# ASP.NET Core App in a Docker Container in Linux

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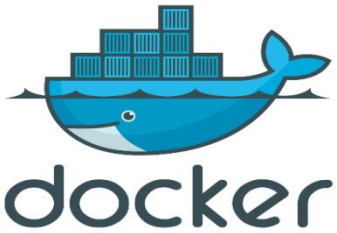
#Docker, #ASPNETCORE



January 12, 2017
Mississauga .NET User Group
https://www.meetup.com/MississaugaNETUG/events/236338932/

# Agenda

- Docker Containers
- Docker Benefits for Developers
- How to use a Docker Client
- ASP.NET Core
- Hooking Your Source Code into a Container
- Demo

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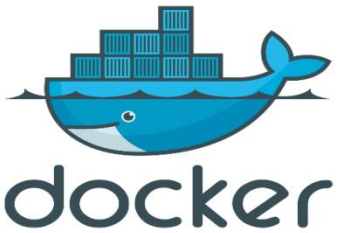
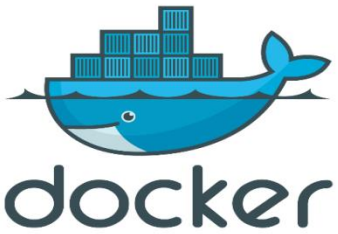
# What is Docker?

- Docker containers wrap a piece of software in a complete filesystem that contains everything needed to run: code, runtime, system tools, system libraries – anything that can be installed on a server. This guarantees that the software will always run the same, regardless of its environment.



# What is Docker?

- Lightweight, open source, secure platform
- Simplifies building, shipping, running apps
- Shipping container system for delivering code
- Runs natively on Linux and Windows Server 2016 or higher
- Relies on Images and Containers



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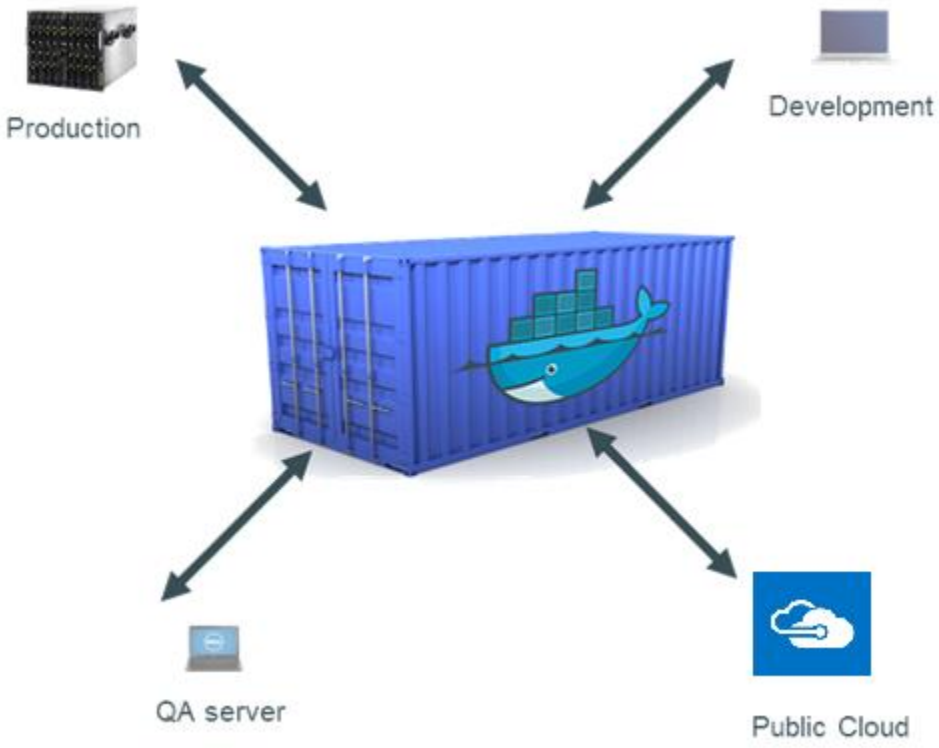
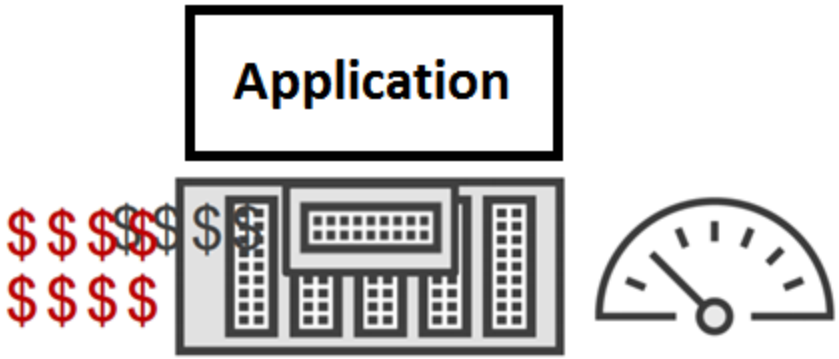


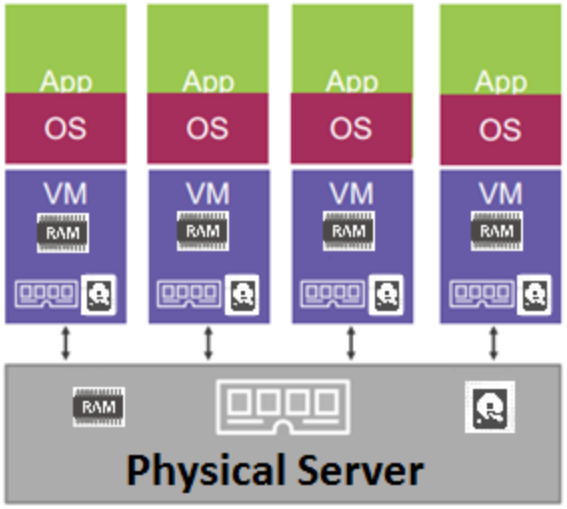
# Servers in Old days

– One application on one physical server.
  - Procurement
  - Capex and Opex costs
  - Costs: Hardware, Power, Administration, etc.
  - Massively Over-Powered Servers with 10% CPU consumption



# Virtualization and Hypervisor

– Technology that enables us having Same Physical Server and squeeze so much more
– Instead of one application on one physical server, now multiple application on one physical server.



