EASIER AND DEVOPS-FRIENDLY DYNAMICS NAV ENVIRONMENTS USING DOCKER / WINDOWS CONTAINERS

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vanakjakub @vanakjakub ·Oct 28
New #docker images for #MSDynNAV are arriving into the public repo! Many thanks!!! Now, everyone can enjoy them.
hub.docker.com/r/microsoft/dy...

microsoft/dynamics-nav

AJ Ansari @AJAnsariNAV ·Sep 26
We're so close to docking, I can feel it! 😁 #MSDynNAV #Docker

Schnieringer @schnieringer ·Oct 28
Wow also Versions 2016 and 2017 #MSDynNav on #Docker

14 STARS 4.2K PULLS

NAV TECH DAYS 2017

What is docker? What are Containers? Why should I use containers for NAV on Docker #3)

You have probably heard that all released Microsoft Dynamics NAV versions since NAV 2016RTM now are available as Docker images on the public Docker hub, but if not – then you have now! But what does that mean? What is Docker and what are Containers? Lets start with the easy question What is Docker? Docker is...

October 31, 2017

Jacques Bolduc @Jacquesbolduc ·Nov 1
Running Dynamics NAV on #Docker!
I just deployed my first #MSDynnav on #Docker ! :-D
Tks @freddydk for the great job helping and documenting

Sebastian Klaus @SKlausDev ·Nov 2
Dockerwaldo – My Local Demo Environment ift.tt/2zg4onK #MSDynNAV
#MSDyn365 #ERP

Creating Workshop machines on Azure

Alexander Ermakov @Alex_Ermakov ·Nov 2
Replying to @freddydk
Demanded topic. I've published a blog on that in Russian - 500+ views in less than a day!

For Directions EMEA, we had to spin up approx. 2000 Azure VMs for our hands on labs. All of these machines was created individually from PowerShell in 25 simultaneous jobs, but still one job=one VM) running on my Developer machine in ... The scripts used to create these VMs has been shared with...

November 5, 2017

Freddy Kristiansen @freddydk ·Aug 5
Looking for people who would like to play around with NAV and Docker Containers and give some feedback! PM me #MSDynNAV #Docker #containers

Stefano Demiliani @demiliani ·Oct 29
The magic is here! 👏👏👏 #Docker #MsDynNAV

The 10 commandments of Docker (NAV on Docker #6)

I recommend that you read this blog post before reading this. In this blog post I will describe the 10 docker commands I use most frequently and what I use them for. The commands can be executed in a Command Prompt, PowerShell or PowerShell ISE on a machine with Docker installed. In any case, you...

November 3, 2017

Michael Megel @MMe2K ·Nov
Replying to @vanakjakub @freddydk
Beware #MSDynNAV on #Docker is #HotStuff! 😁

dev builds now also available on the Docker Hub

Saturday we posted all NAV 2016 and NAV 2017 public builds to the Docker Hub. Today the October update of the developer preview is also on the Docker Hub to run locally. You now choose between two options for the developer preview. ... http://aka.ms/... VM with NAV on Docker inside) docker run...

October

James Crowter @Jamescrowter ·Nov 10
At this rate of download #msdynnav on #docker will be the big thing.
It's awesome

Daniel Rimmelzwaan @drimmelzwaan ·Nov 2
#Docker for NAV is the next big thing, well it's today's big thing really
#MSDynNAV #DynDev365

phenno @phenno1 ·Nov 2
Replying to @freddydk
And so it begins... :)

Chris Blank @chrisblankde ·Oct 4
What I learned from @freddydk : #docker with #MSDynNAV
#DirectionsEMEA

Troubleshooting NAV on Docker

@Docker pull, refresh container, download & install vsix, download symbols, done!
Enjoy the new November release (devpreview) and start @Code-ing on your own product!
#dyndev365 #msdynnav
blogs.msdn.microsoft.com/nav/2017/11/08

With the release of official NAV images on Docker hub, we already see a larger uptake of people trying this great technology. ... post I will ... issues people are typically running into when trying out NAV on Docker. The first two topics are only relevant on Docker CE (Community Edition)...

October

Modifying a NAV on Docker image (NAV on Docker #5)

```
Modifying NAV Service Tier Config File for Docker
Creating Self Signed Certificate
Self Signed Certificate Thumbprint 530EF5054F205F0EBBB3C292E3FAC85169F62810
Modifying NAV Service Tier Config File with Instance Specific Settings
Start NAV Service Tier
```

If you ... (prior blog post) will use docker run ... commands will run ... container locally...

MikeGlue365 @NavBitsBytes ·Oct 27
This has been an amazing journey and brings major innovation to how developers can work with #MsDynNAV !

Tobias Fenster
Nav devpreview as open as possible

NAV-X ERP @NAVXERP ·Nov 3
Big thank you to @freddydk for #MSDynNAV #Docker. We have automated all our #bsts builds, releseases, and object merges for CAL and AL

It has never been easier... (NAV on Docker #2)

As of today, all shipped cumulative updates (+ all localizations) of Microsoft Dynamics NAV 2016 and 2017 are available as Docker images in the Docker Hub... on a Windows system with Docker installed... computer running Windows 10 Professional edition...

Stanislaw Stempin @msstanst ·Nov 8
Finally here, C/SIDE side by side with AL, and more in the November Update
blogs.msdn.microsoft.com/nav/2017/11/08... #dyndev365, #msdynnav

1-800-GET-NAV (NAV on Docker #4)

What a cool phone number to have if you are a NAV partner... this relates to ... and modernized it to the cloud world. it would be: aka-ms-getnav ... This is probably the easiest way to spin up a NAV on Docker environment on Azure for development and test. The mechanism has...

November 5, 2017

Panos Koutsogilas @PKoutsogilas ·Nov 8
Very cool !!

#navtechdays

Andrius A @Andrius_A ·Nov 8
Some cool new features. Can't wait to try it out

vanakjakub @vanakjakub ·Nov 10
Running #MSDynNAV C/SIDE and AL side-by-side with #Docker - the changes are automatically reflected by AL.

A small step for man kind but a giant leap for us! (aka NAV on Docker)

1709 and NAV on Docker

MikeGlue365 @NavBitsBytes
Using these commands so much now. They make life so easy! #NavOnDocker

Some months ago, a colleague tried to convince me that Docker was the new black and I really had to look at that. Today, we have started deploying official Microsoft Dynamics NAV images to the Docker Hub – https://hub.docker.com/r/microsoft/dynamics-nav/ and over the next days, all CUs and all country versions for NAV 2016 and NAV 2017 will be...

October 27, 2017

Arend-Jan Kauffmann @ajkauffmann ·Nov 5
Great work! Already used previous templates for our workshops. This makes it simpler and faster to deploy a bunch of Azure VMs. #MSDYN365

As of yesterday evening Windows Server version 1709 (with ... containers) is available ... Azure... I thought it would be a good idea to describe how this relates to the NAV Docker images recently published on the Docker Hub. Before diving into the details, please read ... post which talks about the Windows...

November 1, 2017

Speakers

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Freddy Kristiansen (@freddydk)
Technical Evangelist at Microsoft

Jakub Vanak (@vanakjakub)
Software Developer at Marques Olivia

marquēs olivia

Tobias Fenster (@TobiasFenster)
Chief Technical Officer at Axians Infoma
Microsoft MVP

axians

Agenda

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Introduction to Docker / Windows Containers

Architecture of NAV on Docker

Extend the standard NAV image

Build and reuse your own images

Resource governance

Running a Multi-CU Environment

Heplful PowerShell-Scripts

What is Microsoft shipping

Just a glimpse: advanced topics

Q&A

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Introduction to Docker / Windows Containers

On Windows Server – slight differences on Windows 10

What is Docker?

Leading cross platform software container environment

What is a Docker container and a Docker image?

An image is a template with the minimum amount of os, libraries and application binaries needed

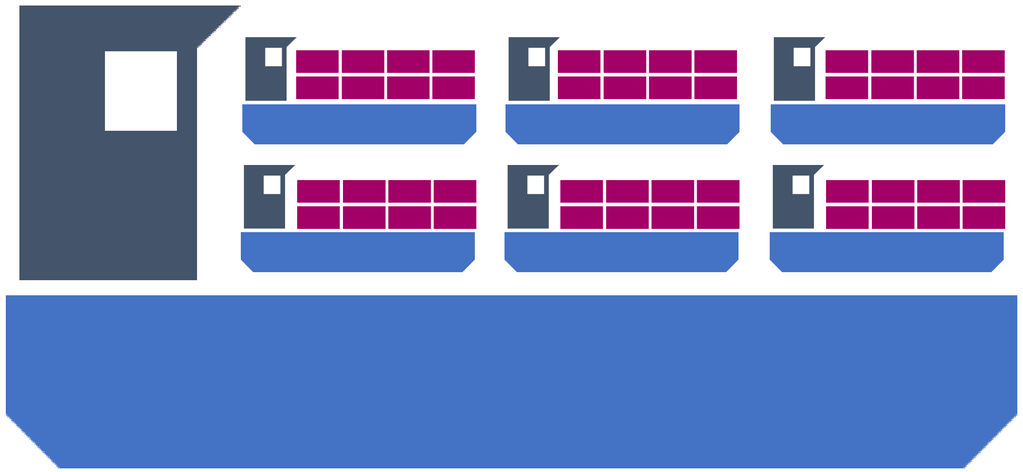
A container is an instance of an image with an immutable base and it's changes on top

