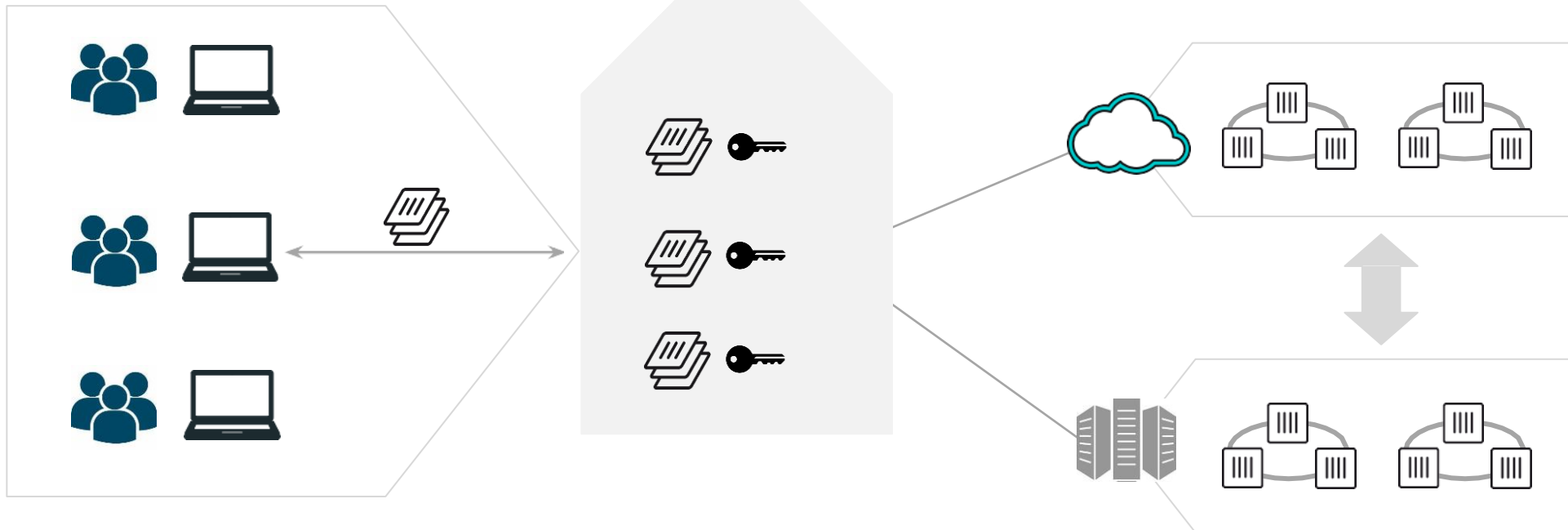
Developers

IT Operations

BUILD
Development Environments

SHIP
Create & Store Images
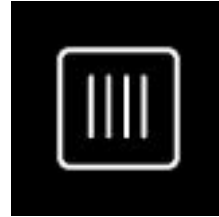
RUN
Deploy, Manage, Scale

6

Some Docker vocabulary

Docker Image

The basis of a Docker container. Represents a full application
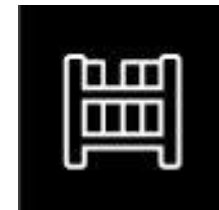
Docker Container

The standard unit in which the application service resides and executes

Docker Engine

Creates, ships and runs Docker containers deployable on a physical or virtual, host locally, in a datacenter or cloud service provider

Registry Service (Docker Hub(Public) or Docker Trusted Registry(Private))