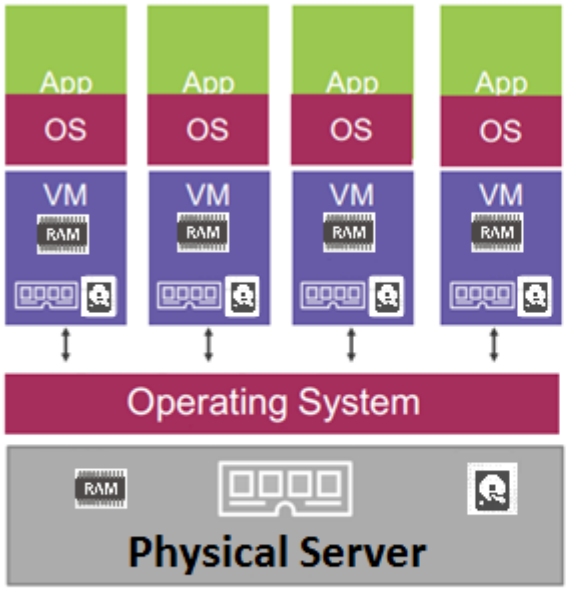
# Virtualization Issues

- One physical server
- n virtual machines for n applications
- These vm are slices of physical hardware, e.g. allocating 25% of cpu power, 25% memory, 25% disk space
- These vm are slices of real resources in the physical server
- Each of these vms needs a dedicated OS and each of which uses cpu, memory, and disk
- So far it is just OS and there is no application yet
- Each OS needs license $$$$
- Each OS needs admin e.g. patching, anti-virus

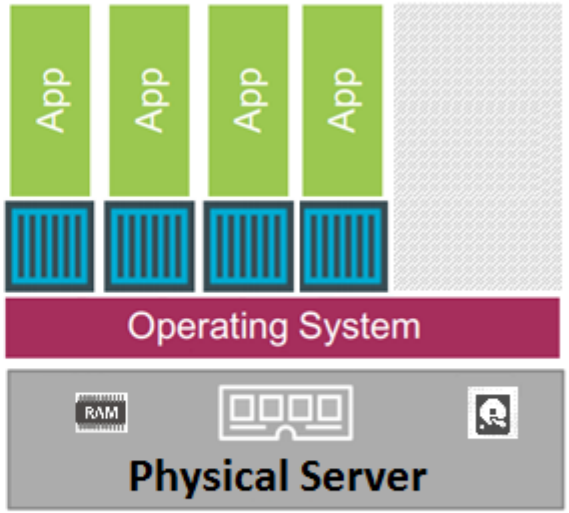
# Docker containers

- Instead of installing Hypervisor and virtual machines, we install only one OS and on top that we create 4 containers. Then applications are running inside each containers.
- Containers are much smaller and more efficient than VMs

# Containers vs Virtualization




Hypervisor Architecture



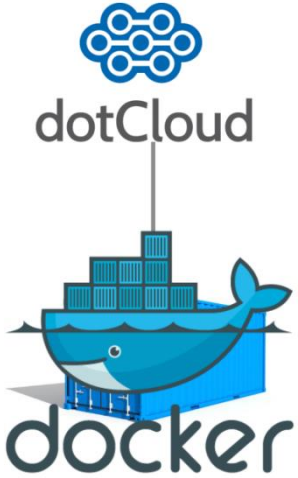

Container Architecture

# Docker

- Docker is the containers What Vmwares is to the Hypervisor
- Docker Inc.(the company)
- Docker project: container engine plus Docker tools e.g. Docker client, Docker compose…

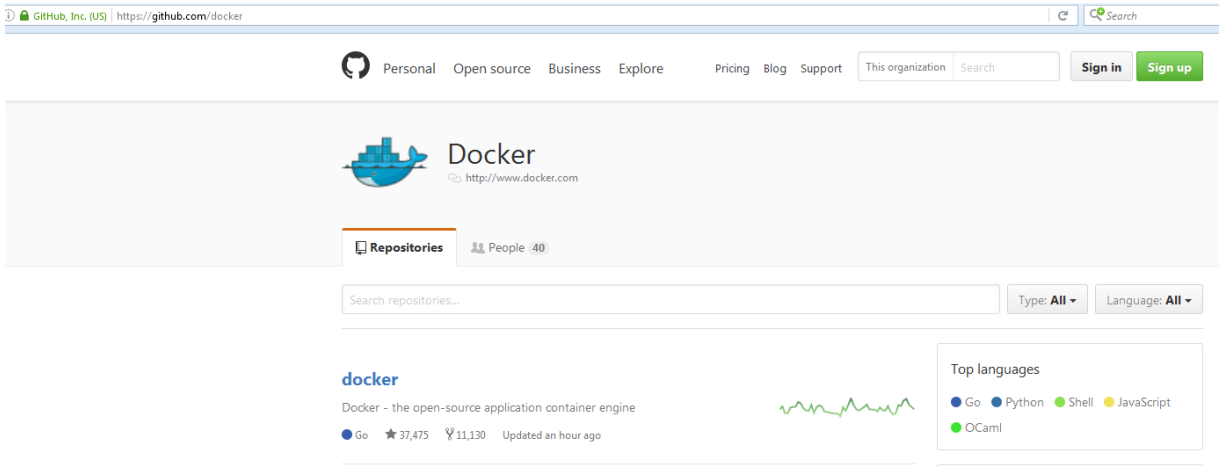
# Docker Inc.