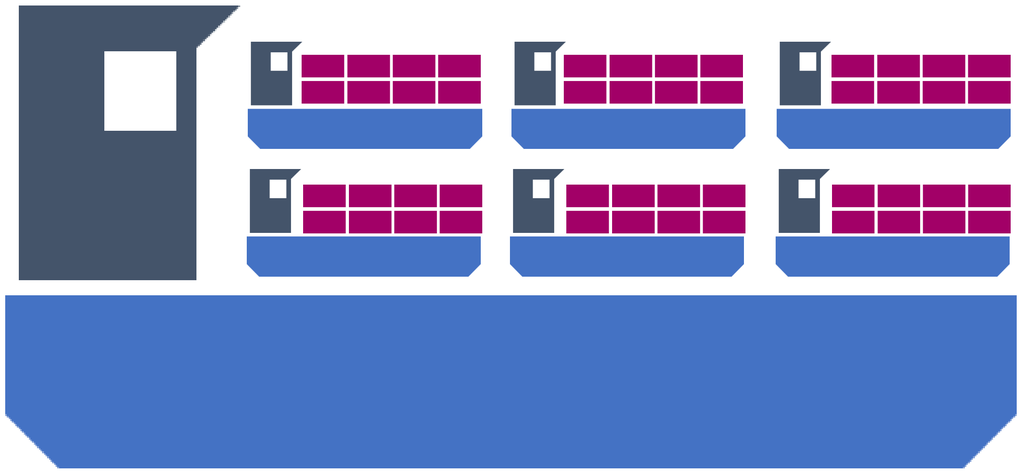
A container is NOT a VM, you especially don't have a GUI and nothing you can connect to with RDP!

What is a Docker host?

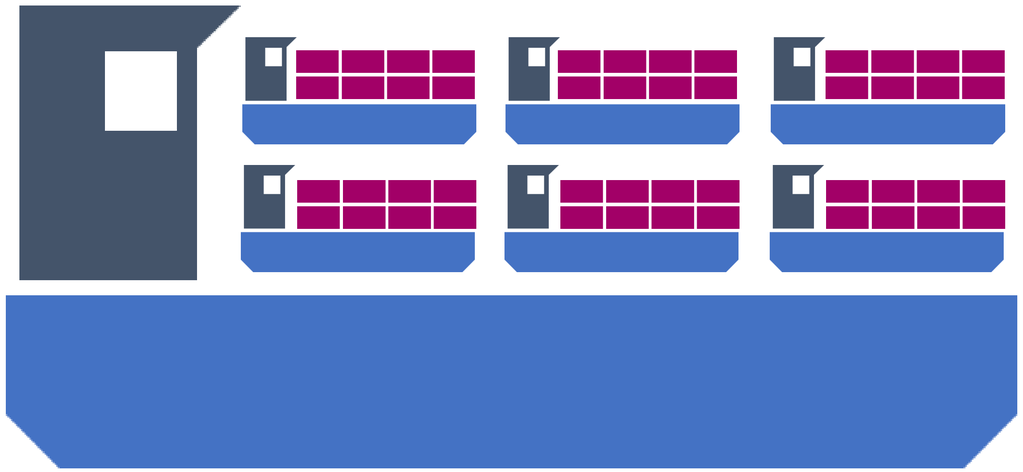
The (physical or virtual) machine where the containers are running

