Workshop

Container

in the Microsoft Universe

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time cockpit
Saves the day.

Your Host

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Questions for this Session

Why?
Docker is great on Linux, why do we need it on Windows?

Options, options, options
When to use what?

Demos, demos, demos
See things in action

Overview

Available Options and Tools

Microsoft ❤ Containers

Docker client on Windows

In Windows shell

In Bash shell (Bash on Ubuntu on Windows)

Demo

Docker Client

Docker Client in Windows Shell

Ubuntu subsystem for Windows

- Not Docker, not Hyper-V
- Pico processes

Bash on Ubuntu on Windows

- Advantage: Completion

Microsoft ❤ Containers

Docker client on Windows

In Windows shell
In Bash shell (Bash on Ubuntu on Windows)

Linux containers on Windows

Docker for Windows

Windows containers on Windows

Windows Server containers
Hyper-V containers
Docker support on Windows Server 2016 and Windows 10

Microsoft ❤ Containers

Ready-made containers

For Linux and Windows

See Docker Hub (e.g. Azure CLI, .NET Core, PowerShell, IIS, SQL Server on Linux, etc.)

Containers on Azure

Templates (e.g. Docker on Unbuntu) and drivers from Microsoft (details later)

Docker Machine with Azure driver

Run clusters (DC/OS, Docker Swarm, Kubernetes) with Azure Container Service

Visual Studio Support

Visual Studio Tools for Docker (VS2017)

VSTS Docker Extension

Demo

SQL Server

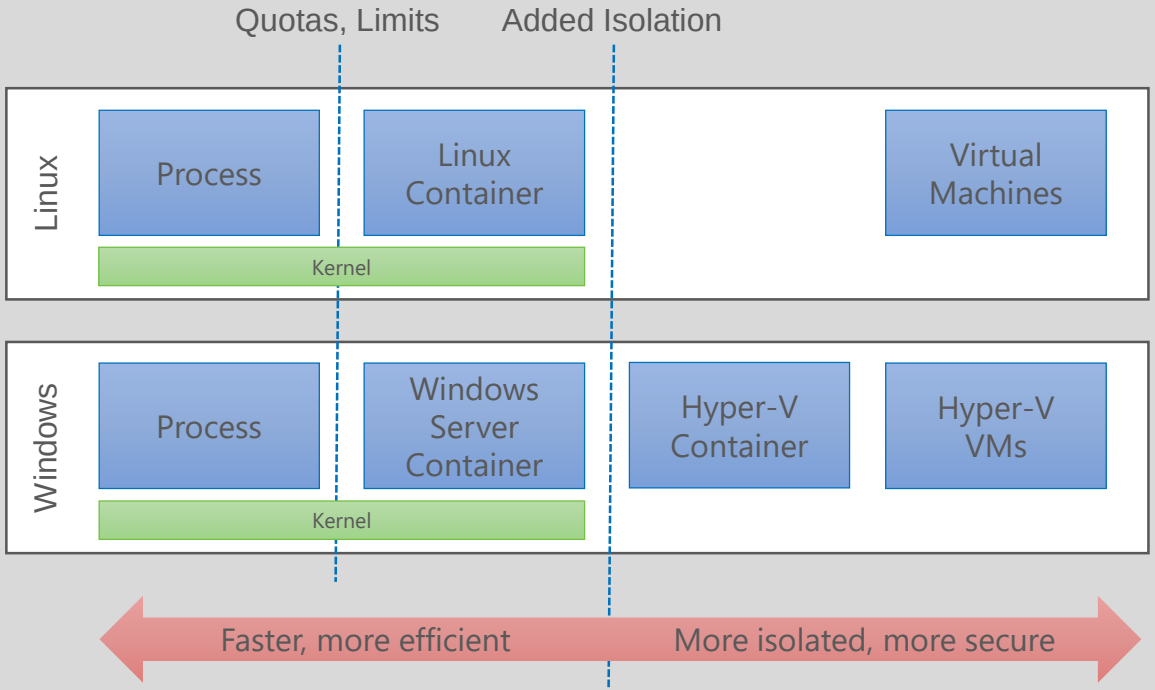
Linux

Windows

```
# Linux
docker run -e ACCEPT_EULA=Y -e SA_PASSWORD=P@ssw0rd!123 -m
4096MB -p 1433:1433 -d microsoft/mssql-server-linux

# Windows
docker run -d -p 1433:1433 -e sa_password=P@ssw0rd!123 -e
ACCEPT_EULA=Y microsoft/mssql-server-windows-developer
```

