

# Windows Server Container

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Thanks to our friendly hosts:

Helge & Timm



## Podcast: Sliding Windows



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

### Guests

- Helge Klein
- Benny Tritsch
- (..)



# A brief history of (Linux) Container

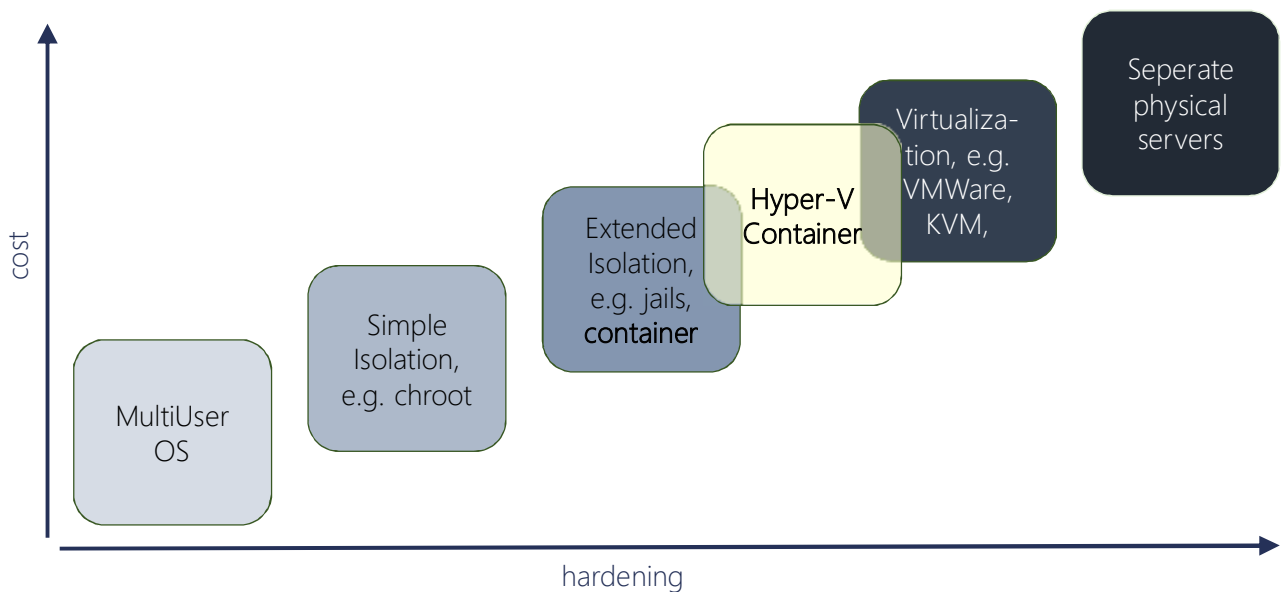
Chapter 1

# Container

- Linux Container: [docker.com](https://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 ..)



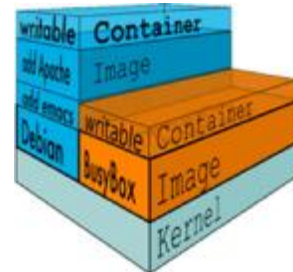
## Basic principles



docker.com

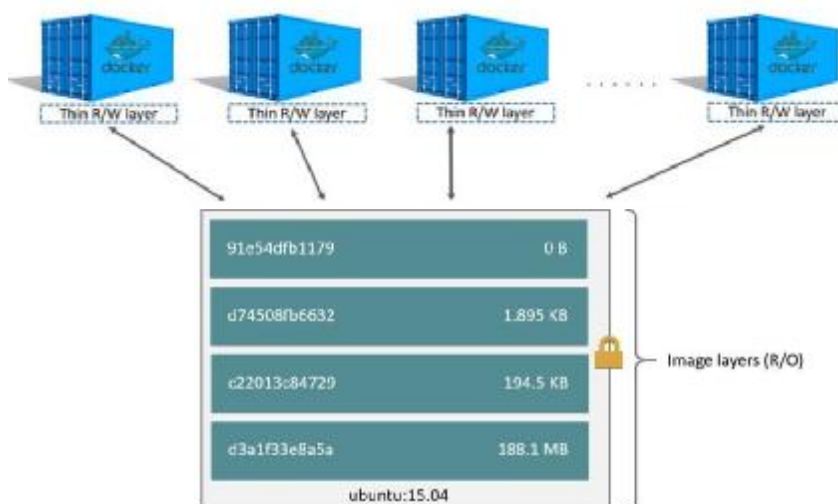


- Founded 2013
- Initially built upon "Linux Containers" (LXC), since v0.9: libcontainer
- Requires Linux 3.8 or later, using "Control Groups" (Cgroups), "Namespaces"
- Unifying FS: AUFS, OverlayFS, ZFS ..