Virtual Machines vs Containers

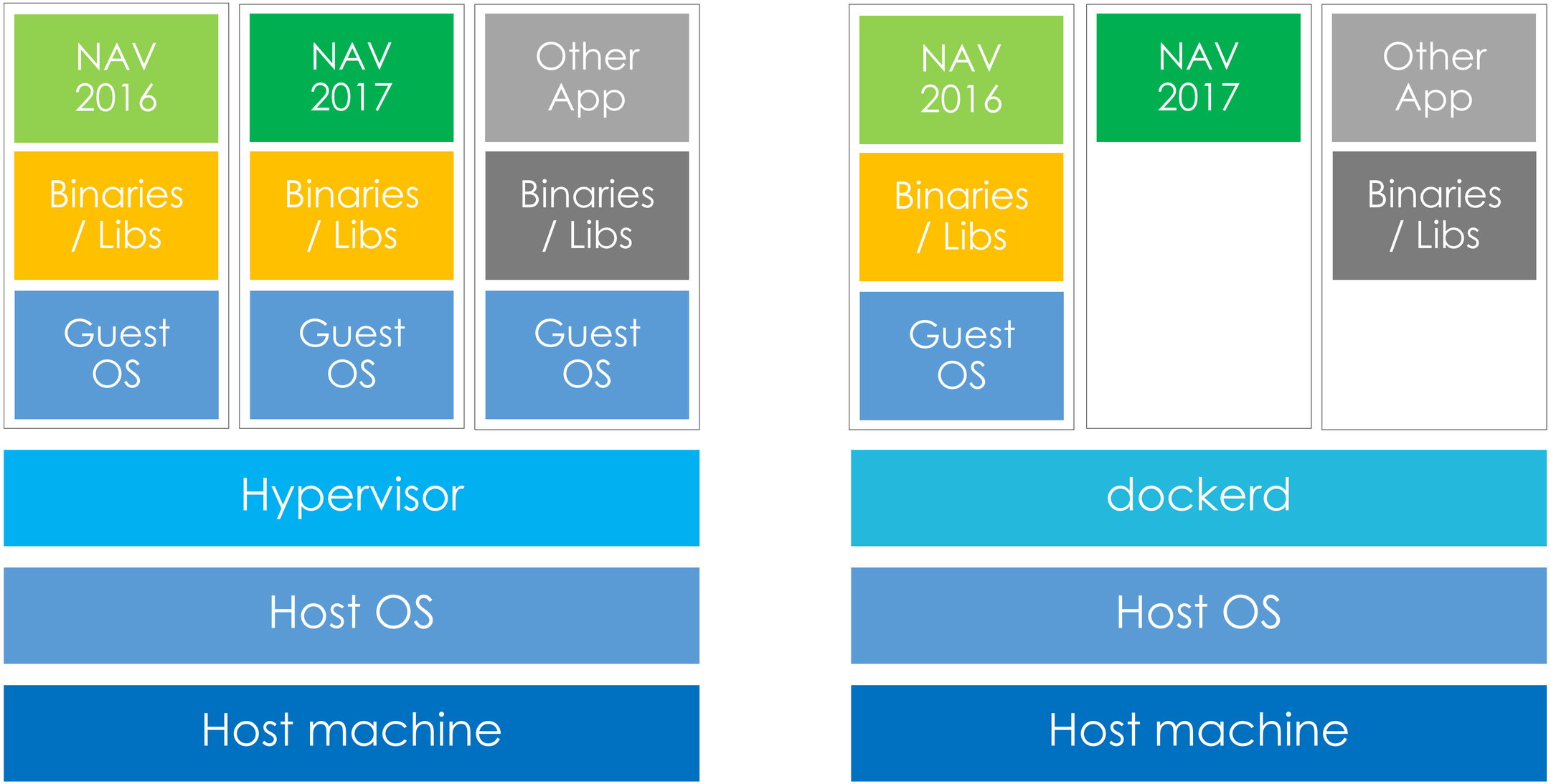




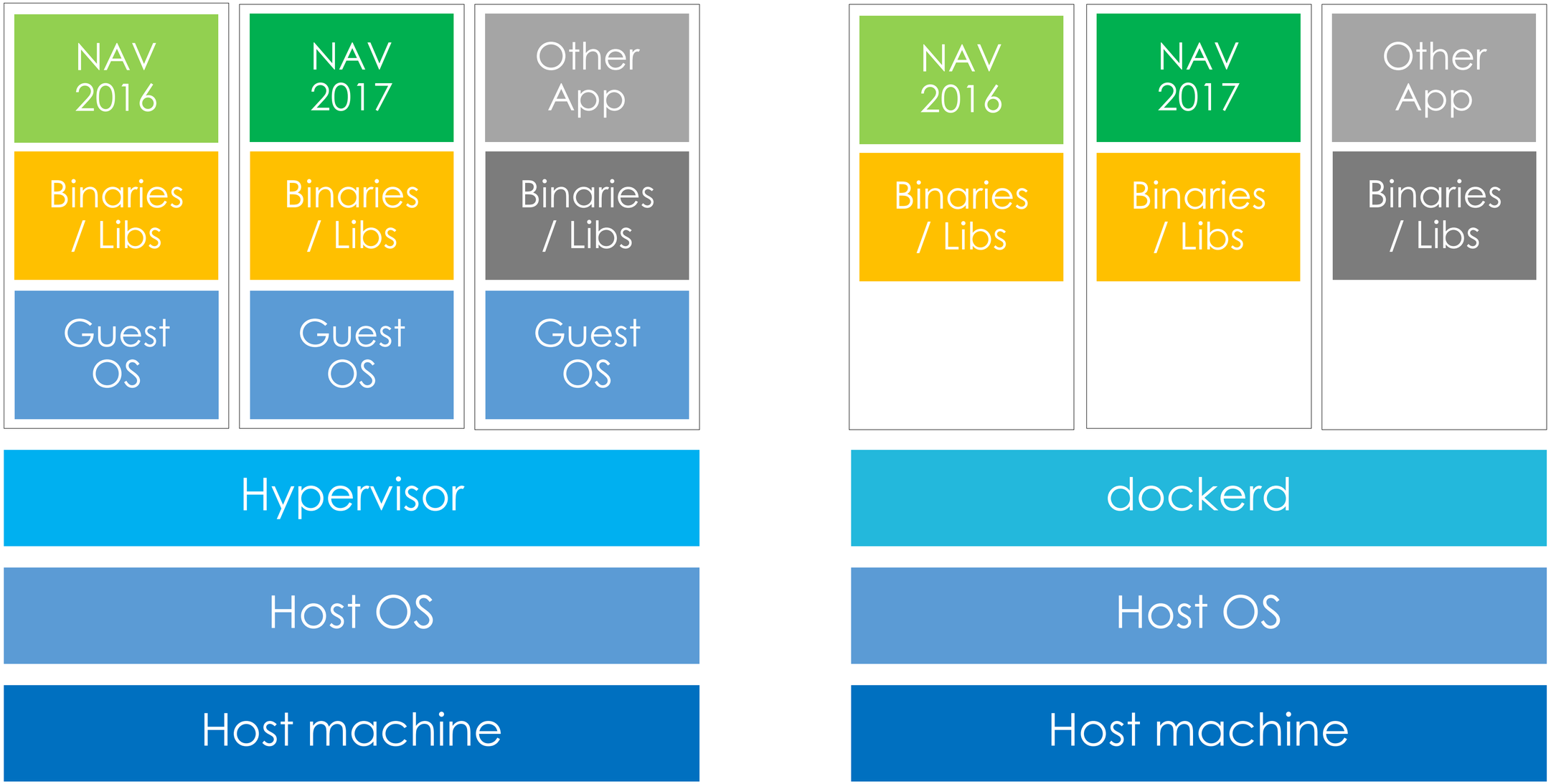
Virtual Machines vs Containers



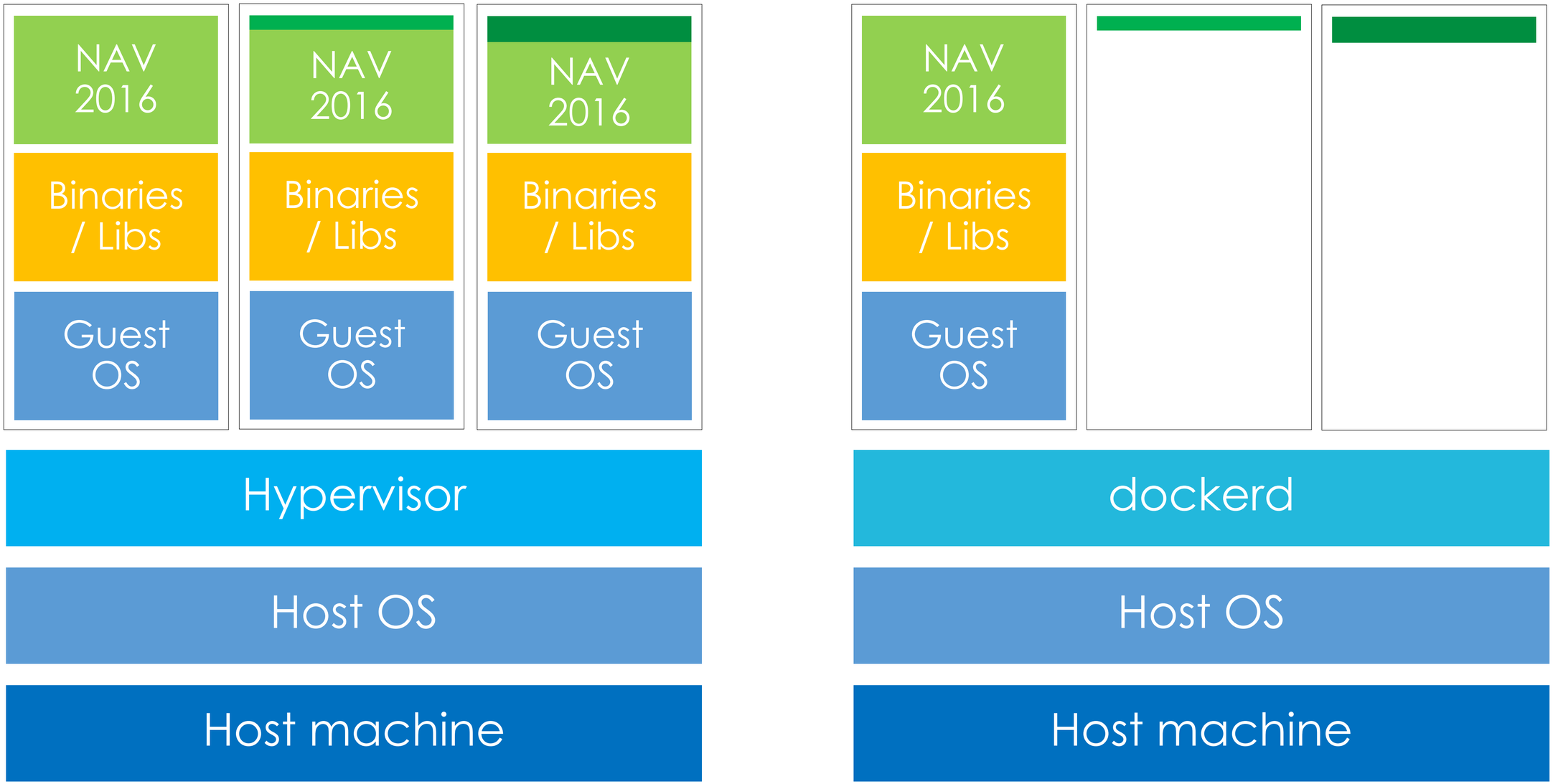
VMs vs Containers – Image Storage



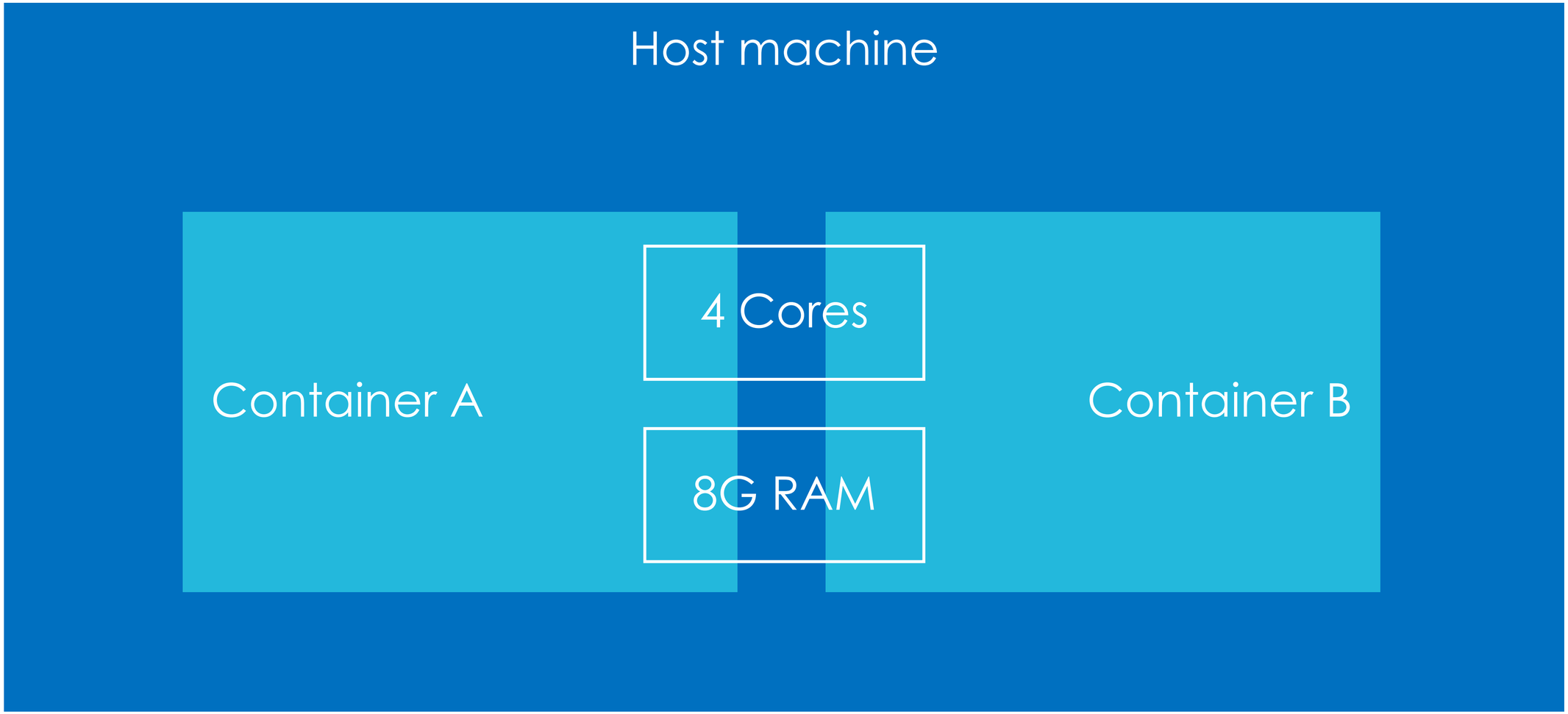
VMs vs Containers – Runtime



VMs vs Containers – Instance storage