- The major company and the main sponsor behind the container technology.
- Tech Starter based on SF
- https://www.docker.com/company
- Originally it was dotCloud (platform as a service) and the idea behind that business was to offer the developer platform on top of amazon web service



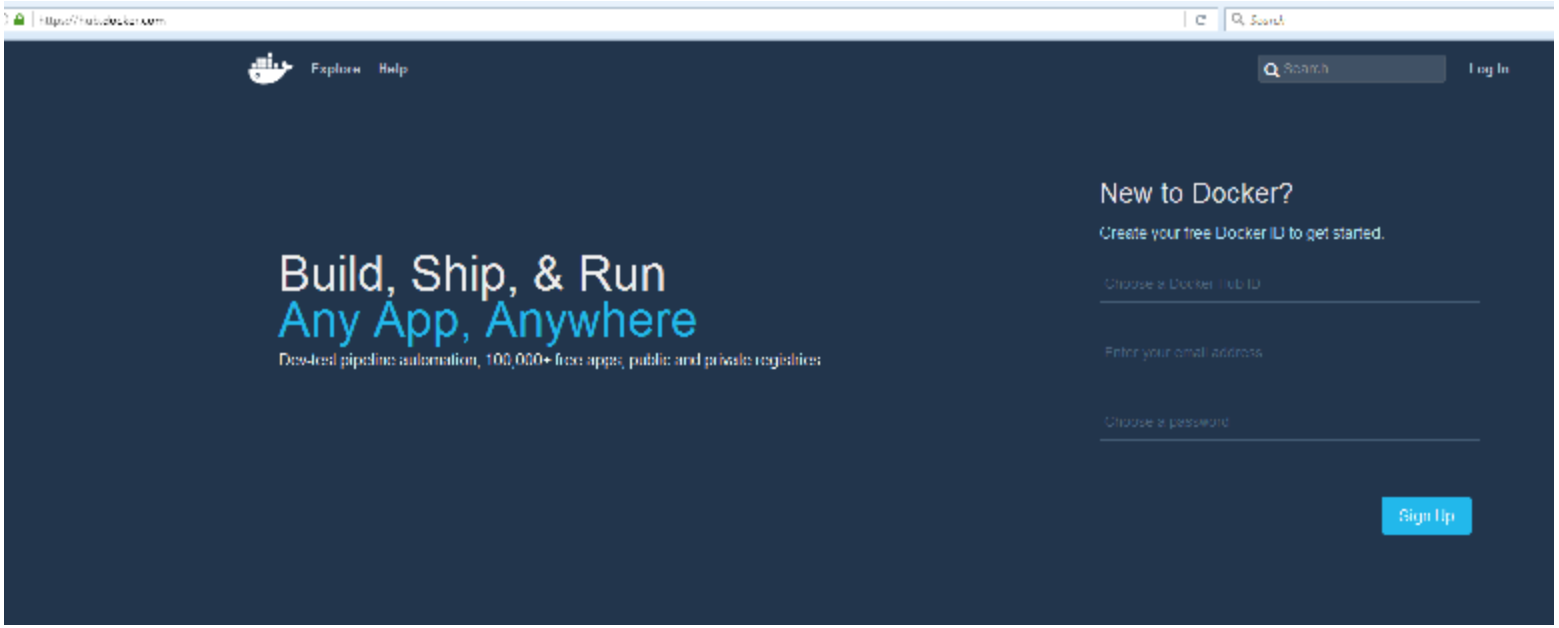
# Docker Project

- The Docker project is not absolutely the Docker Inc.
- It belongs to the community.
- Open source under Apache License 2.0
- Core Docker component written in GO language



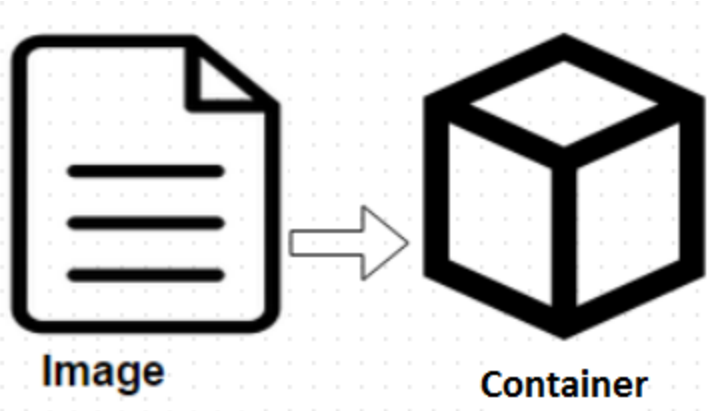
# Docker Hub

- The public Docker registry.
- Place you can store and retrieve Docker images



# What is Docker Image?

- Image: is a virtual machine template
- docker images
- docker run images-name
- docker stop myDockerMachine
- docker start myDockerMachine



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# Docker Benefits for Developers

- Accelerate Developer Onboarding
- No More App Conflict
- Consistent Environment
- Faster Software Shipment