Cloud or server based storage and distribution service for your images

Basic Docker Commands

```
$ docker image pull node:latest

$ docker image ls

$ docker container run -d -p 5000:5000 --name node node:latest

$ docker container ps


$ docker container stop node(or <container id>)

$ docker container rm node (or <container id>)

$ docker image rmi (or <image id>)

$ docker build -t node:2.0 .

$ docker image push node:2.0

$ docker --help
```
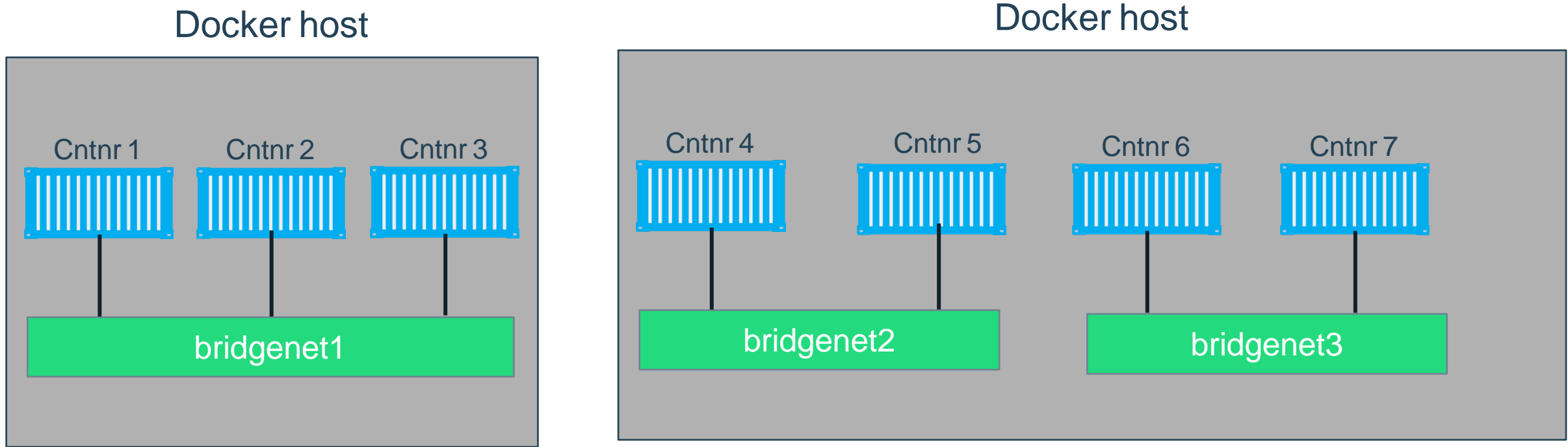
Docker and Networking
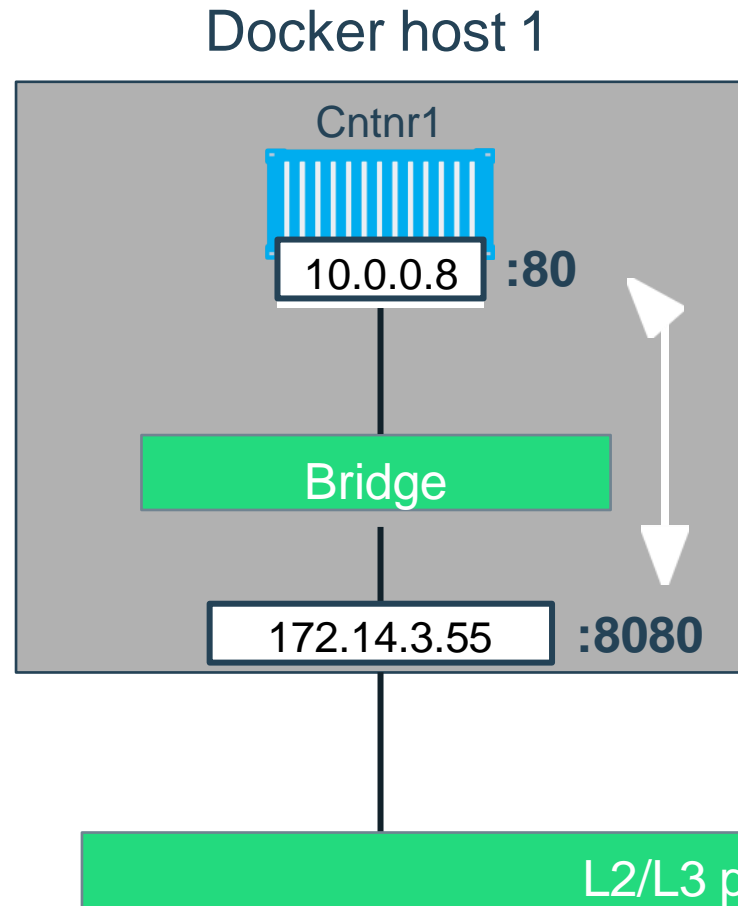
What is Docker Bridge Networking