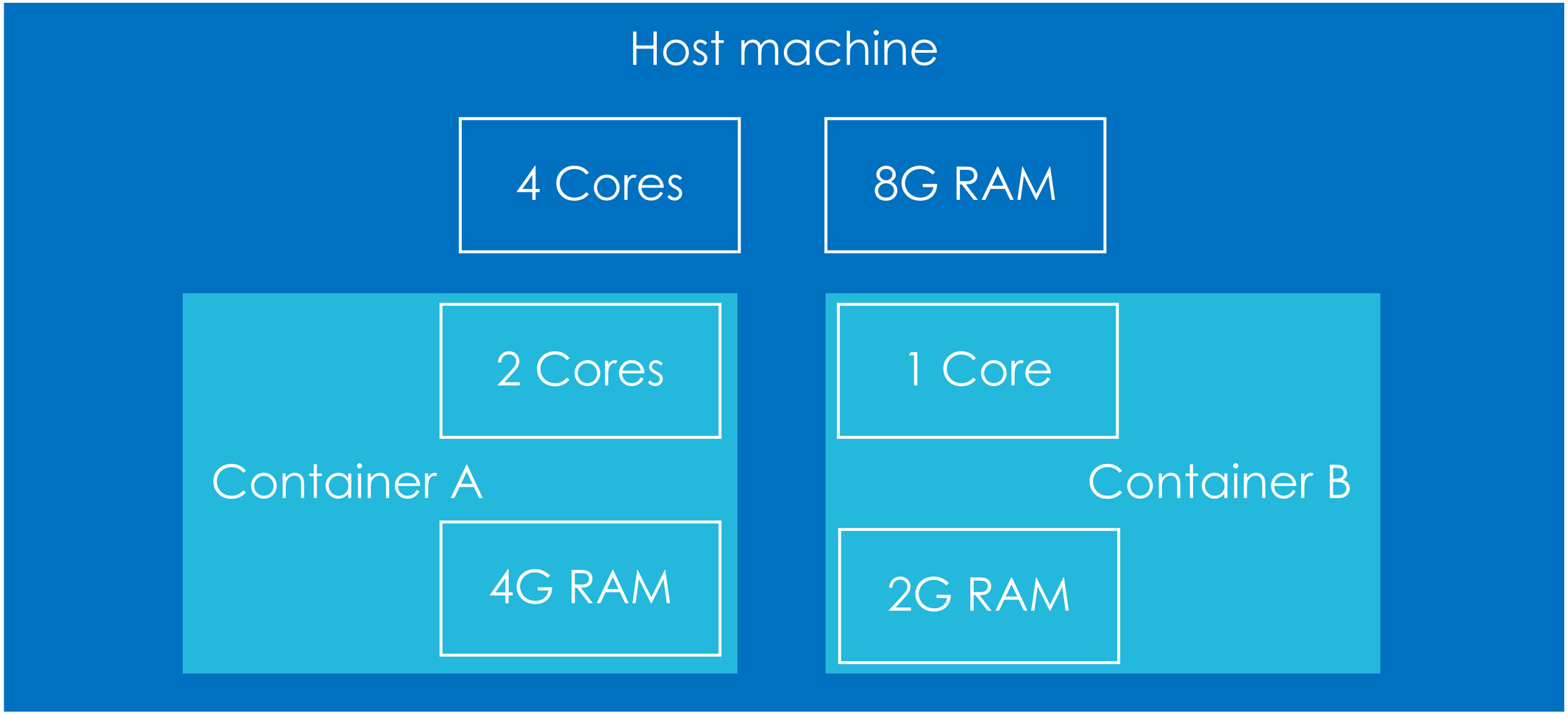


Host / Container resource sharing



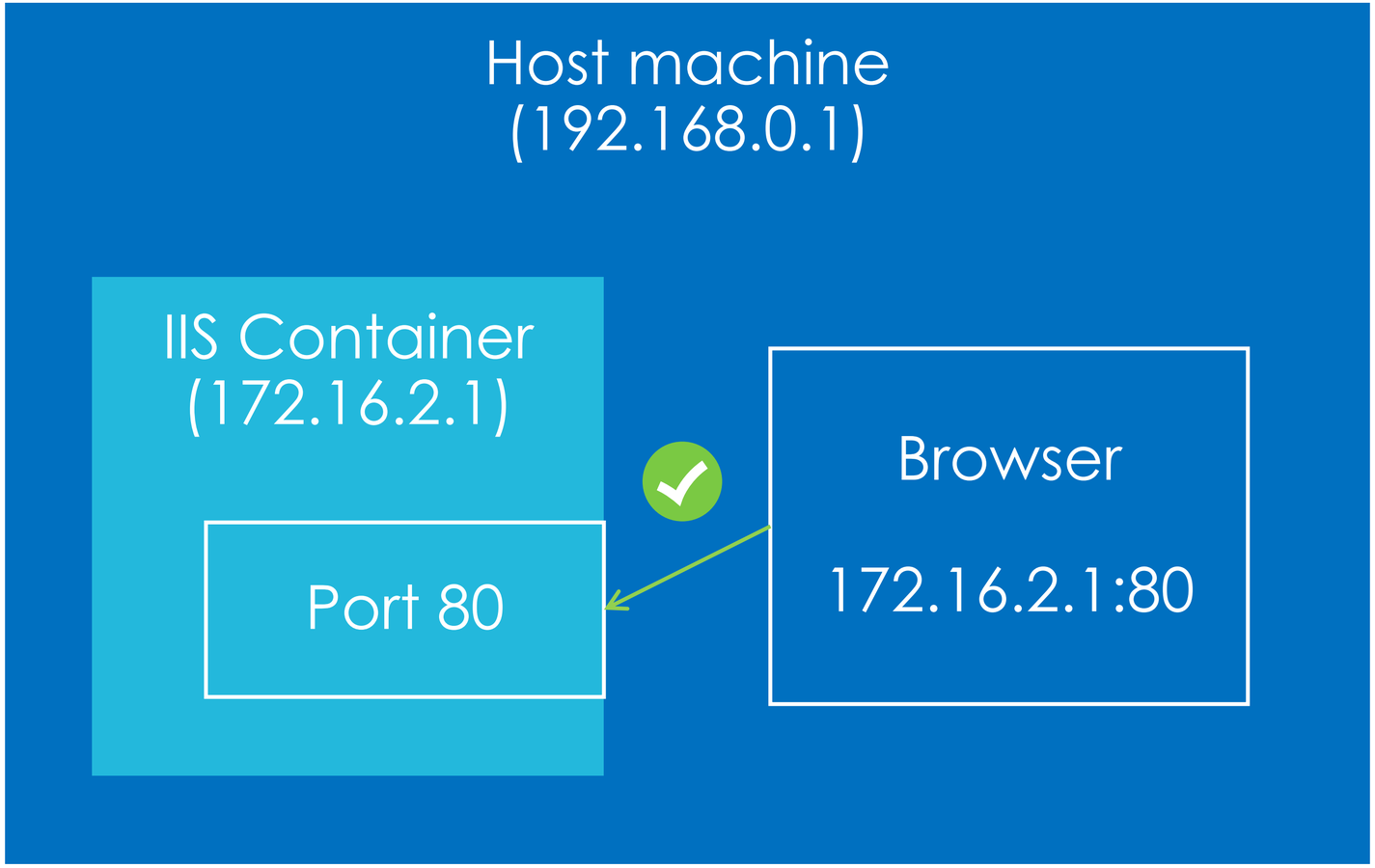
Standard resource setup: nothing configured

Container limited resource usage



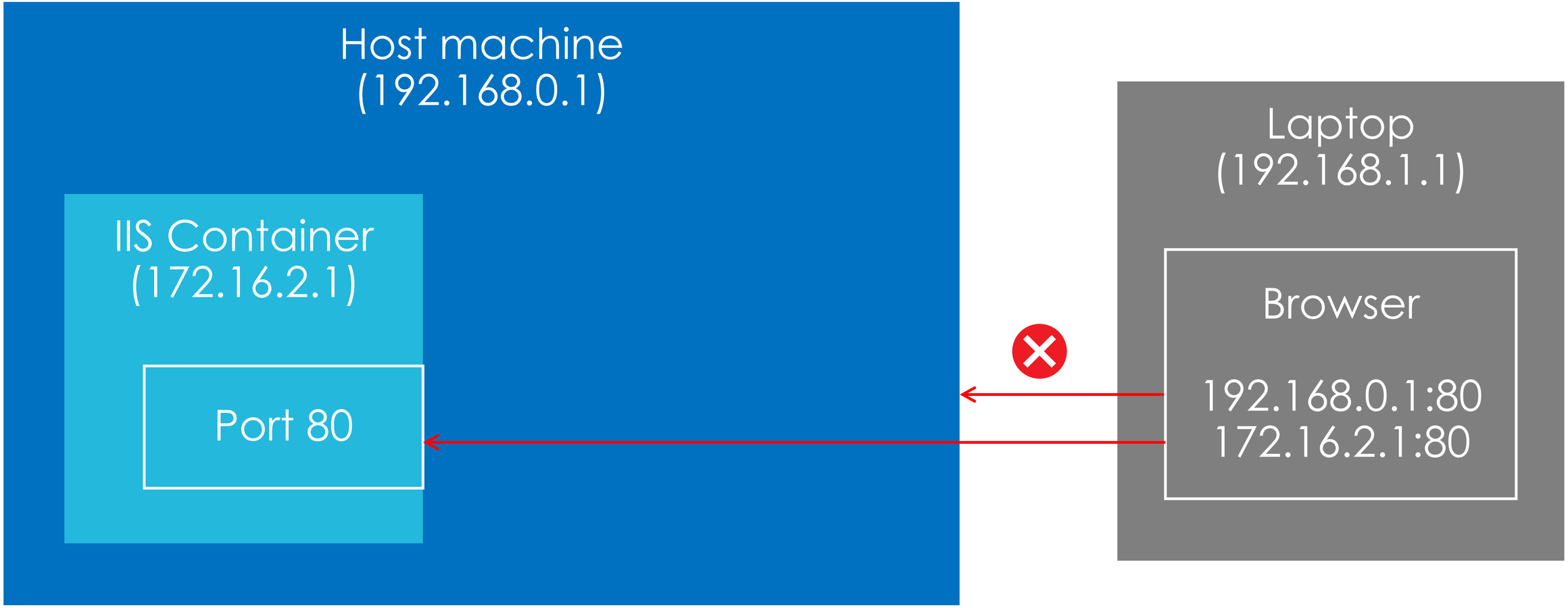
Specific resource setup: limits are configured, e.g. -m 4g --cpus 2