SQL Server

Strengths and Limits



Windows Server vs. Hyper-V Containers

- Managed almost identically (Docker and PowerShell)
- Difference: Isolation level
- More details in docs

Version Compatibility

- Server Containers: Must match
- Hyper-V Containers: Need not match

Source: Mark Fussel (Microsoft), Azure Service Fabric - Build always-on, hyper-scalable, microservice-based cloud applications

Isoluation

Windows Hyper-V Containers

Demo

```
# Run Hyper-V container
docker run -it --rm --isolation=hyperv microsoft/nanoserver
  cmd /c ping localhost –t

# Show vmwp.exe process on host -> virtual machine


# Run Windows Server container
docker run -it --rm --isolation=hyperv microsoft/nanoserver
  cmd /c ping localhost –t

# Show ping process on host -> kernel reuse
```

Isoluation

Windows Hyper-V Containers

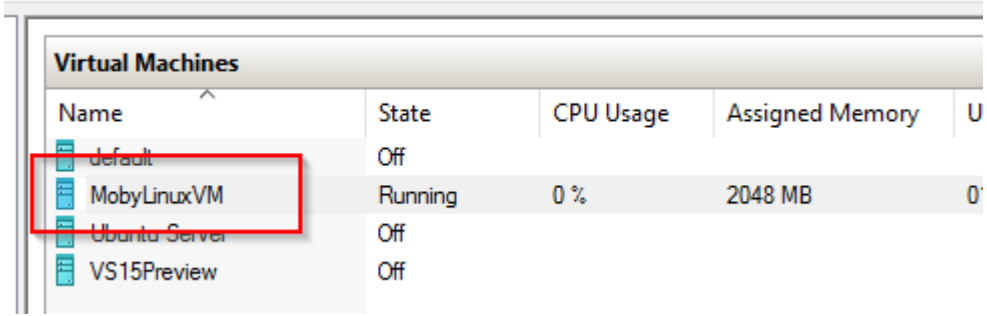
Linux on Windows

Running Linux containers on Windows

Linux on Windows

Use Docker for Windows

Uses Hyper-V to run Linux with Docker



Run Docker client on Windows or Linux

Demo

Docker for Windows

Docker for Windows UI

- Settings
- VM in Hyper-V

Container scenarios

- Interactive container
- Volume mapping
- Port mapping

Microsoft-provide image

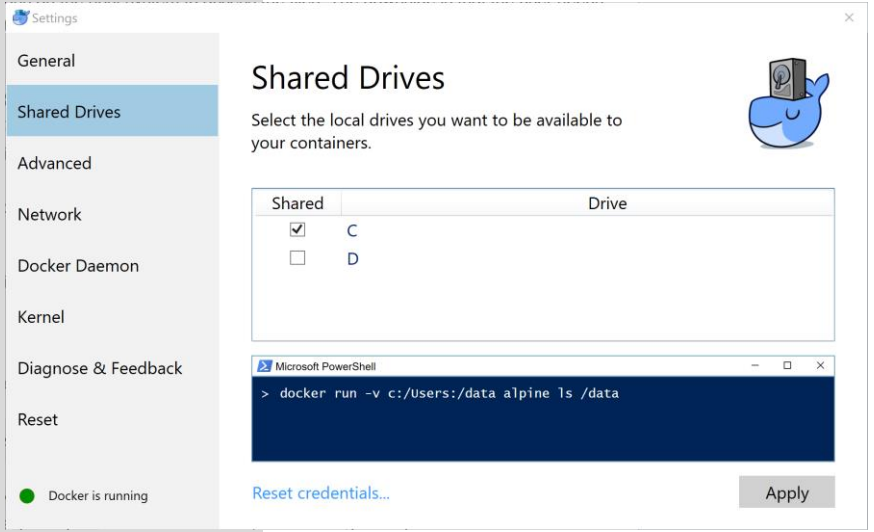
- .NET on Linux

```
# Run interactive ubuntu container
docker run -it --rm ubuntu /bin/bash

# Run postgres with volume mapping
docker run –d --name postgres -v c:\temp\data:/dbdata -e
POSTGRES_PASSWORD=P@ssw0rd! -e PGDATA=/dbdata postgres
# Show content of mapped volume on Windows

# Run mongo with port mapping
docker run -d --name mongo -p 27017:27017 mongo
# Use mongo client under Windows to access mongo in container

# Run .NET Core on Linux
docker run -it --rm microsoft/dotnet /bin/bash
mkdir /demo
cd /demo
dotnet new console --framework netcoreapp1.1
ls –la
dotnet restore
dotnet run

# Option: Show .NET Core with VSCode and
#         Volume mapping
```