Docker host

Docker host

Cntnr 1   Cntnr 2   Cntnr 3

Cntnr 4   Cntnr 5   Cntnr 6   Cntnr 7

bridgenet1

bridgenet2

bridgenet3

```
docker network create -d bridge --name bridgenet1
```

Docker Bridge Networking and Port Mapping

Docker host 1

Cntnr1

10.0.0.8 **:80**

Bridge

172.14.3.55 **:8080**

L2/L3 physical network

Host port   Container port

```
$ docker container run -p 8080:80 ...
```

Docker for Windows

Official Microsoft Docker Images

- Official .NET Docker images | Microsoft Docs
- The Official .NET Docker images are Docker images created and optimized by Microsoft.
- They are publicly available in the Microsoft repositories on Docker Hub.
- Each repository can contain multiple images, depending on .NET versions, and depending on the OS and versions (Linux Debian, Linux Alpine, Windows Nano Server, Windows Server Core, etc.).

Official images for .NET and ASP.NET Core

- .NET (docker.com)

- **Featured Repos**
  - dotnet/sdk: .NET SDK
  - dotnet/aspnet: ASP.NET Core Runtime
  - dotnet/runtime: .NET Runtime
  - dotnet/runtime-deps: .NET Runtime Dependencies
  - dotnet/samples: .NET Samples

Official images for the .NET Framework, ASP.NET, and Windows Communication Framework (WCF)

- .NET Framework (docker.com)

- Features Repos:
  - dotnet/framework/sdk: .NET Framework SDK
  - dotnet/framework/aspnet: ASP.NET Web Forms and MVC
  - dotnet/framework/runtime: .NET Framework Runtime
  - dotnet/framework/wcf: Windows Communication Foundation (WCF)
  - dotnet/framework/samples: .NET Framework, ASP.NET and WCF Samples

How to Use the Images

- Container sample: Run a simple application

- Type the following command to run a sample console application:

  docker run --rm mcr.microsoft.com/dotnet/framework/samples:dotnetapp

How to Use the Images

- Container sample: Run a simple application
- Type the following command to run a sample web application:

docker run -it --rm -p 8000:80 --name aspnet_sample
mcr.microsoft.com/dotnet/framework/samples:aspnetapp

- After the application starts, navigate to http://localhost:8000 in your web browser.
- You need to navigate to the application via IP address instead of localhost for earlier Windows versions, which is demonstrated in View the ASP.NET app in a running container on Windows.

Be careful !