Host / Container networking



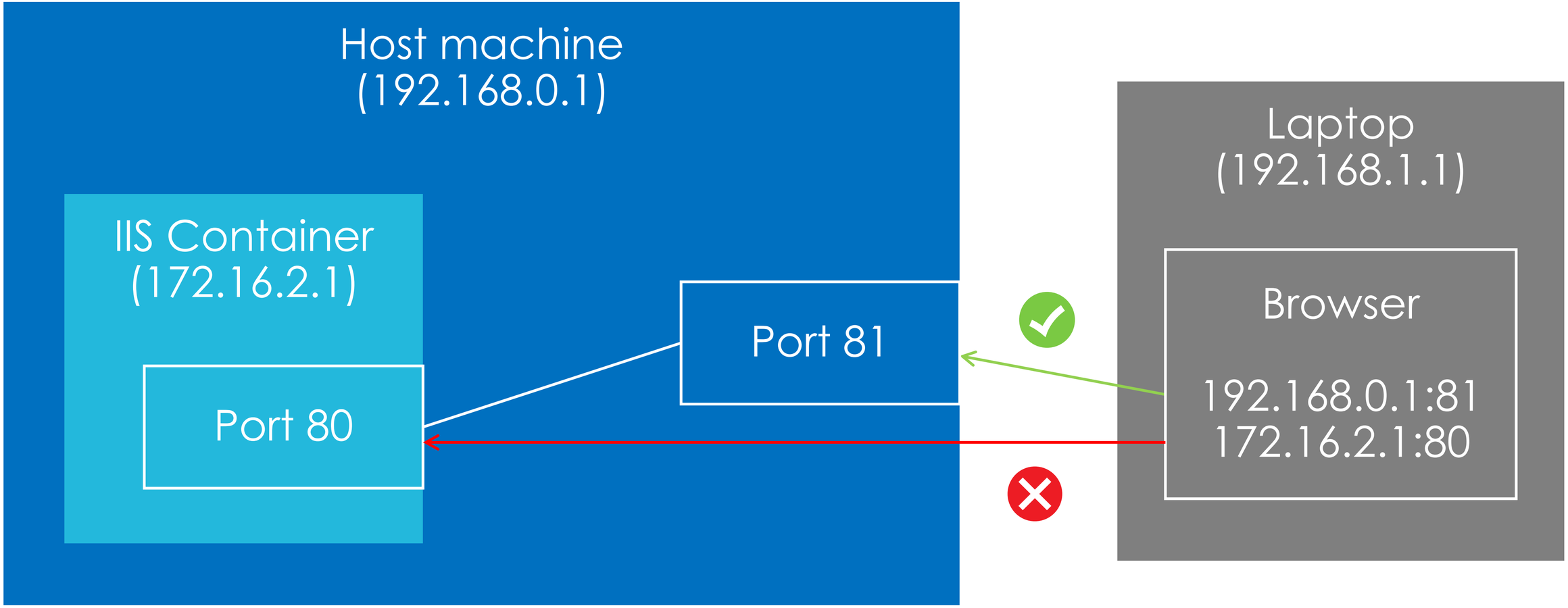
Standard network setup: NAT

Host / Container networking



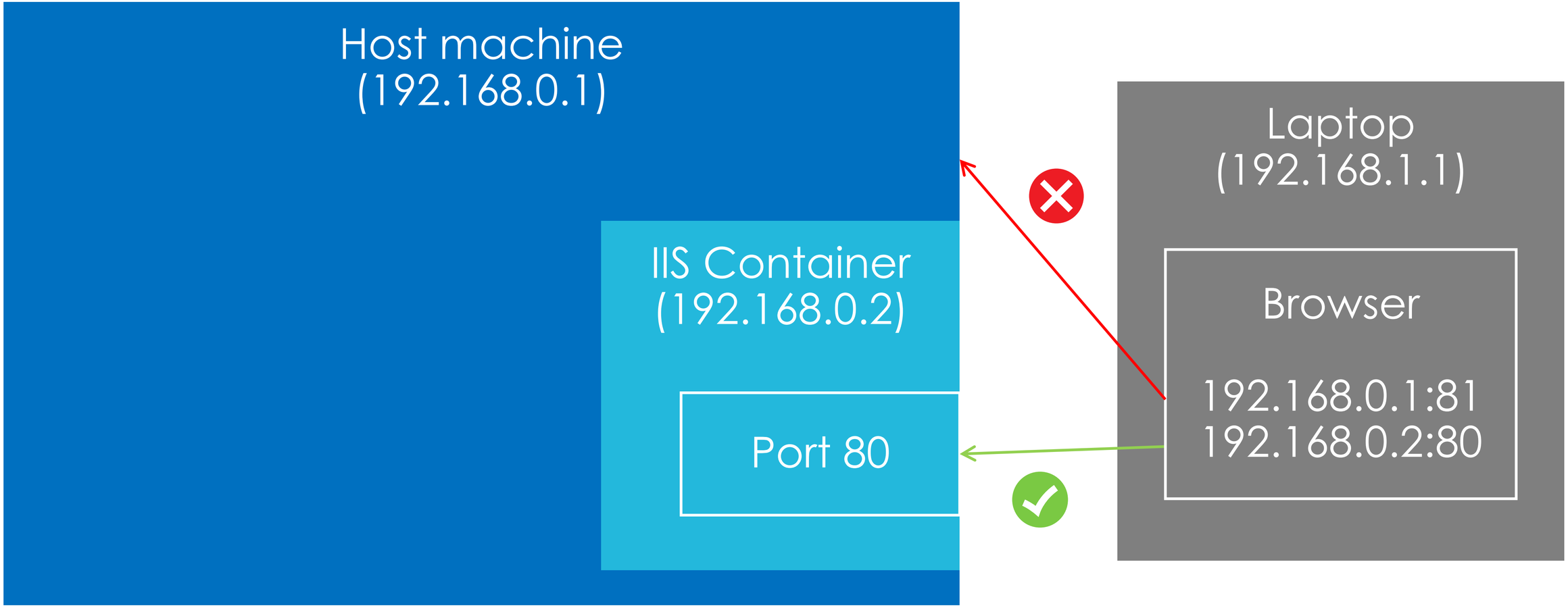
Standard network setup: NAT

Host / Container networking



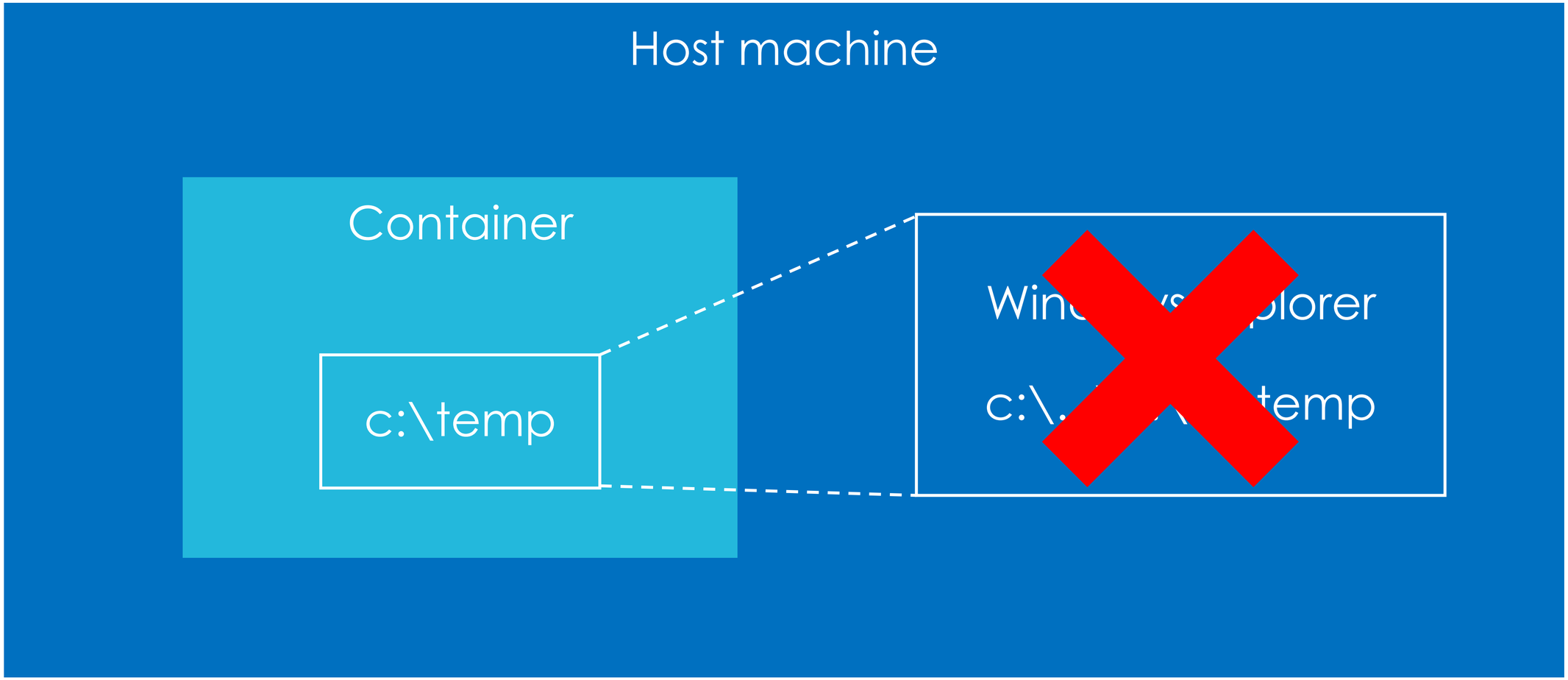
Standard network setup with port mapping, e.g param -p 81:80