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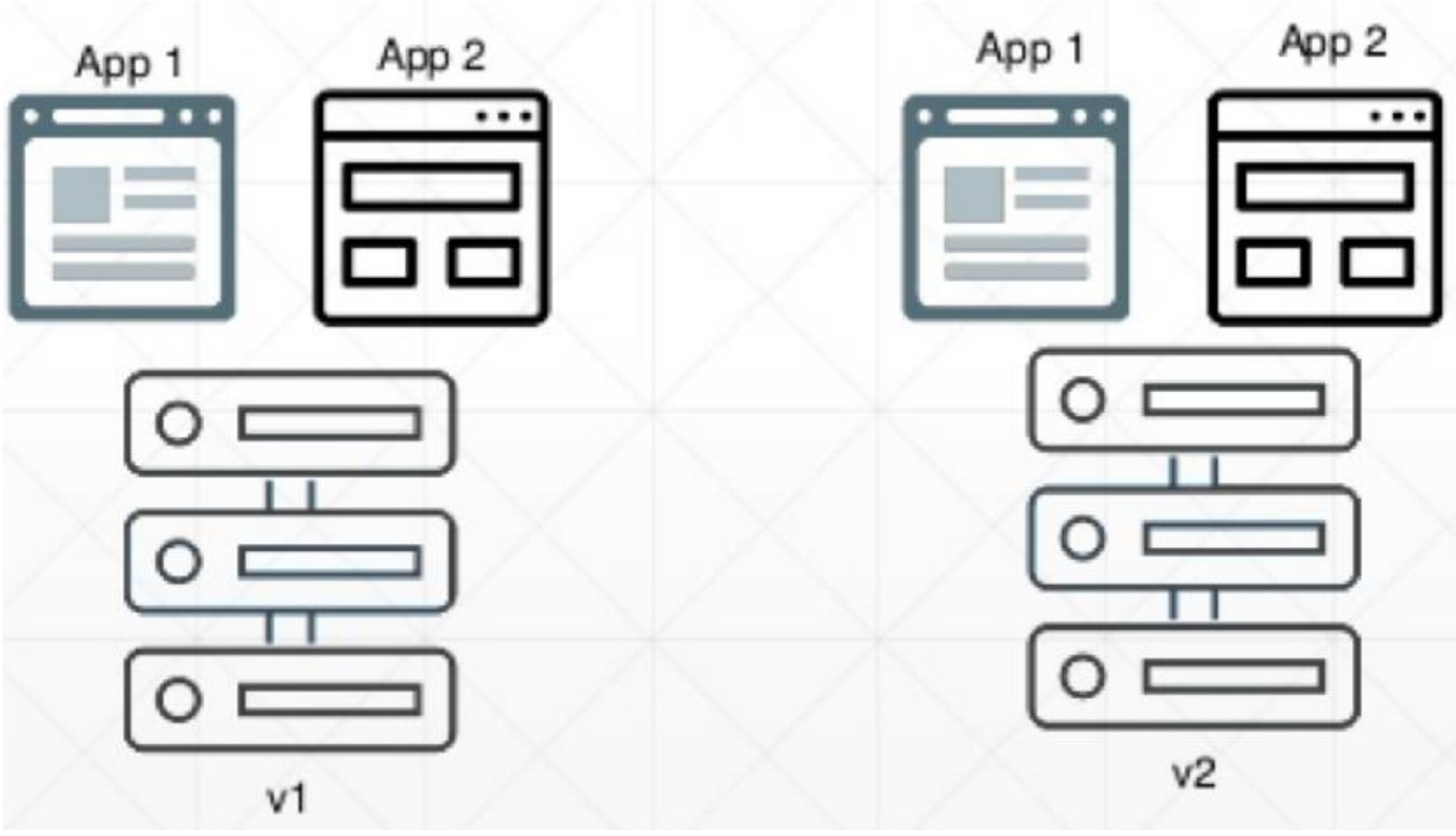

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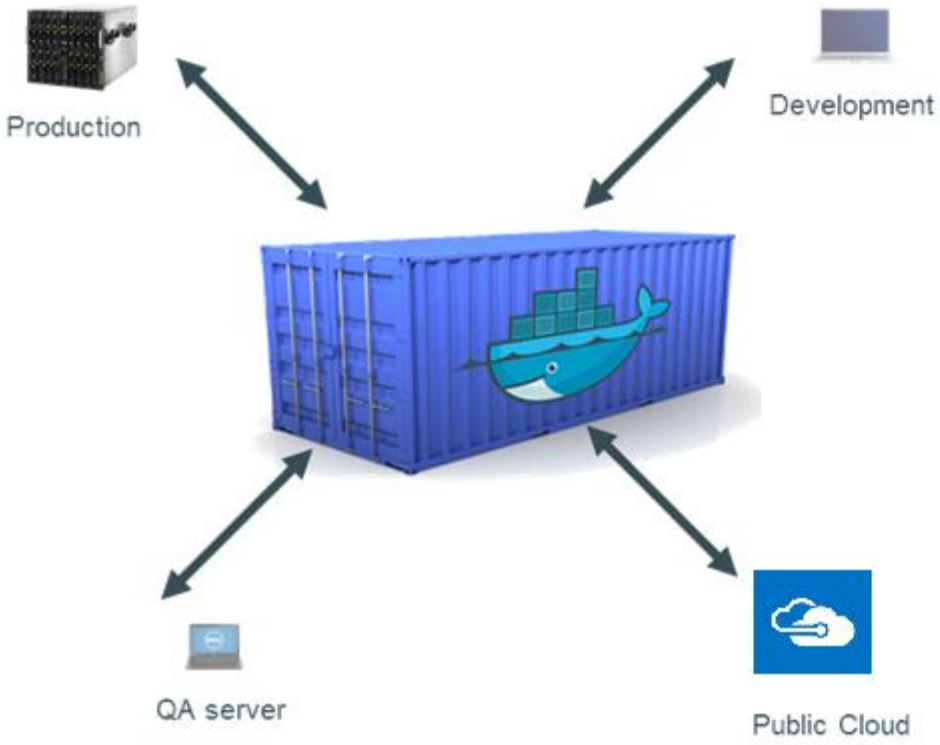

