

# Lunchtimme med Stefan

Docker och Containers

Stefan Holmberg, Systemmentor AB

# Agenda

- Vad är Docker (dvs containers)
  - Virtuella maskiner vs Docker
  - Vad är Linuxdistributioner och relaterar det till Docker?
  - Resultatet: container är **som** en VM fast med subsekund boot
- Användningsområden
  - För utvecklare (olika miljöer, versioner av SQL etc etc etc)
  - Deploya vår applikation med OS och all konf = aldrig mer (jaha det funkar inte på kundens server för dom har ju v 2.2 av blablabla)
  - Low cost/low resource isolerade miljöer
    - Ex Cloud hosting tjänster idag hostar mha Docker images (ex Elastic Beanstalk, Azure App Service)
- Praktiska demonstrationer
- Kubernetes



# Om mig

- Eget företag i 23 år
  - Konsultat som Webutvecklare( .NET stack ) bank/finans/ecommerce
  - Utbildar inom IT (.NET, IOT, Säkerhet, Java)
  - SAAS tjänster Cloud
    - lab1.systemmentor.se - interaktiv online Studentportal

# Virtuella maskiner

## Definition

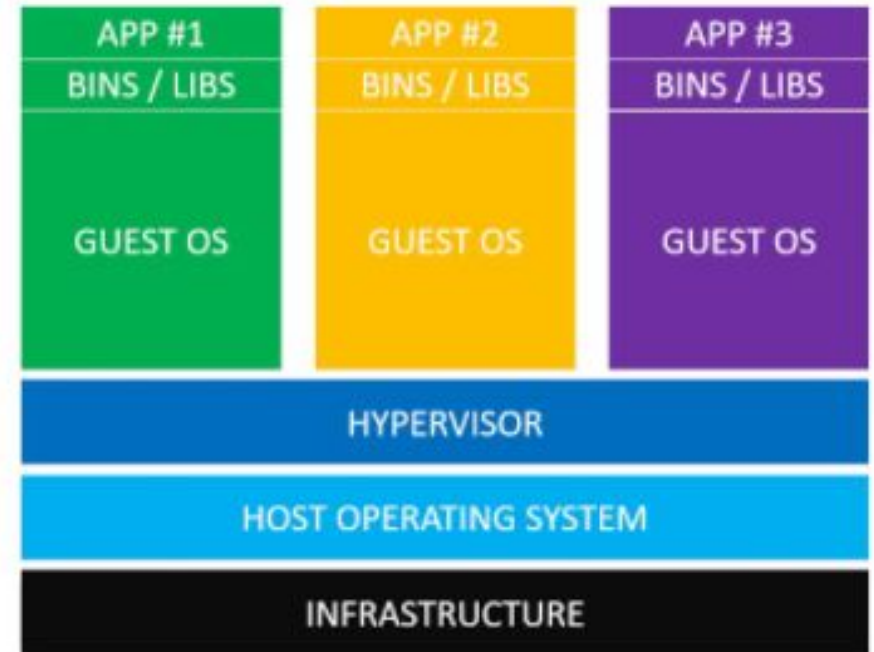
- A program to simulate a computer inside
- a computer. It is useful for testing programs that need a
- separate computer, without actually having a
- second computer.
- DET ÄR INTE: "dual boot".**

## Exempel:

- Vic64/Nintendo emulatorer på PC
- Köra många maskiner samtidigt (eget "labb"
- och sätta upp nätverk etc hemma)

## Obs!

- Alla virtuella maskiner har ett eget OS osv osv



Virtual Machines

# Stefan demar

Vi skapar en ny virtuell maskin

Vi laddar ner Ubuntu 20 (2.7GB)



Vi installerar tex Ubuntu ...

Vi installerar ex Apache/Tomcat  
Java 11 etc etc etc

Vi startar en virtuell maskin

Of course I'm not gonna do this while you are waiting...



# Stefan demar

Vi skapar en ny container...

Lås oss säga med MySQL v5.7.33 (gammal men låt oss säga att en kund har problem med vår app och dom kör just den versionen )



Vi startar containern och konfar nätverk så port 3306 (MySQL porten) tunnlas till hosten - dvs (localhost,

Vi kör MySQL prompt mot den...