Host / Container networking



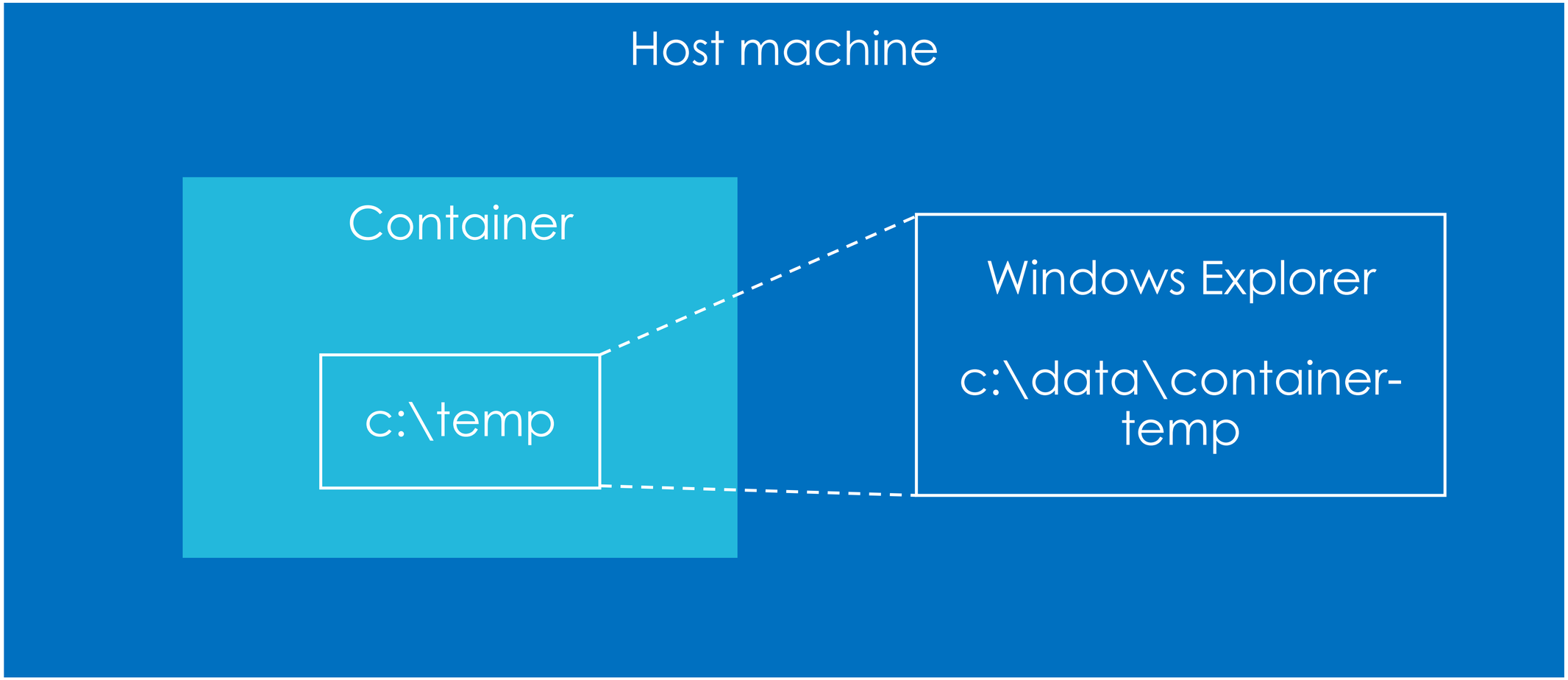
Transparent network setup: host and container “share” the network adapter

Host / Container file system



Standard fs setup: nothing configured

Host / Container file system



fs setup with a volume mapping, e.g. -v c:\data\container-temp:c:\temp

Demo

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Run your first Container

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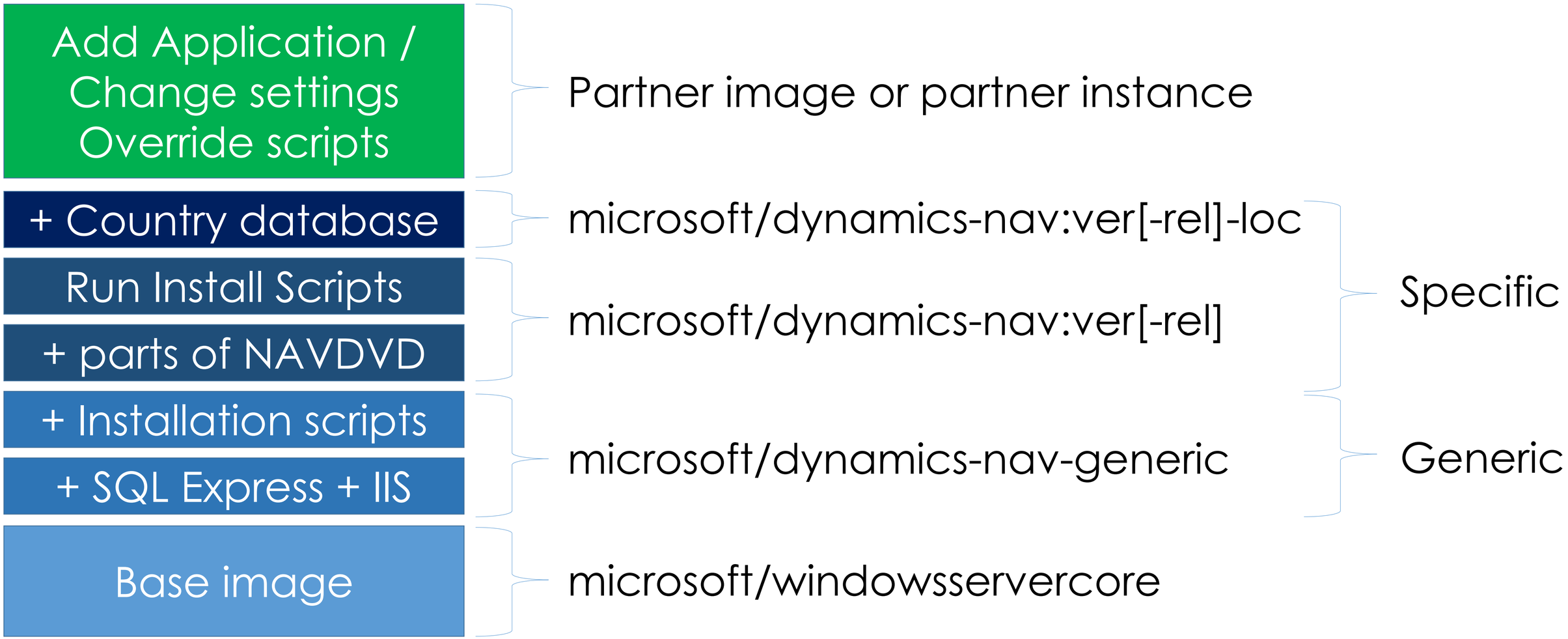
Architecture of NAV on Docker

NAV Container Image Architecture



NAV on Docker Image Tags

Format

microsoft/dynamics-nav:tag

tag is

[<version>[-<release>][-<localization>]]

Examples:

2017
2016-cu5
2017-cu9-dk
2017-gb
devpreview-finus

What happens when running a specific image

Start SQL Server (if necessary)

Start IIS (if necessary)

Create Certificate (if necessary)