docker pull mcr.microsoft.com/dotnet/framework/samples:dotnetapp

dotnetapp: Pulling from dotnet/framework/samples

no matching manifest for linux/amd64 in the manifest list entries

- There could be many reasons for this error. But most obvious reason for this error is using Windows Container in Linux Container Mode or vise versa.
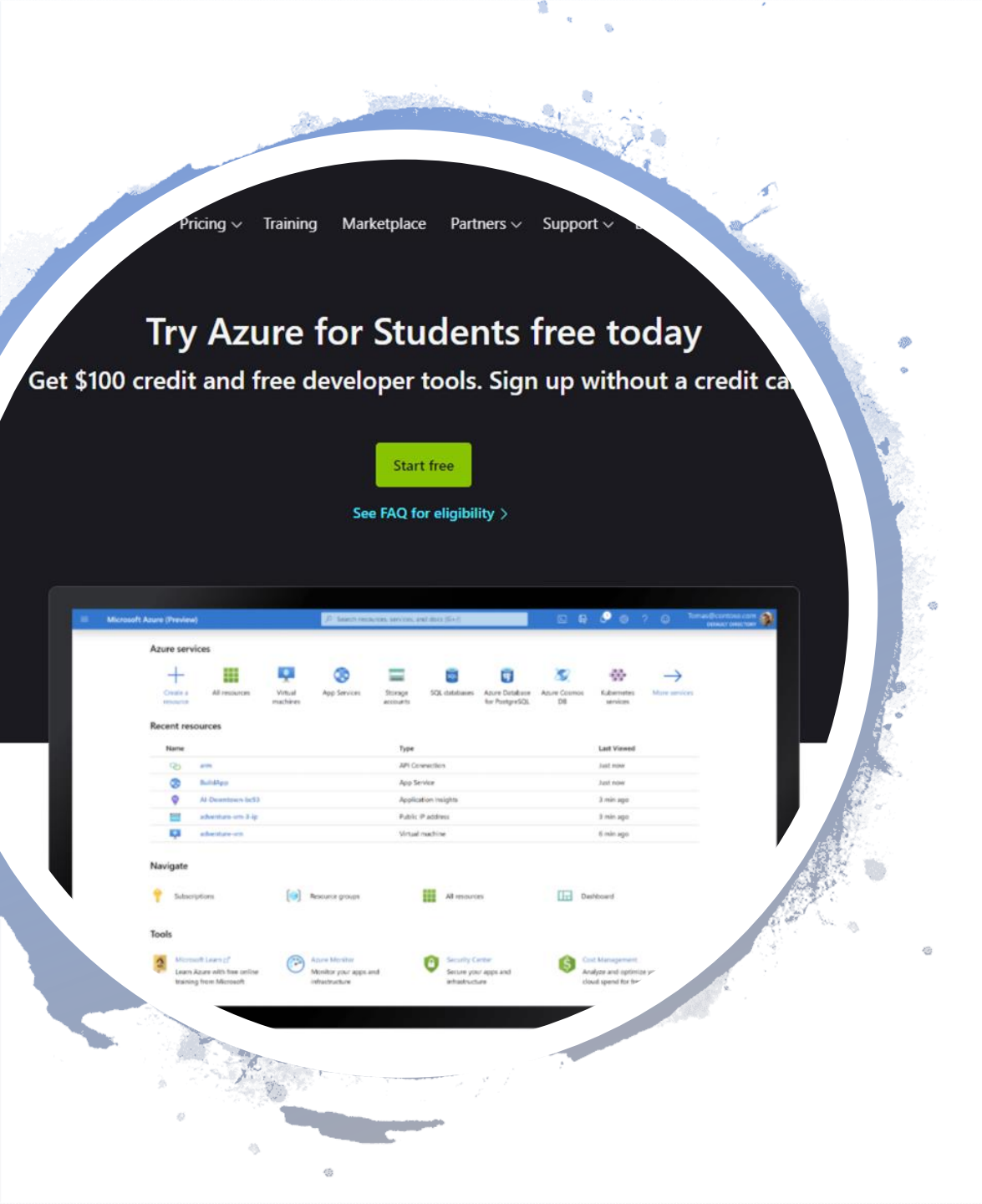
Be careful !