Demo

Prerequisites

- Docker for Windows installed and configured
- Don't forget to share drive in Docker for Windows settings!



```
# nginx.conf
events {
  worker_connections 4096; ## Default: 1024
}

http {
  server {
    listen 80;
    location /global-azure-bootcamp-2017/ {
      root /usr/share/web;
    }
    location / {
      return 301 /global-azure-bootcamp-2017/;
    }
  }
}

# Dockerfile
FROM nginx:alpine
COPY . /usr/share/web/global-azure-bootcamp-2017
COPY nginx.conf /etc/nginx/nginx.conf
```

Demo

Jekyll

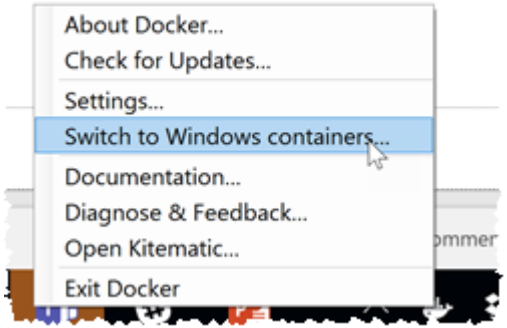
Windows on Windows

Running Windows containers on Windows

Windows on Windows

OS Support

Windows Server 2016
Windows 10 (Hyper-V Container)
Nice integration with Docker for Windows on Windows 10



Windows Server Container

Hyper-V Container

Additional isolation layer
Runs inside of Windows Nano Server VM

```
docker run -it --rm --isolation=hyperv microsoft/nanoserver
```

Demo

Windows Container

Docker on Windows 10
- Nano Server

Docker on Windows Server 2016
- Full Server
- Nano Server
- Remote Docker (Linux and Windows) client

Container scenarios
- Interactive container
- Dockerfiles on Windows
- Volume mapping
- Ready-made container (.NET)

```
# Ping Docker host on Windows Server
docker -H tcp://1.2.3.4:2375 info
set DOCKER_HOST=tcp://1.2.3.4:2375
docker info
docker ps -a
docker images

# Run 'dir' inside a short-lived Nano Server container
docker run --rm microsoft/nanoserver cmd /C dir

# Run existing IIS image (source: Microsoft)
docker run -d -p 80:80 microsoft/iis

# Volume mapping
echo Hello > c:\temp\greeting.txt
docker run --rm -v c:\temp:c:\somedir microsoft/nanoserver cmd
/C type \somedir\greeting.txt
```

Demo

Prerequisites

Windows Server with Container support

See also sample Dockerfile
https://github.com/rstropek/DockerVS2015Intro/blob/master/dockerDemos/07-win-container-nano-server/Dockerfile

```
FROM microsoft/windowsservercore
MAINTAINER rainer@timecockpit.com

RUN dism.exe /online /enable-feature /all /featurename:iis-
webserver /NoRestart

RUN echo "Hello World - Dockerfile" >
c:\inetpub\wwwroot\index.html

CMD [ "ping", "-t", "127.0.0.1" ]
```

Dockerfile

```
FROM microsoft/aspnet
COPY . /inetpub/wwwroot
```

Dockerfile

ASP.NET 4.6

Windows on Windows

Configuration via *daemon.json*

Details see Microsoft docs

Support for Dockerfiles

Windows shell
Powershell support
Details see Microsoft docs

Swarm-support is coming

Available to Windows 10 insiders already
Details see blog post

PowerShell for Docker

Alternative to Docker CLI

Docker on Azure

Running containers in Azure

Docker on Azure

Docker support in *Azure Resource Manager* (ARM)