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          40b5124b270b   6 weeks ago    1.84 kB
root@yakkety:~# docker ps -a
CONTAINER ID        IMAGE           COMMAND          CREATED         STATUS         PORTS           NAMES
1h854698b176       hello-world     "/hello"        5 minutes ago   Exited (0) 5 minutes ago           happy_hardeen
root@yakkety:~#
```

# A brief history of Windows Server 2016

## Chapter 2

## Footprints (WS 2016 RTW)

ImageName	ImageSize(Byte)	ImageSize(GB)	FileCount	
Windows Server 2012 R2 SERVERSTANDARD CORE	6897618255	6,42	70229	
Windows Server 2012 R2 SERVERSTANDARD	12069723893	11,24	89410	
Windows Server 2012 R2 SERVERDATA CENTER CORE	6876269628	6,4	70120	
Windows Server 2012 R2 SERVERDATA CENTER	12066707039	11,24	89288	
Windows Server 2016 SERVERSTANDARD CORE	9353610808	8,71	67418	60,6%
Windows Server 2016 SERVERSTANDARD	15433268353	14,37	113677	100,0%
Windows Server 2016 SERVERDATA CENTER CORE	9353315396	8,71	67092	60,6%
Windows Server 2016 SERVERDATA CENTER	15440147913	14,38	113554	100,0%
Windows Server 2016 SERVERSTANDARD NANO	800233355	0,75	8182	5,2%



## Nano Server in v1607 (initial release of WS 2016)



- Install image NanoServer: 169 MB
- "Zero foot print": no roles and features onboard
- Main purpose: "Compute clusters"
  - Hyper-V-Host
  - Storage: SoFS, etc.
- Purpose 2: "born-in-the-cloud" application
- Usage: physical, virtual, container
- Headless, no local logon
- Only 64-bit applications
- PowerShell Core
- Limited roles (e.g. no dc)
- No activation required/supported
- Manual windows updates
- CBB (only)
- Must be provisioned





Tuva:  
170,500 km<sup>2</sup>  
307.930  
residents

Vatican:  
0.44 km<sup>2</sup>  
690 residents

## Delivering continuous innovation with Windows Server

Erin Chapple (General Manager, Windows Server), 2017-06-15:

"Based on that feedback, we are making an important change to Nano Server. This next release will focus on making Nano Server the very best container image possible. From these changes, customers will now see the Nano Server images shrink in size by more than 50 percent, further decreasing startup times and improving container density. As part of this effort to focus on containers, we will be removing the functionality for infrastructure-related roles. "



Ryan Yates 90