1. Click Docker Icon in System Tray In Context Menu
2. Click "Switch to Window/Linux Container"
3. Option Click Switch Button in Switch Dialog
4. It may take little time
5. Make Sure Docker is Running State Now
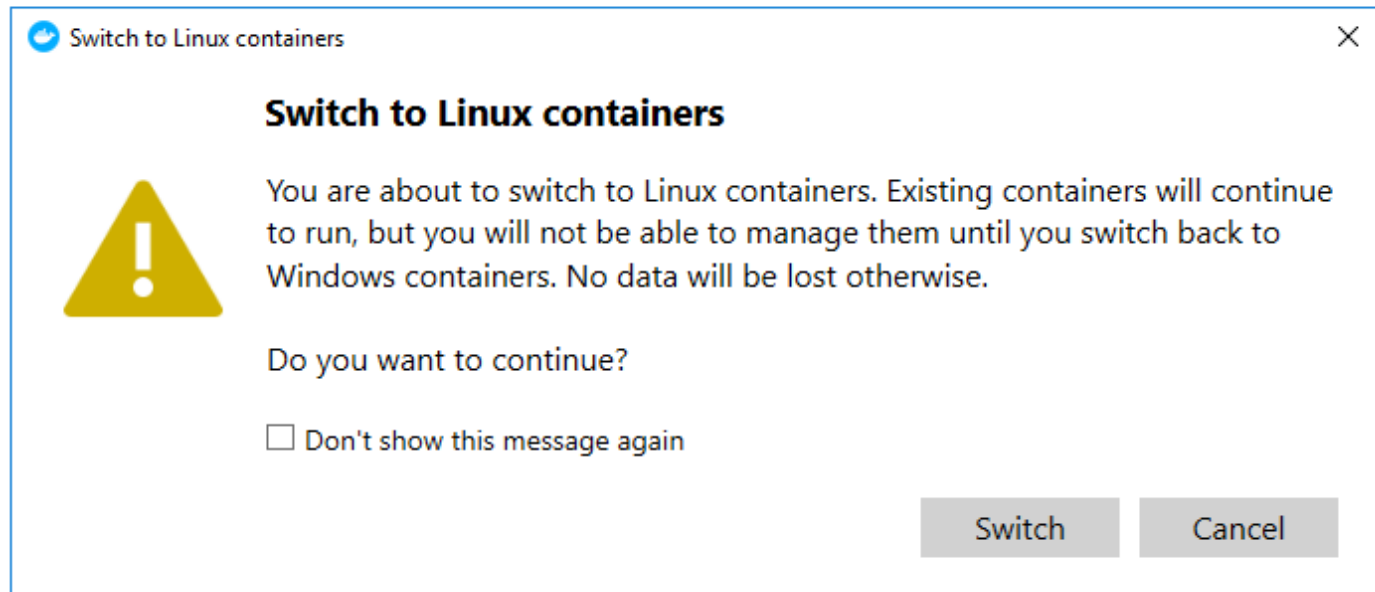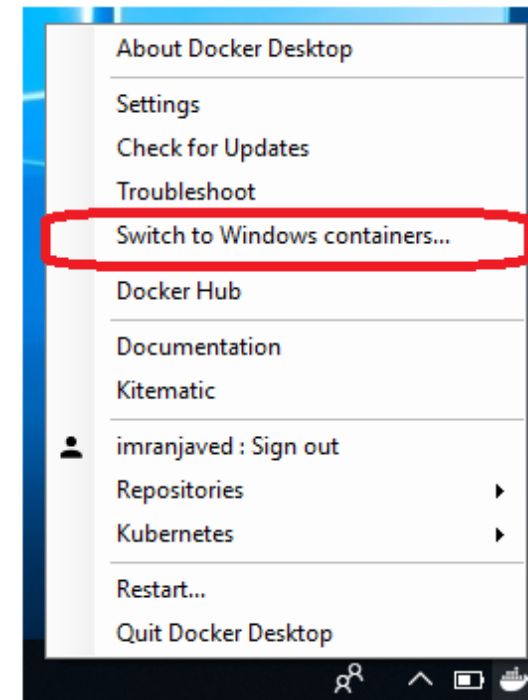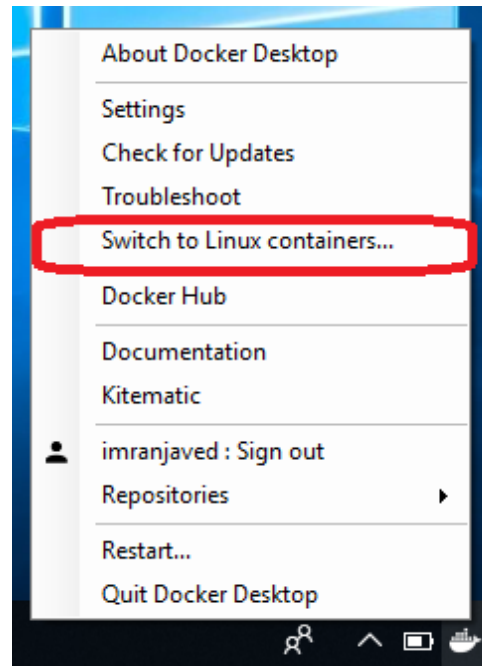
Azure Free Subscription

- 100 $ for free without credit card

Azure Deployment

- [Quickstart - Deploy Docker container to container instance - Azure CLI - Azure Container Instances | Microsoft Docs](#)

- Use Azure Container Instances to run serverless Docker containers in Azure with simplicity and speed.

- [Azure Cloud Shell Quickstart - Bash | Microsoft Docs](#)
- If you prefer, [install](#) the Azure CLI to run CLI reference commands.

Deploying a container on Azure

- [Deploying Docker containers on Azure | Docker Documentation](#)
- Run Docker containers on ACI

- Docker not only runs containers locally, but also enables developers to seamlessly deploy Docker containers on ACI using docker run or deploy multi-container applications defined in a Compose file using the docker compose up command.

- The following sections contain instructions on how to deploy your Docker containers on ACI.

- Also see the full list of container features supported by ACI.

- The Docker Azure Integration enables developers to use native Docker commands to run applications in Azure Container Instances (ACI) when building cloud-native applications.

Deploying a container on Azure

- Azure Container Instance
- [ACI integration container features | Docker Documentation](#)
- Single containers can be executed on ACI with the docker run command. A single container is executed in its own ACI container group, that will container only one container.
- Containers can be listed with the docker ps command, and stopped and removed with docker stop <CONTAINER> and docker rm <CONTAINER>.