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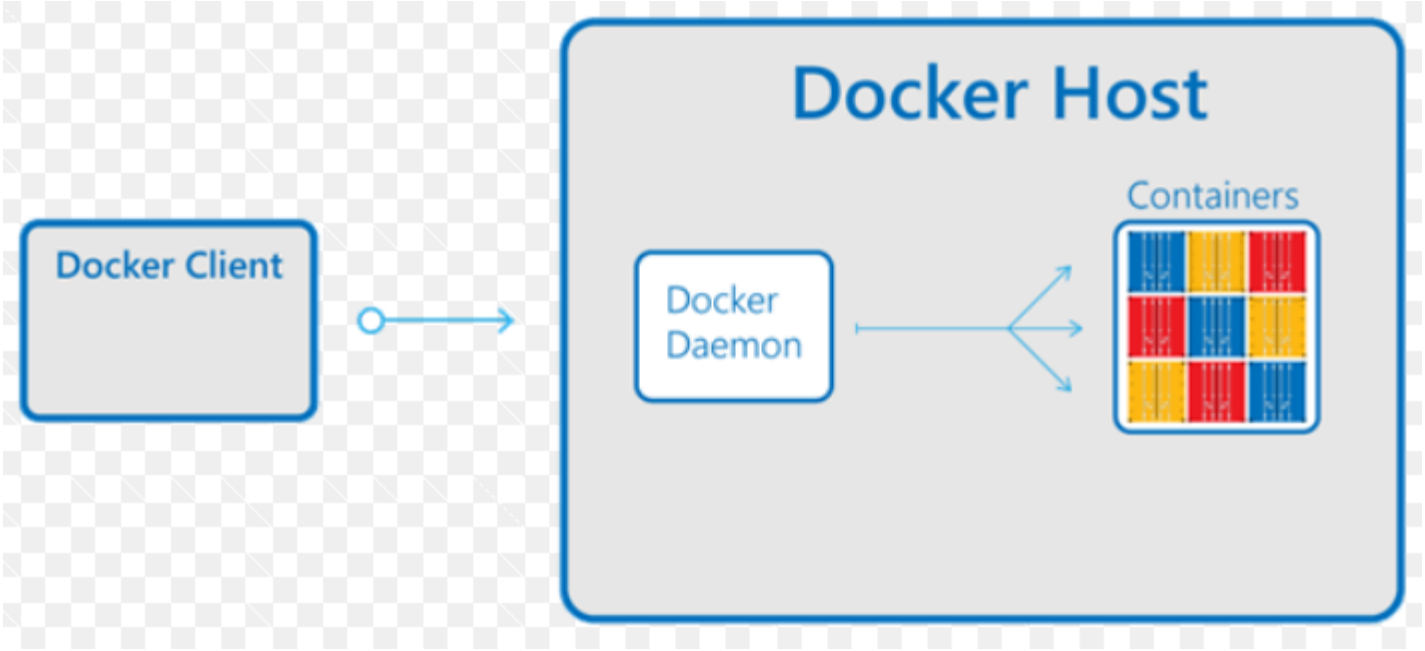
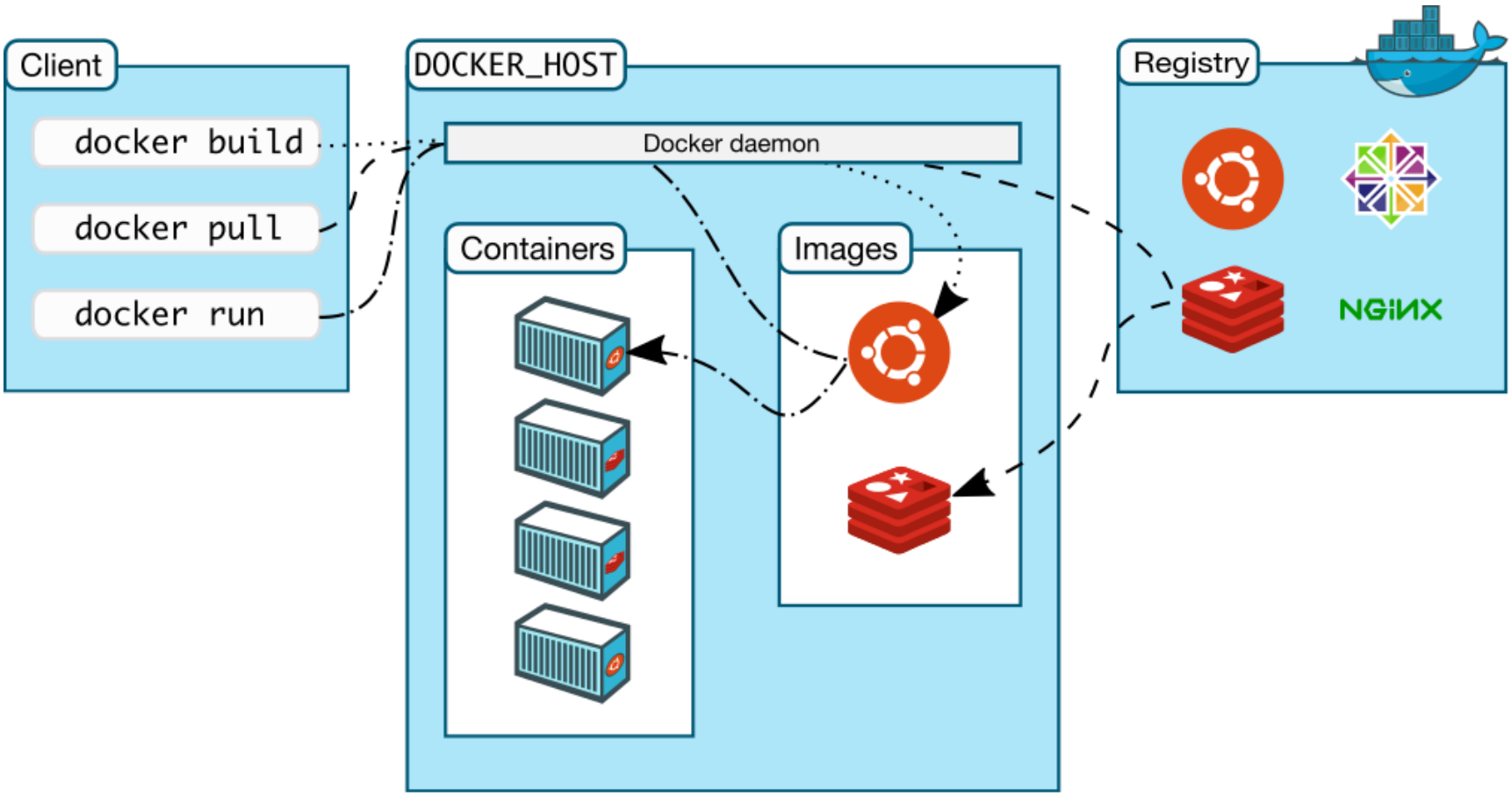
# Docker Client