Extension for Docker on Linux
Ready-made ARM-templates (e.g. Docker on Ubuntu)

Azure driver for *Docker Machine*

Azure Container Services (ACS)

Storage

Docker Volume Driver for Azure File Storage

Demo

Containers in Azure

Docker Machine
- Azure Driver

ARM with Docker
- Using Quickstart Template

Volume driver for Files

```
docker-machine create --driver azure --azure-subscription-id
00000000-0000-0000-0000-000000000000 doc16-demo
# Show result in Azure Portal

# Create volume on Azure files
docker volume ls
docker volume create -d azurefile --name myvol -o share=doc16
docker volume ls
docker run -it --rm -v myvol:/data ubuntu /bin/bash
  cd /data
  echo Hello > greeting.txt
  # Show result in Azure Portal
```

Demo

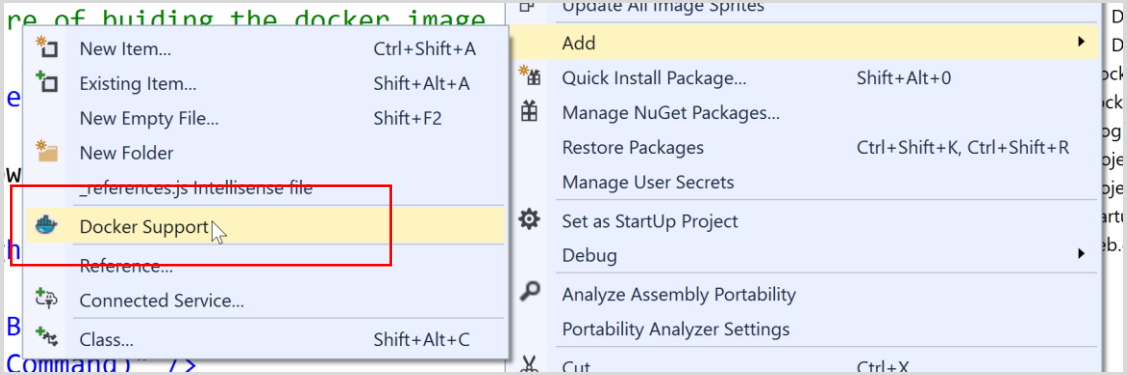
Prerequisites

- Docker Machine installed
- Docker Driver for Azure Files installed and configured