Vi stänger ner

Vi startar igen osv osv

Nu har vi har en kund till och den kör MySQL 8

Vi skapar container, startar, kör osv osv



```
docker pull mysql:5.7.33
docker run --name mysqlold -p 3306:3306 -e MYSQL_ROOT_PASSWORD=stefan mysql:5.7.33
docker stop mysqlold
```

```
docker pull mysql:latest
docker run --name mysqlnew -p 3306:3306 -e MYSQL_ROOT_PASSWORD=stefan mysql:latest
docker stop mysqlnew
```

# Begrepp

<h2>VM</h2>	<h2>DOCKER</h2>																																																																																																																																												
<p><b>ISO</b> (Dvs en fil med ett "operativsystem" i redo att installeras) STORA FILER, ex 2,7GB (Ubuntu 20)</p> <p>Används för att skapa</p> 	<p><b>IMAGE</b> (dessa kan man hitta på tex <a href="https://hub.docker.com">hub.docker.com</a>) De är smarta ("changeset"-drivna lite som git) och bygger på andra images etc (väsentligt mindre att ladda ner).</p> <p>Docker hanterar images åt oss (vi behöver inte komma ihåg c:\stefan\downloads eller var det nu var)</p> <p>Används för att skapa</p> 																																																																																																																																												
<h2>Virtual machine</h2>  <p>En virtuell maskin är en körbar "dator"</p>	<h2>Container</h2> <pre>PS C:\Users\stefa\source\repos\Business\StudentPortal\docker\docker\inside\dockerwith\console&gt; docker ps -a</pre> <table border="1"><thead><tr><th>CONTAINER ID</th><th>IMAGE</th><th>COMMAND</th><th>CREATED</th><th>STATUS</th><th>PORTS</th><th>NAMES</th></tr></thead><tbody><tr><td>7c268db93b1c</td><td>docker:dind</td><td>"dockerd-entrypoint..."</td><td>16 hours ago</td><td>Up 16 hours</td><td>2375-2376/tcp</td><td>interactivedocker-21</td></tr><tr><td>553ccab22e1b</td><td>docker:dind</td><td>"dockerd-entrypoint..."</td><td>39 hours ago</td><td>Up 39 hours</td><td>2375-2376/tcp</td><td>interactivedocker-20</td></tr><tr><td>a0823403614c</td><td>docker:dind</td><td>"dockerd-entrypoint..."</td><td>39 hours ago</td><td>Up 39 hours</td><td>2375-2376/tcp</td><td>interactivedocker-19</td></tr><tr><td>9d5aaf795fbc</td><td>docker:dind</td><td>"dockerd-entrypoint..."</td><td>39 hours ago</td><td>Up 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# Same same but different names alltså?

## **Absolut INTE!**

Alla containers DELAR Linuxkärnan i HOST. Inga helt egna OS

= sjukt mycket mer effektivt - resurs

= sjukt mycket mer effektivt = prestanda

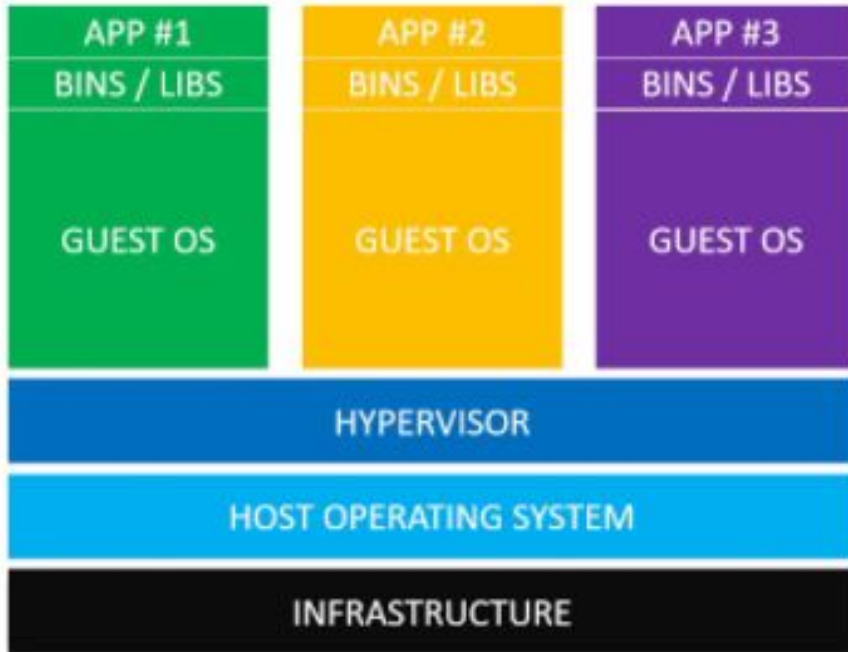
En VM bootar som en vanlig maskin...tar 1 minut?

En Container går igång på 1 sekund eller så!