Basically you need to forget about it being a Developer only focused world (because it still is far from that) and bring back the infrastructure roles to Nano Server.

This is just a HUGE step backwards in innovation.

<https://blogs.technet.microsoft.com/hybridcloud/2017/06/15/delivering-continuous-innovation-with-windows-server/>

# Windows as a Service



## Windows 10

- Version **1507** (initial release, Threshold 1, Build 10240)
- Version **1511** (November update, Threshold 2, Build 10586)
- Version **1607** (Anniversary update, Redstone 1, Build 14393 )
- Version **1703** (Creators Update, Redstone 2, Build 15063)
- Version **1709** (Fall Creators Update, Redstone 3)
- Version **1803** ...

## Windows Server 2016

- Version **1607** (Redstone 1, Build 14393)
- Version **1709** (Redstone 3)

## Remote Server Administration Tools for Windows 10

Version:	Date Published:
1.2	10/12/2016
File Name:	File Size:
WindowsTH-RSAT_WS2016-x64.msu	92.3 MB
WindowsTH-RSAT_WS2016-x86.msu	60.5 MB

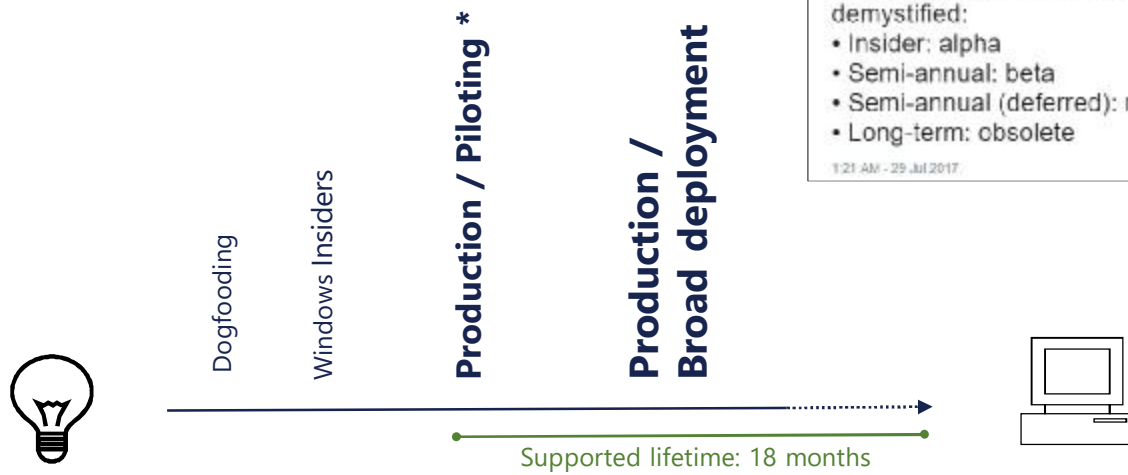
**Paid Upgrade**

## Servicing branches: Lifecycle (prior to July 2017)





## Semi-Annual Channel: Lifecycle (July 2017)



\* also referred to as "targeted deployment"

## Windows Server 2016: Releases, Branches, Installation Options

- v1607:
  - Core: LTSC
  - Desktop Experience: LTSC
  - Nano: CBB
- v1709 (insider preview, build 1627)
  - Core: Semi-annual

1st preview: build 16237  
2nd preview: build 16257  
3rd preview: build 16267

AUGUST 22, 2017 10:31 AM

Announcing Windows Server Insider Preview Build 16267

By Dons Sarkar / Software Engineer, Windows and Devices Group

## Nano Server in v1709 (2nd release of WS 2016)



- > 50% in size compared to previous
- No infrastructure roles
- No hyper-V, SoFS
- Main purpose: Support of .NET Core applications
- Usage: container, IoT Core installations
- Windows PowerShell, .NET Core, WM: no longer included by default (can be included when building a container)
- No install image, no servicing stack included (anymore); instead: docker hub

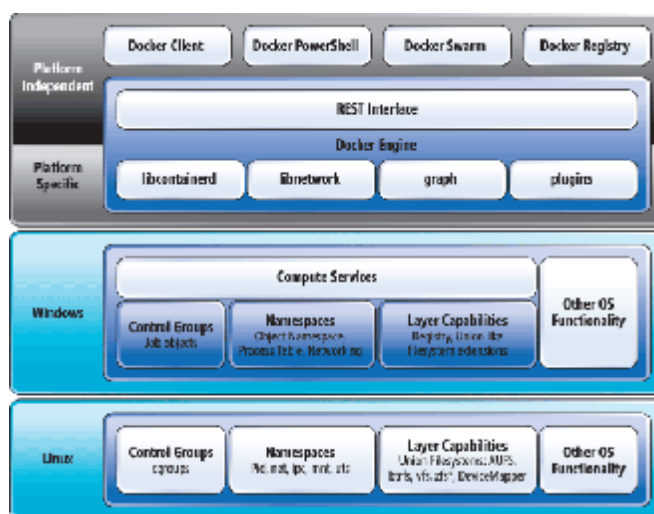
# Windows Container

## Chapter 3

## From drawbridge to Hyper-V container

- 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

## Container: 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

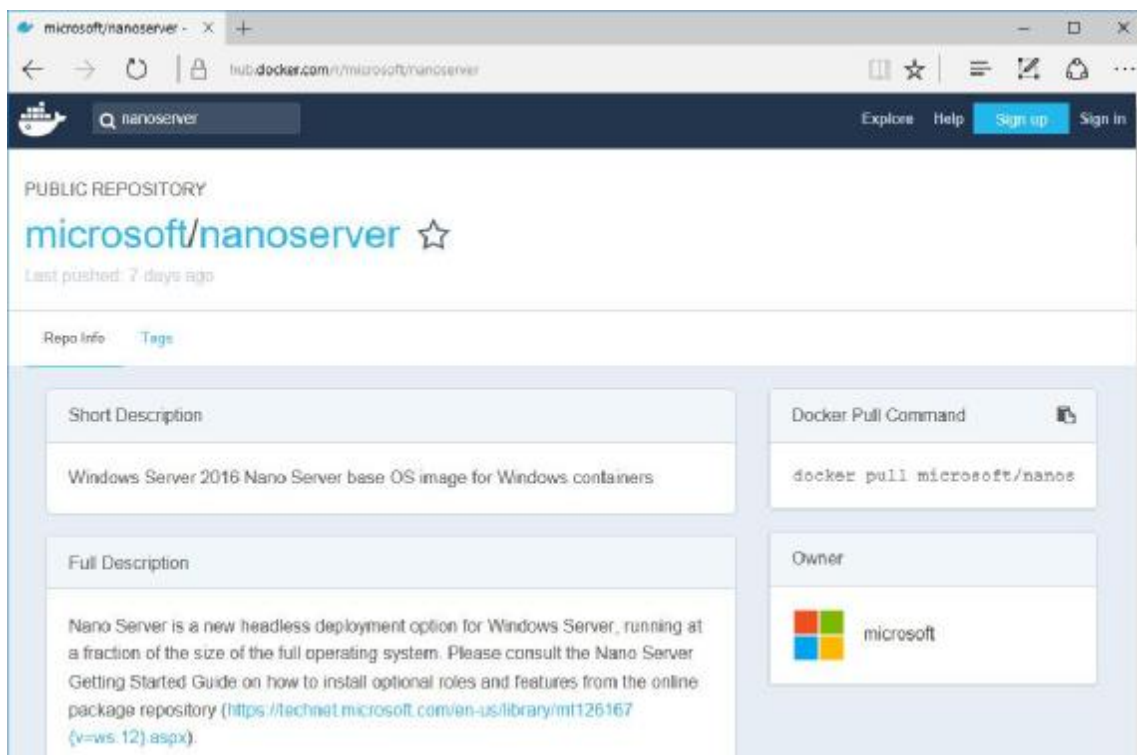
```
# Enable Windows feature(s)
Install-WindowsFeature -Restart -Name Containers
Install-WindowsFeature -Restart -Name Hyper-V # Optional