# Docker Client



# Docker Client

- Install Ubuntu
- In my machine the host OS is Ubuntu but if you have a windows machine you can install Ubuntu or any other Linux distro using Virtual box.
- Sudo su
- apt-get install –y docker.io
- Docker version =>gives both client and server version
- Docker info => give info about containers status and images
- Docker pull  IMAGE_NAME=> pull image locally
- Docker images
- Docker run IMAGE_NAME
- Docker ps => list running containers
- Docker ps  -a=> list all containers
- Docker stop IMAGE_NAME =>stop container
- Docker rm  IMAGE_NAME=> remove stopped container
- Docker rmi IMAGE_NAME =>remove image from docker host

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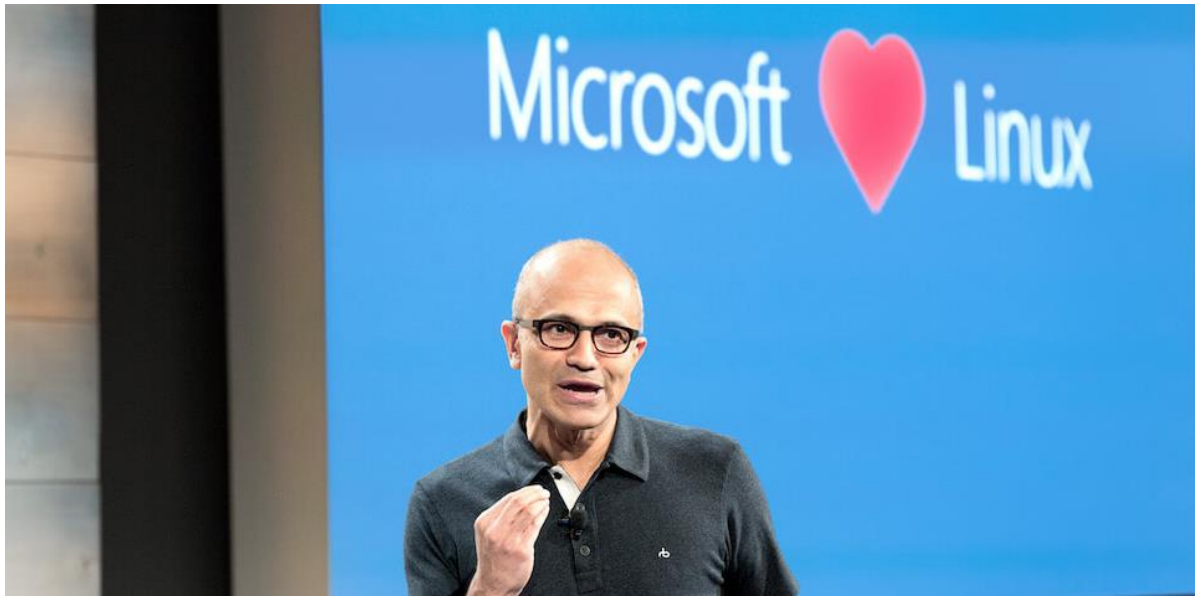
# ASP.NET Core

- Cross Plat form .NET
  - Mono
  - .NET Core



# ASP.NET Core

- Mono
  - Mono is an open source implementation of Microsoft's .NET Framework
  - Sponsored by Microsoft
  - Joined the .NET Foundation

