

# about\_Containers

A note from the field

Thorsten Butz



Get-Help about\_me

```
$speaker = @{  
    name = Thorsten Butz  
    jobrole = Trainer, Consultant, Author  
    certification = MC*, LPIC-2  
    twitter = thorstenbutz  
    facebook = facebook.com/thbutz  
    website = www.thorsten-butz.de  
}
```



## Podcast: Sliding Windows



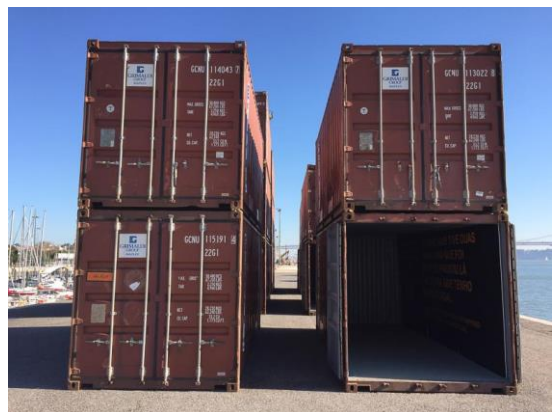
[www.slidingwindows.de/?feed=slw-mp3](http://www.slidingwindows.de/?feed=slw-mp3)

Episode 04: "The X files",  
with Bruce Payette  
(rec) PSConf 2016

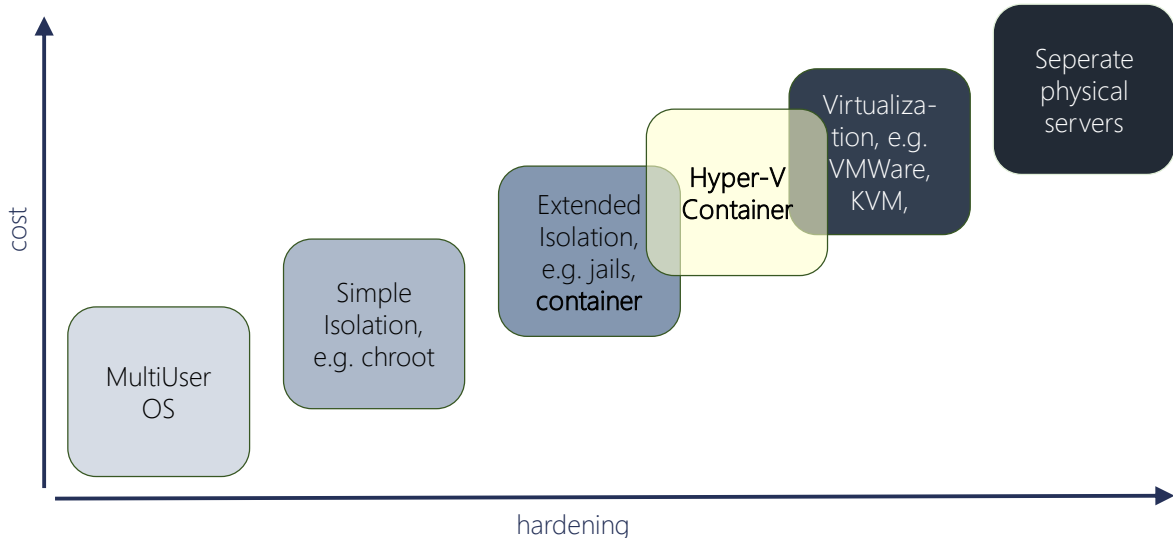


## Container

- Linux Container: [docker.com](http://docker.com)
- Container in Windows Server
  1. Windows Server Container  
Hyper-V not required
  2. Hyper-V Container  
requires Hyper-V
  3. LinuxKit  
Announced at DockerCon 2017
- Desktop solutions (Win 10, MacOS ..)