Developer Tools

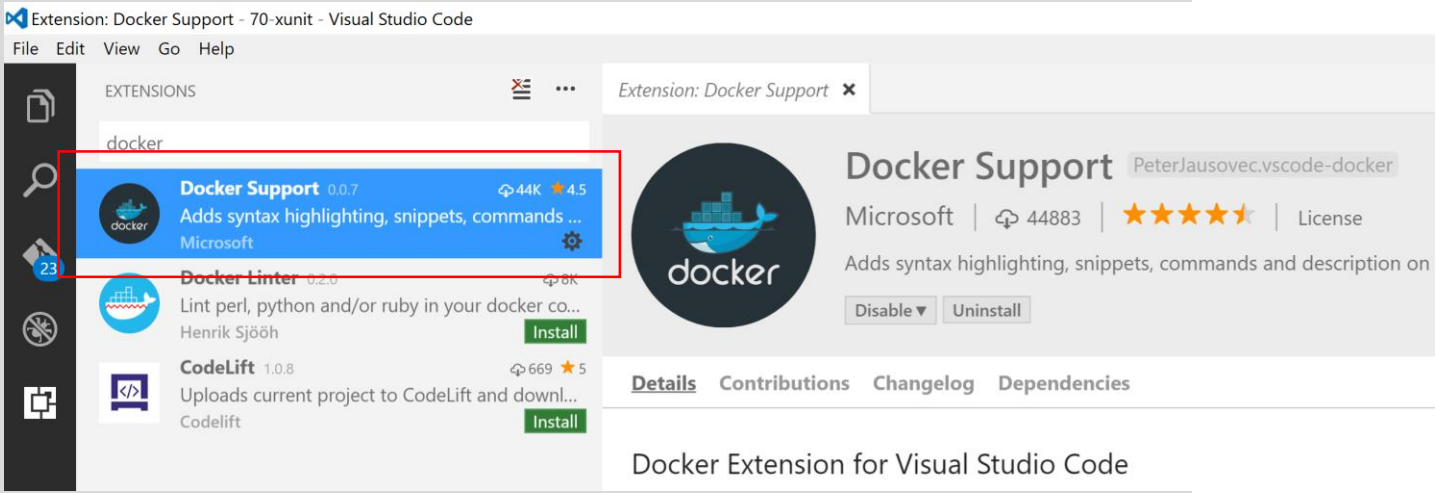
Visual Studio support

Visual Studio

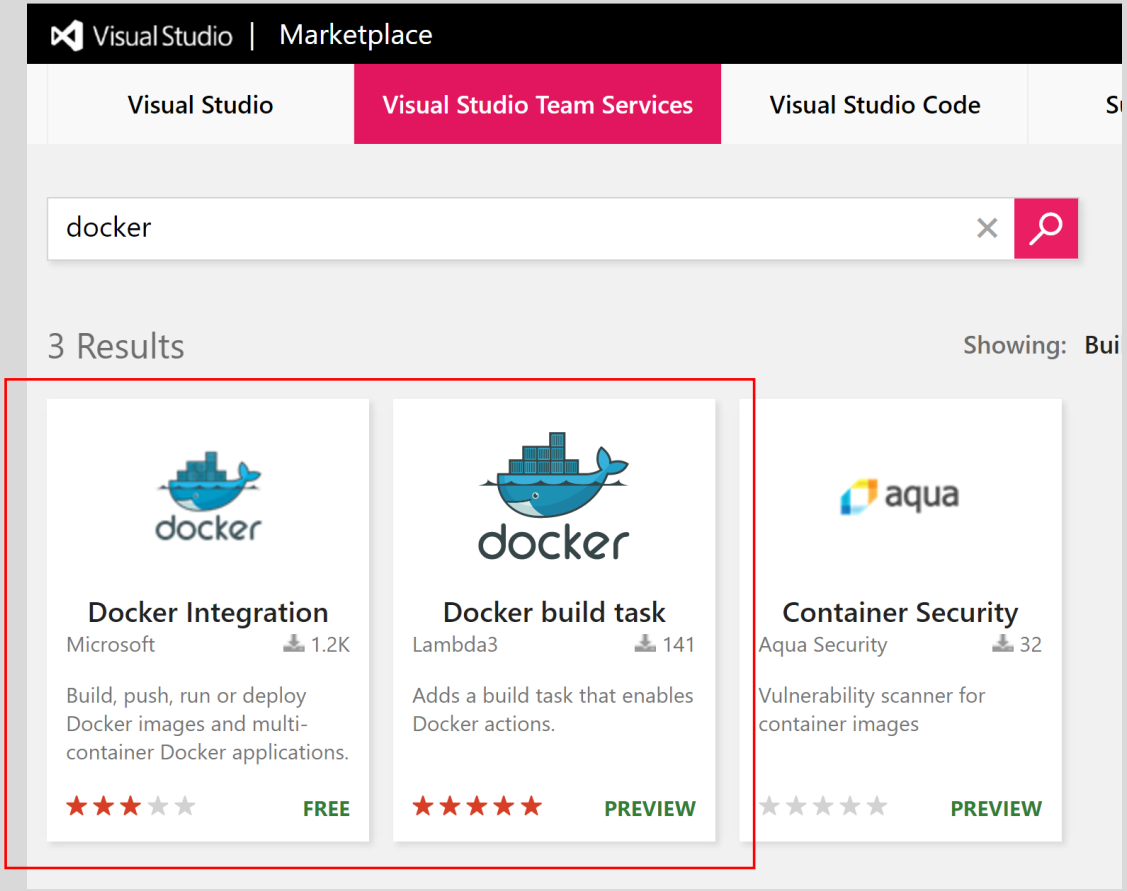


[Docker Tools for Visual Studio]

Docker support for Visual Studio Code



TFS/VSTS



[Docker extensions for TFS/VSTS]

Summary

Summary

Microsoft ♥ Linux and containers

Linux on Windows
Windows on Windows
All kinds of containers on Azure

For dev/test and prod

Containers on Windows 10 for devs
Windows Server 2016 for Windows prod
Azure Container Service for Linux prod

Q&A

Thank you for attending!

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Saves the day.