# 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
```



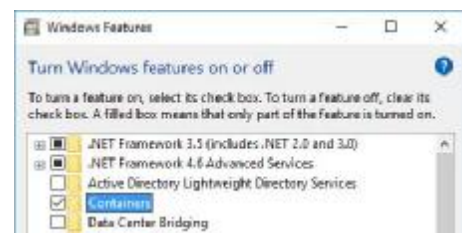


## Combinations

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	-	-	✓	✓	✓	?

## 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" (September 2017)

- "Community Edition"
- **docker version:**  
**Version 17.06.2-ce (Client, Server)**
- Supports Windows Containers,  
Hyper-V isolation only
- Supports Linux Containers  
via Alpine Linux VM in Hyper-V



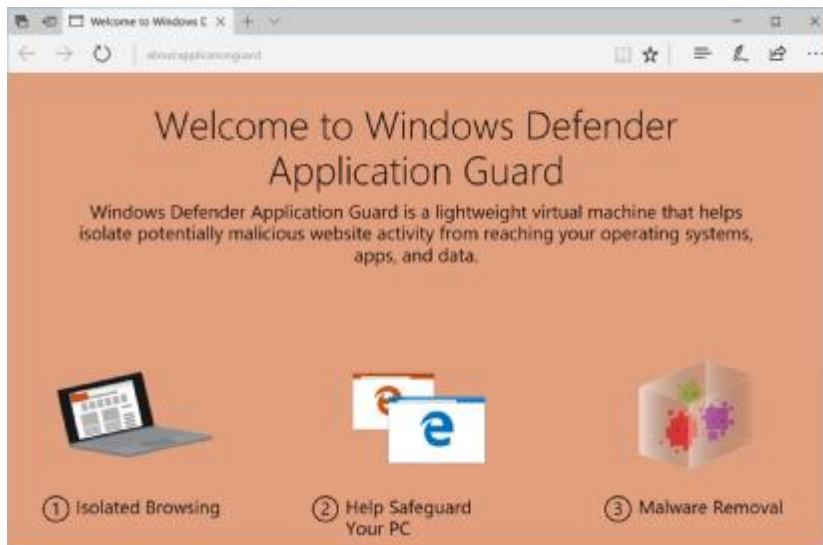
## PowerShell Cmdlets for Docker (September 2017)



<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





KEEP  
CALM  
AND  
ENJOY  
VCNRW

2016



**jsnover**  
@jsnover

Make no mistake about it  
Nano Server is the  
future of the datacenter

<https://blogs.technet.microsoft.com/windowsserver/2016/02/10/exploring-nano-server-for-windows-server-2016/>

11:24 PM - 10 Feb 2016

2017



Get-Help about\_me

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