En container är mer än en "tom" VM - den kan färdigprepareras med applikationen man vill köra. Tex vår egen microservice eller så. Eller Webserver och applikation



# Hur???



Virtual Machines

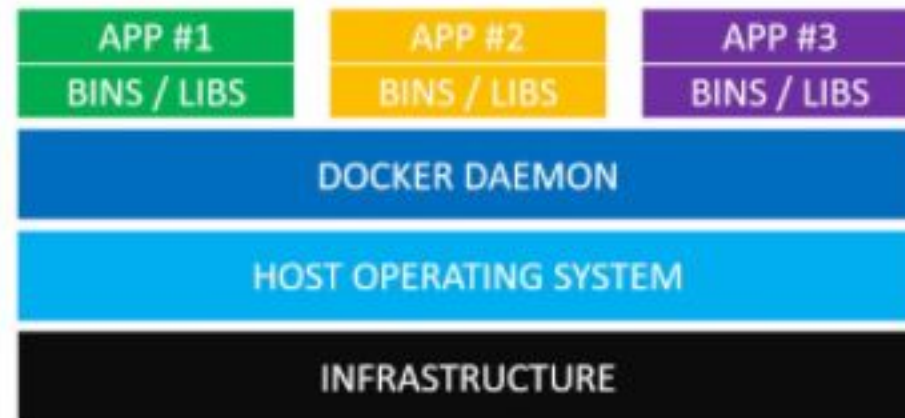
Vad menas med Linuxdistributioner?

Alla har samma Kernel!!! Förenklat är det "bara" Officepaket, fönstersystem, pakethanterare etc etc som är skillnaden.

Vad tar tid vid boot? Hårdvaruinitiering (kernel)

I Docker delar alla containers på hostens Kernel.