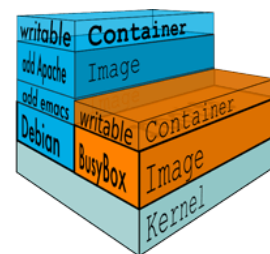
## Basic principles



docker.com

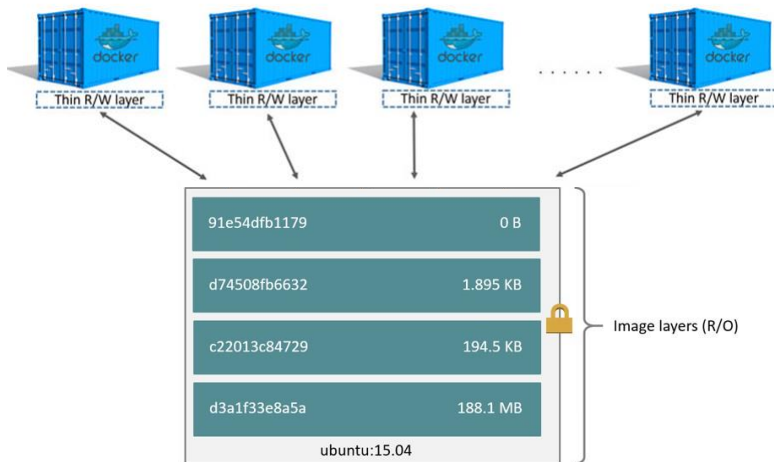


- Founded 2013
- Initially built upon "Linux Containers" (LXC), since v0.9: libcontainer
- Requires Linux 3.8 or later, using "Control Groups" (Cgroups), "Namespaces"
- Unifying FS: AUFS, OverlayFS, ZFS ..



Figures: [www.docker.com/what-docker](http://www.docker.com/what-docker)

## docker: Images and layers



<https://docs.docker.com/engine/userguide/storagedriver/imagesandcontainers/>



## Setup docker (Ubuntu, Debian)

### # Install, verify

```
apt-get install docker.io
```

```
docker version
```

```
docker info
```

### # List containers

```
docker ps
```

### # List images

```
docker images
```

### # Search the docker hub

```
docker search hello-world
```

```
docker run hello-world
```

```
root@yakkety:~# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
hello-world         latest             48b5124b2768       6 weeks ago       1.84 kB
root@yakkety:~# docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
1b853698b126       hello-world        "/hello"           5 minutes ago      Exited (0) 5 minutes ago              happy_bardeen
root@yakkety:~#
```



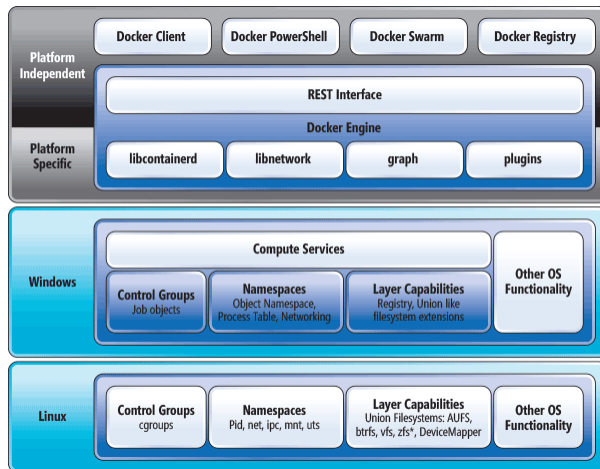


KEEP  
CALM  
IT'S  
DEMO  
TIME

## From drawbridge to Hyper-V containers

- 2008: Hyper-V  
Support for Legacy OS, enlightening modern OS
- 2011: Research project "[Drawbridge](#)"  
Process isolation container technology for Azure
- 2013: Microsoft & Docker partnering  
Development of a common management interface

## Containers: Linux vs. Windows



"Comparing the Basic Architecture of Containers and Docker Across Windows and Linux",  
<https://msdn.microsoft.com/en-us/magazine/mt797649.aspx>