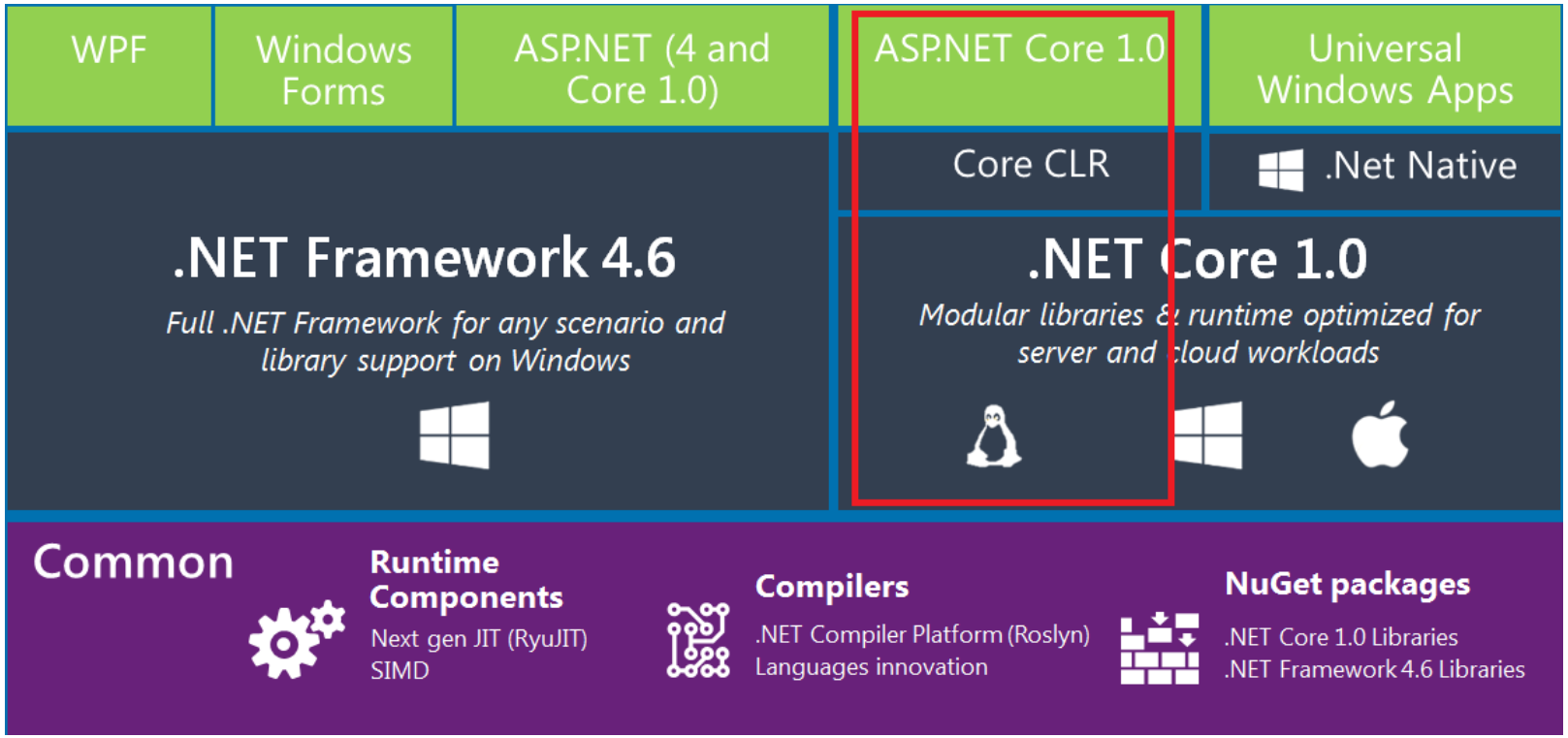
# ASP.NET Core

- .NET Core
  - Lightweight open source framework
  - Runs on Windows, Linux, OSX
  - Less features than old .NET Framework

# ASP.NET Core

- ASP.NET Core is a lean and composable framework for building web and cloud applications.
- Fully open source and available on **GitHub**
- Formerly ASP.NET 5
- Runs on .NET Framework and .NET Core
- Available on Windows, Mac, and Linux