Huereka = när en container "bootar" är kerneldelen ju redan klar



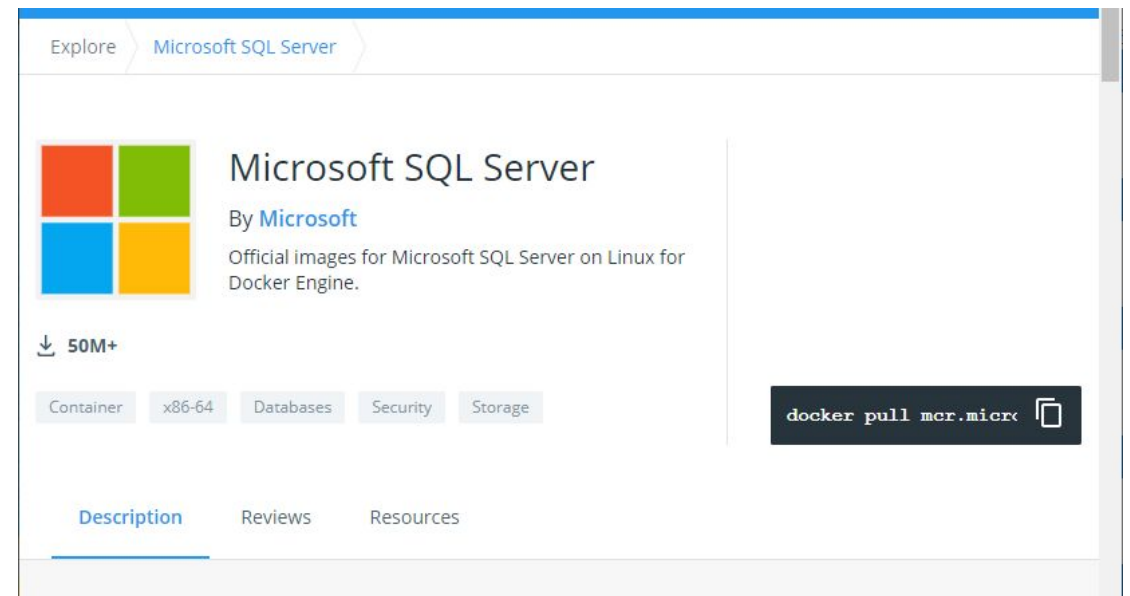
Docker Containers

# Ok men du pratar Linux ???

Jag kör ASP.NET Core och SQL Server

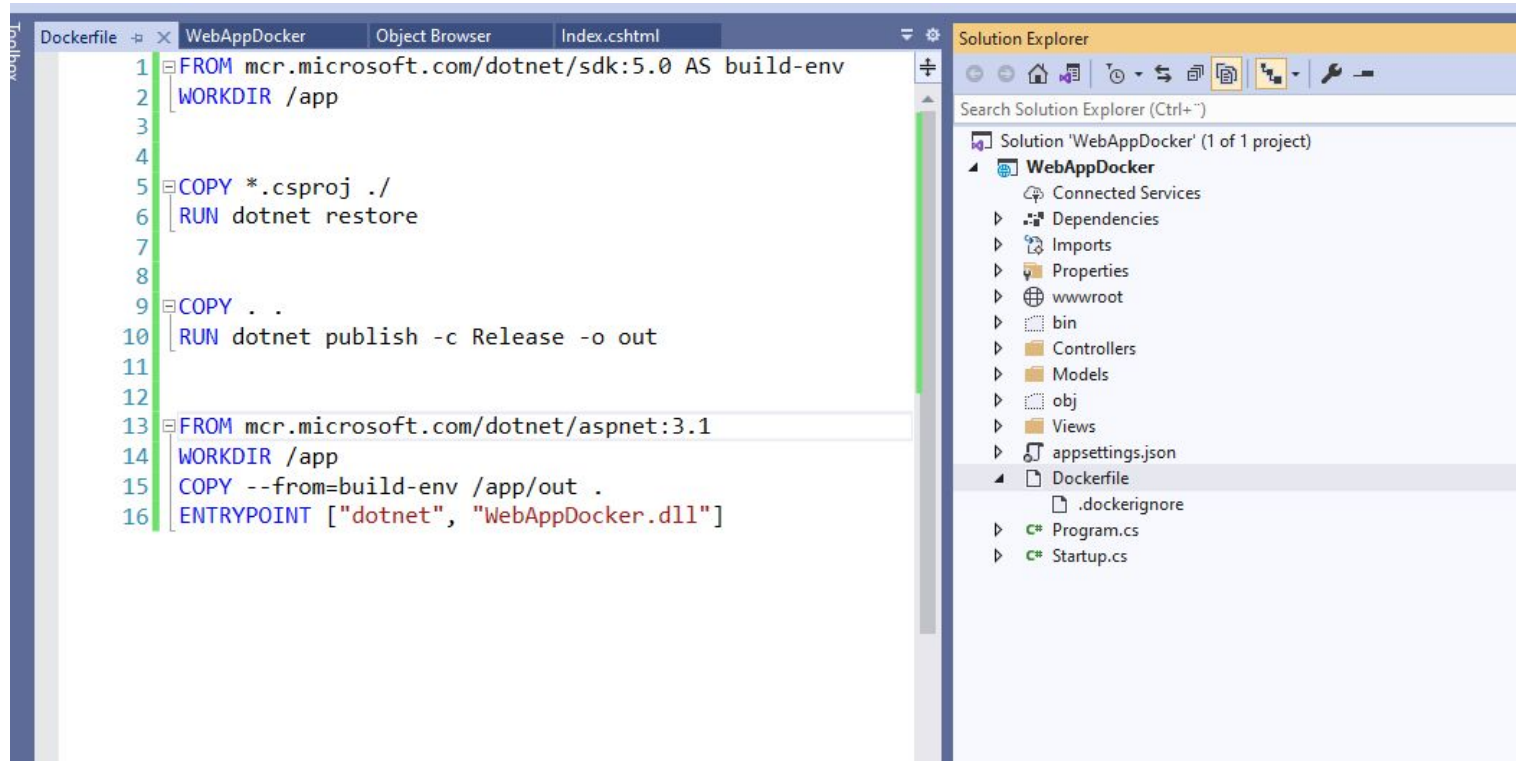
Fine! Jag hostar ALLA mina ASP.NET MVC Core sajter i Azure på en Linux App Service. Deploy (publish) funkar PRECIS som vanligt

SQL Server: jag kör Azure SQL i Azure men lokalt?



# Skapa en “egen” image - med vår kod körbar och färdigkonfod på

Vi lägger till en Dockerfile i ASP.NET Core projektet



```
1 FROM mcr.microsoft.com/dotnet/sdk:5.0 AS build-env
2 WORKDIR /app
3
4
5 COPY *.csproj ./
6 RUN dotnet restore
7
8
9 COPY . .
10 RUN dotnet publish -c Release -o out
11
12
13 FROM mcr.microsoft.com/dotnet/aspnet:3.1
14 WORKDIR /app
15 COPY --from=build-env /app/out .
16 ENTRYPOINT ["dotnet", "WebAppDocker.dll"]
```

The screenshot shows the Visual Studio IDE. The left pane displays the Dockerfile with 16 lines of code. The right pane shows the Solution Explorer for the project 'WebAppDocker', listing various folders and files including 'bin', 'obj', 'Views', 'appsettings.json', 'Dockerfile', and 'Startup.cs'.

# Skapa en “egen” image - med vår kod körbar och färdigkonfod på

```
FROM mcr.microsoft.com/dotnet/sdk:5.0 AS build-env  
WORKDIR /app
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FROM mcr.microsoft.com/dotnet/aspnet:3.1  
WORKDIR /app  
COPY --from=build-env /app/out .  
ENTRYPOINT ["dotnet", "WebAppDocker.dll"]
```

.dockerignore

bin/  
obj/

# Build image

Ställ dig i mappen med Dockerfile

```
docker build -t stefanscoreapp .
```

För att köra:

```
docker run -p 8080:80 --name myapp stefanscoreapp
```

Och surfa nu till (hostens) localhost:8080