## Windows isolation modes

- Windows supports:
  - (default)
  - process
  - hyperv
- Hyper-V Container (Hyper-V must be enabled):
  - VM worker process "vmwp" on host, each container has it's own csrss process

```
C:\>docker info | findstr Isolation
Default Isolation: hyperv

C:\>docker run --interactive --isolation process --tty microsoft/nanoserver
docker: Error response from daemon: Windows client operating systems only support Hyper-V containers.
See 'docker run --help'.
```

## Setup Windows Server Containers

```
# Enable Windows feature(s)
Install-WindowsFeature -Restart -Name Containers
Install-WindowsFeature -Restart -Name Hyper-V # Optional

# Get docker
Install-Module -Name DockerMsftProvider -Repository PSGallery
Install-Package -Name docker -ProviderName DockerMsftProvider

# Reboot
Restart-Computer

# Verify setup
Get-ComputeProcess
docker version
docker info
```



The screenshot shows a web browser window displaying the Docker Hub page for the `microsoft/nanoserver` repository. The browser's address bar shows `hub.docker.com/r/microsoft/nanoserver`. The page header includes navigation links for `Explore`, `Help`, `Sign up`, and `Sign in`. The repository is identified as a `PUBLIC REPOSITORY` for `microsoft/nanoserver`, with a star icon and a note that it was `Last pushed: 7 days ago`. Below this, there are tabs for `Repo Info` and `Tags`. The `Repo Info` tab is active, showing a `Short Description` of "Windows Server 2016 Nano Server base OS image for Windows containers" and a `Full Description` that describes Nano Server as a headless deployment option. To the right, there is a `Docker Pull Command` box showing `docker pull microsoft/nanos` and an `Owner` box showing the `microsoft` logo.

## Combinations

HOST OS	Windows Server Container		Hyper-V Container		Linux Container	
	Nano	Core	Nano	Core	Hyper-V VM	LinuxKit
WS 2016 Nano	✓	-	✓	✓		?
WS 2016 Core	✓	✓	✓	✓		?
WS 2016 SaD	✓	✓	✓	✓		?
Windows 10	-	-	✓	✓	✓	?

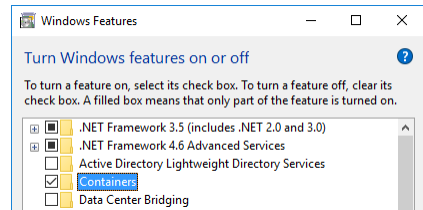
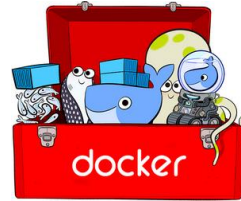


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TIME



## Dazed and confused ..

- a) Docker Toolbox  
Legacy: "older Mac + Windows OS",  
uses Virtualbox
- b) Docker for Windows  
uses Hyper-V + Windows Containers  
Linux + Windows Containers
- c) Containers for Windows  
native Windows Containers,  
no (G)UI, Isolation: Hyper-V



## Install "Docker for Windows" (on Win 10)

**#Requires -RunAsAdministrator**

**Enable-WindowsOptionalFeature -Online -NoRestart**

**-FeatureName 'Microsoft-Hyper-V-All', 'Containers'**

**Invoke-WebRequest**

**-uri 'https://download.docker.com/win/stable/InstallDocker.msi'**

**-OutFile 'c:\InstallDocker.msi'**

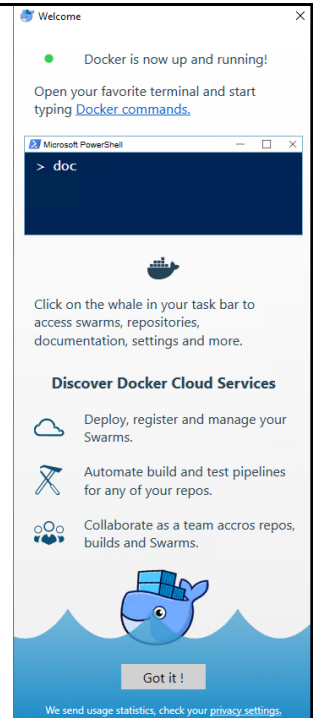
**msiexec.exe /i 'c:\InstallDocker.msi' /passive /forcerestart**