Reconfigure NAV Service Tier

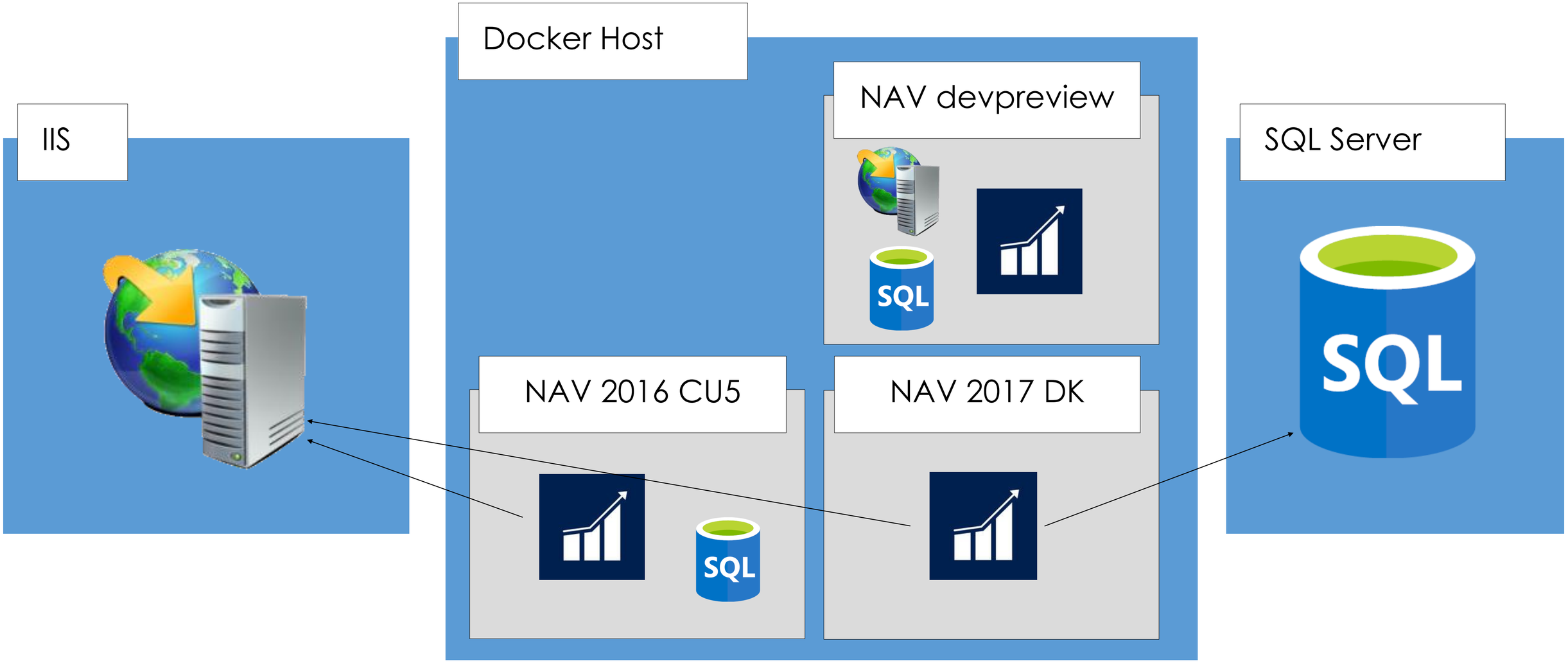
Start NAV Service Tier

Setup Web Client (if necessary)

Setup File Share (if necessary)

Setup Users (if necessary)

Running the NAV Container Image



Extend the standard Docker NAV images

Scenarios

Use your own license file

Use your own database

Use your own domain name and Ssl Certificate

Publish ports on the host for public access

Add your control add-ins

Use ClickOnce for the Windows Client

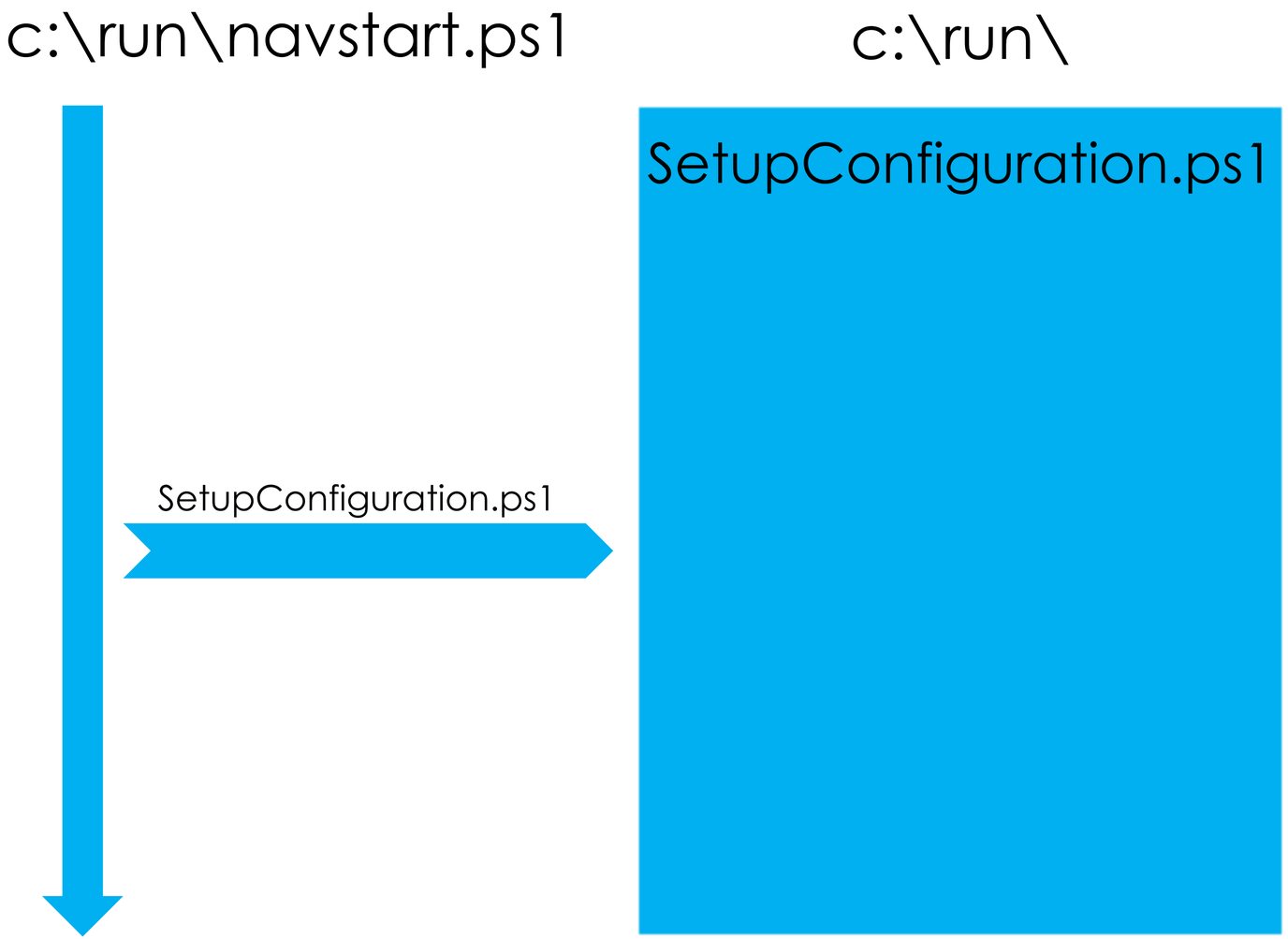
Setup additional users

Modify customsettings.config

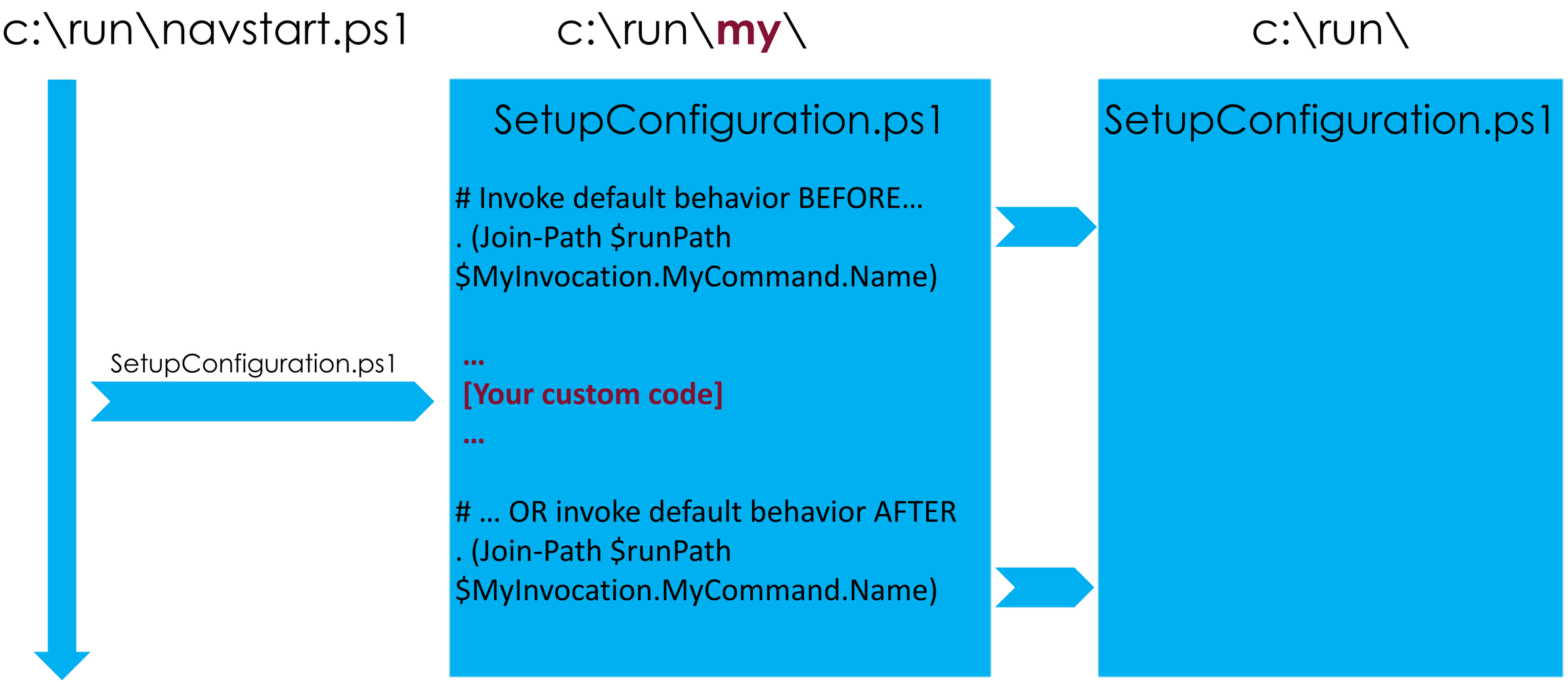
Modify web.config

And many many more…

Extend NAV containers – Mechanism



Extend NAV containers – Mechanism



Extend NAV containers – Why, How & Where

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SetupConfiguration.ps1

NAV service configurations

Use cases:

- Set environment specific settings
- E.g. Web Service language, disable Buffered Insert (dev only!!!) etc.

```
$CustomConfig.SelectSingleNode("//appSettings/add[@key='SOAPServicesSSLEnabled']").Value = $servicesUseSSL.ToString().ToLower()
$CustomConfig.SelectSingleNode("//appSettings/add[@key='ODataServicesSSLEnabled']").Value = $servicesUseSSL.ToString().ToLower()
$developerServicesKeyExists = ($customConfig.SelectSingleNode("//appSettings/add[@key='DeveloperServicesPort']") -ne $null)
if ($developerServicesKeyExists) {
    $customConfig.SelectSingleNode("//appSettings/add[@key='DeveloperServicesPort']").Value = "7049"
    $customConfig.SelectSingleNode("//appSettings/add[@key='DeveloperServicesEnabled']").Value = "true"
    $CustomConfig.SelectSingleNode("//appSettings/add[@key='DeveloperServicesSSLEnabled']").Value = $servicesUseSSL.ToString().ToLower()
}
$CustomConfig.Save($CustomConfigFile)
```

Extend NAV containers – Why, How & Where

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AdditionalSetup.ps1

The standard file is empty

Purely for custom purposes

Database + Services are already on

Use cases:

- Create NAV users (e.g. for a specific security group in your OU)
- Import your custom PS Modules etc.