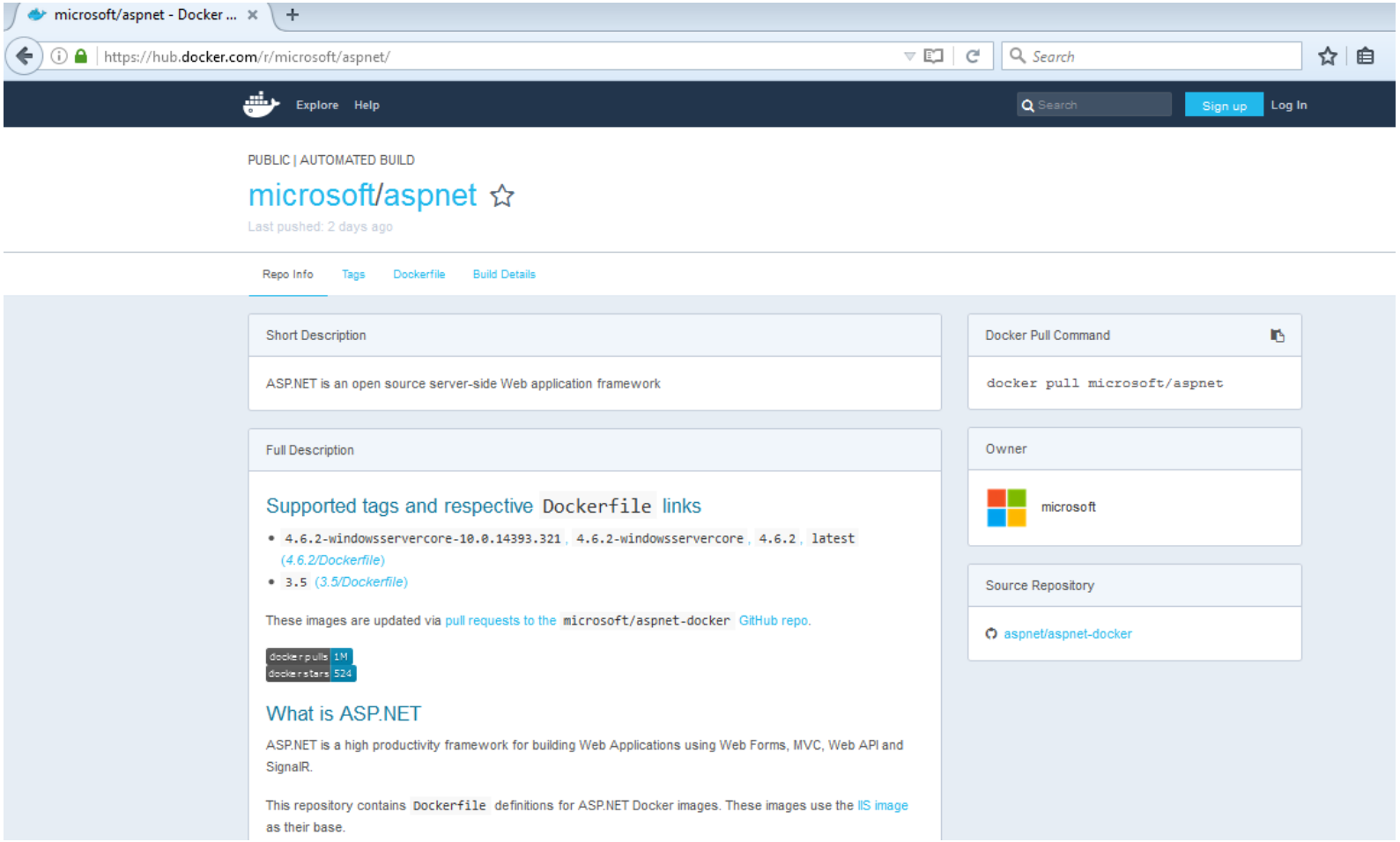
# ASP.NET Core


WPF
Windows Forms
ASP.NET (4 and Core 1.0)
ASP.NET Core 1.0
Universal Windows Apps
Core CLR
.Net Native
.NET Framework 4.6
Full .NET Framework for any scenario and library support on Windows
.NET Core 1.0
Modular libraries & runtime optimized for server and cloud workloads
Common
Runtime Components
Next gen JIT (RyuJIT)
SIMD
Compilers
.NET Compiler Platform (Roslyn)
Languages innovation
NuGet packages
.NET Core 1.0 Libraries
.NET Framework 4.6 Libraries

# ASP.NET Core

- **ASP.NET Core and Docker**
  - microsoft/dotnet image
  - Official base image for .NET Core applications
  - Based on Debian
  - Uses the “stable” version of .NET Core

# ASP.NET Core


microsoft/aspnet - Docker ...
https://hub.docker.com/r/microsoft/aspnet/
Search
Explore
Help
Search
Sign up
Log In
PUBLIC | AUTOMATED BUILD
microsoft/aspnet
Last pushed: 2 days ago
Repo Info
Tags
Dockerfile
Build Details
Short Description
ASP.NET is an open source server-side Web application framework
Docker Pull Command
docker pull microsoft/aspnet
Full Description
Supported tags and respective Dockerfile links
4.6.2-windowsservercore-10.0.14393.321, 4.6.2-windowsservercore, 4.6.2, latest (4.6.2/Dockerfile)
3.5 (3.5/Dockerfile)
These images are updated via pull requests to the microsoft/aspnet-docker GitHub repo.
dockerpulls 1M
dockerstars 524
What is ASP.NET
ASP.NET is a high productivity framework for building Web Applications using Web Forms, MVC, Web API and SignalR.
This repository contains Dockerfile definitions for ASP.NET Docker images. These images use the IIS image as their base.
Owner
microsoft
Source Repository
aspnet/aspnet-docker

# ASP.NET Core

- Ken Cenerelli presentation

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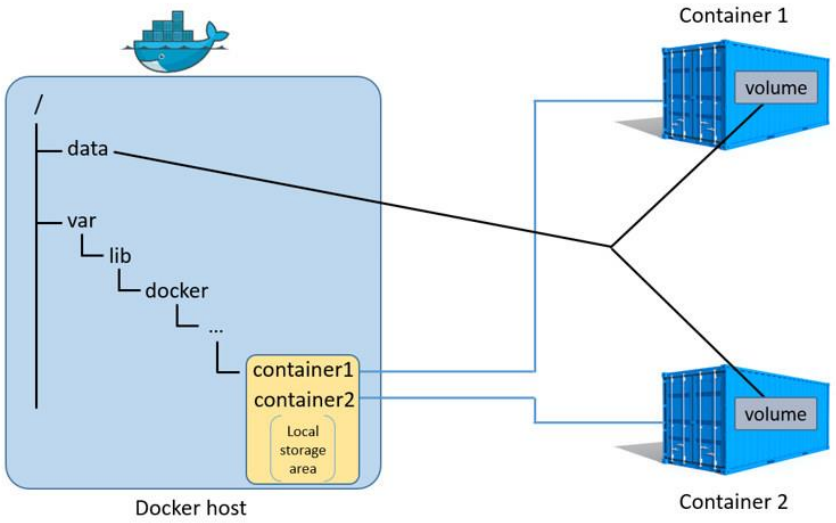
# Sharing Files

- Image Level: Read only
- Container Level: goes away if container removed
- Data Volume

# Volumes

- Data Volume: is a special type of directory in containers. Similar to a network mapped drive.
- Separate from image and containers. Any changes to the image/container won't impact volume.
- They can be shared among other containers e.g. one source code and running multiple instance of the code on different containers.
- Persisted to the Docker host.
- docker run -p 8080:5000  -v $(pwd):/app  microsoft/aspnet



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Demo