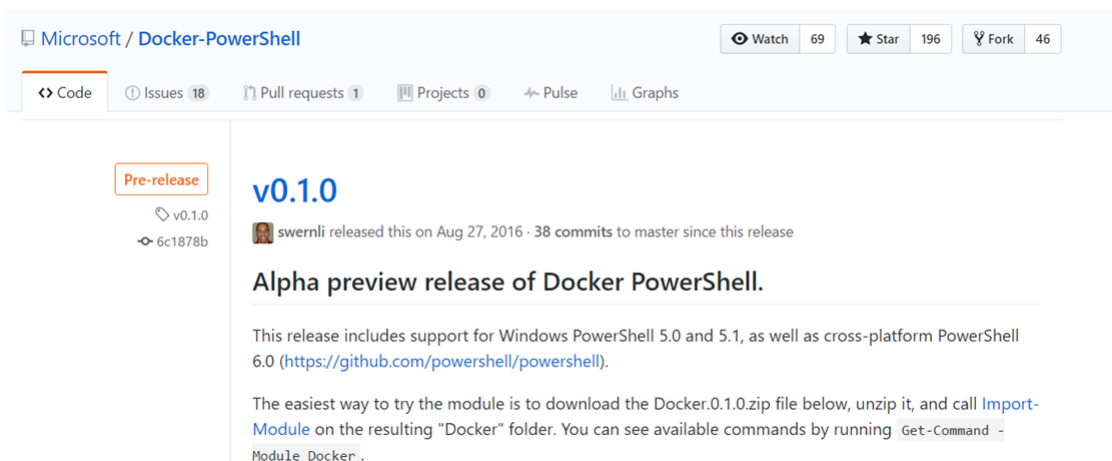
Docker is starting...  
This will only take a few seconds  
Docker for Windows

## "Docker on Windows" (April 2017)

- "Community Edition"
- **docker version:**  
**Version 17.03.1-ce (Client, Server)**
- Supports Windows Containers,  
Hyper-V isolation only
- Supports Linux Containers  
via Alpine Linux VM in Hyper-V



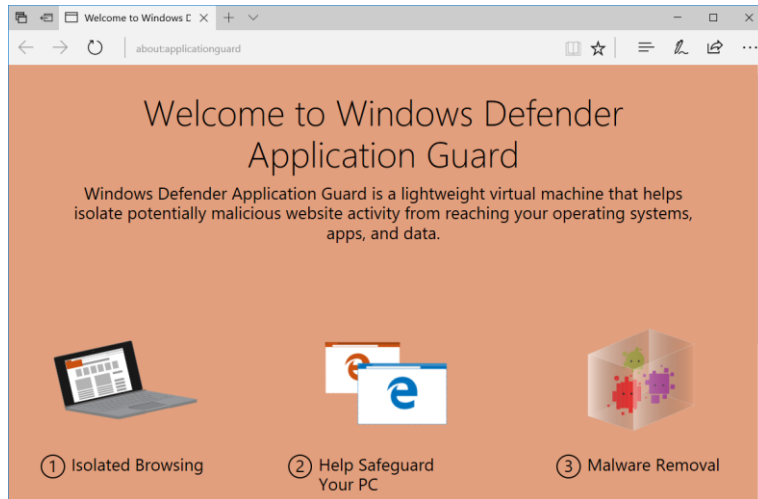
## PowerShell Cmdlets for Docker (April 2017)



<https://github.com/Microsoft/Docker-PowerShell/releases>



## What's beyond ...



Project Barcelona,  
Windows 10 v1703



## Wrap up!

- docker.exe or Cmdlets?
- Will Hyper-V be obsolete?
- Pets or cattles ?
- #LinuxKit