Extend NAV containers – Why, How & Where

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And more and more extension points…

SetupDatabase.ps1

SetupAddIns.ps1

SetupLicense.ps1

SetupVariables.ps1

SetupWebClient.ps1

SetupWebConfiguration.ps1

SetupFileShare.ps1

… and more …

Demo

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Extending the Container

Build and reuse your own images

Build and reuse your own images

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Problem: After extending the standard NAV Docker images, you need to persist that and reuse your images

Partner perspective: Changes need to be reliably delivered to customers

Customer/hoster perspective: Your additional changes need to be persisted and reused

All: Internal / dev / qa / test needs to be as close to production as possible

Build and reuse your own images

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Solution: Create and reuse your own images

Extend images as we just showed you

Docker commit “saves changes” by creating a new image based on a changed Container
Docker tags allow you to identify different “versions”

Docker registries allow you to store and distribute custom images
Step 1: Make the changes and commit your image with your own tag
Step 2: Pull and run the image

Better: create your own Dockerfile = “image recipe” and build images

Resource governance

Resource Governance

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Problem: If a NAV Server instance goes crazy, there is no way to stop it from bringing the whole machine down

We don't have tooling to limit resource consumption

Partner/development perspective: errors in development might block your whole dev / QA team (if you work with a centralized dev environment)

Customer/hoster perspective: a problem in one NAV instance can block all other instances

You can work with one instance per machine but this is a waste of ressources

Resource Governance

Solution: Use resource limits for Containers

There are limits for RAM and CPU usage

You have to add them when starting the Container and won't be able to change them while the Container is running

If the main process in a Container hits an OutOfMemoryExceptions, it stops and restarts the Container (if configured that way)

But users on that instance will lose their session

If you run in "Swarm mode" Docker will automatically make sure multiple instances are always running

Running a Multi-CU environment

Running a Multi-CU Environment

Problem: You can't run multiple NAV Cumulative Updates (CUs) for the same release well on one machine

Different CUs use the same files, links etc, just with different versions, so there is no good and clean way to install them in parallel on the same machine

Microsoft delivers monthly CUs, which makes this a permanent issue

Customer/hoster perspective: Fixes / enhancements include or depend on new CUs

Update test / staging and later production environments with new CUs

Sometimes you might want to go back

Parallel business tests might collide with the technical CU tests

Running a Multi-CU Environment

Partner perspective: Customers running on different CUs need support on different CUs

Problems need to be reproduced on the same CU / custom dll version as the customer has

Fixes need to be delivered using the same CU as the customer has

Fixes by Microsoft need to be tested (are bugs fixed and no new bugs or different behaviour introduced)

Sometimes compatibility between CUs breaks

Running a Multi-CU Environment

Solution: Multiple Containers with different CUs can safely run in parallel on the same machine

A Container instance has it's own separate file system

We don't get conflicts for NAV Server and Web Clients

With ClickOnce we can even deploy separate Windows Clients and Dev Environments

The Container can optionally include it's own database or you can connect it to the right one

Update is only an easy docker pull of the new image

Going back means just throwing away the new Container and creating or re-starting the old one

Demo

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Running a Multi-CU environment

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Helpful PowerShell scripts

navcontainerhelper

Open source project
http://www.github.com/microsoft/navcontainerhelper

Examples:

- New-navcontainer
- Enter-navcontainer
- Import-DeltasToNavContainer
- Convert-ModifiedObjectsToAl
- Publish-NavContainerApp
- Remove-NavContainer
- Replace-NavServerContainer

And many many more…

Demo

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NavContainerHelper

What is Microsoft shipping?

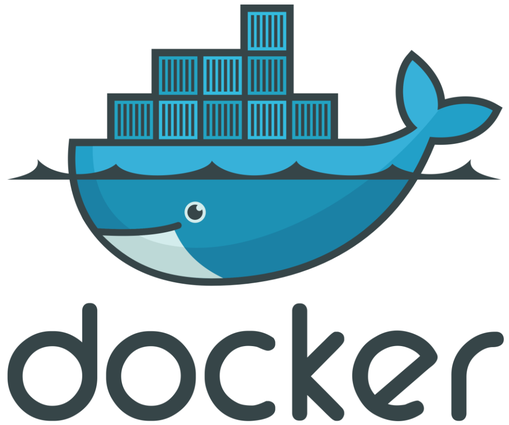
Cumulative Updates

Now
- NAV 2016 and NAV 2017 on-prem
- Dev preview

Soon
- NAV 2018 on-prem

Supported for test and development
All on docker hub

ALSO ON



Azure Images/Templates

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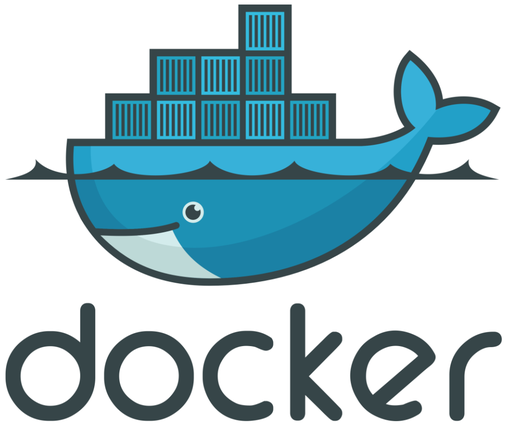
Now
- NAV Developer Preview
- NAV Workshop VMs

Soon:
- Azure Demo Environments
- Financials Sandbox Environments
- NAV Developer Preview

All combined into one Azure template using docker – http://aka.ms/getnav

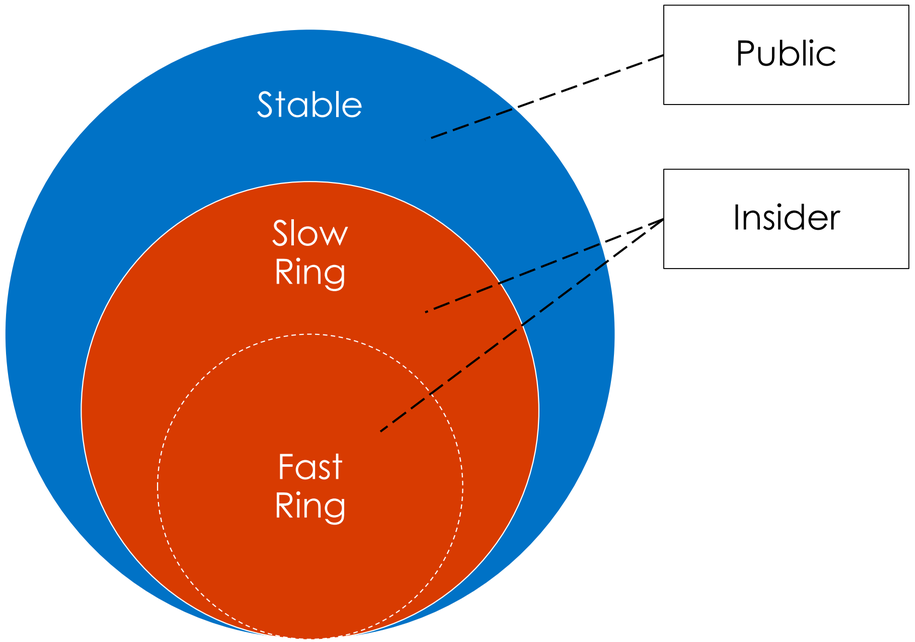
ONLY ON



Going forward

From Autumn 2017:

- Stable: Releases, CUs, Current SaaS builds
- Slow ring: SaaS preview (Insider)
- Fast ring: Daily builds (Insider)

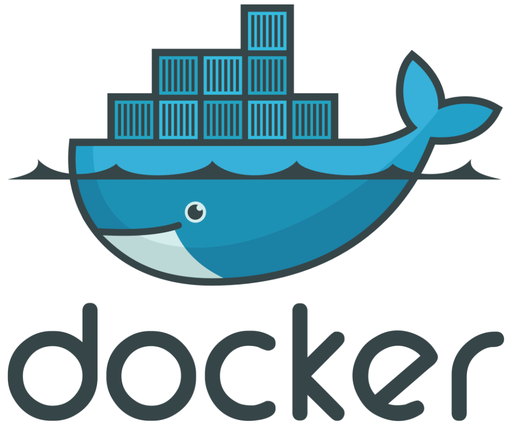


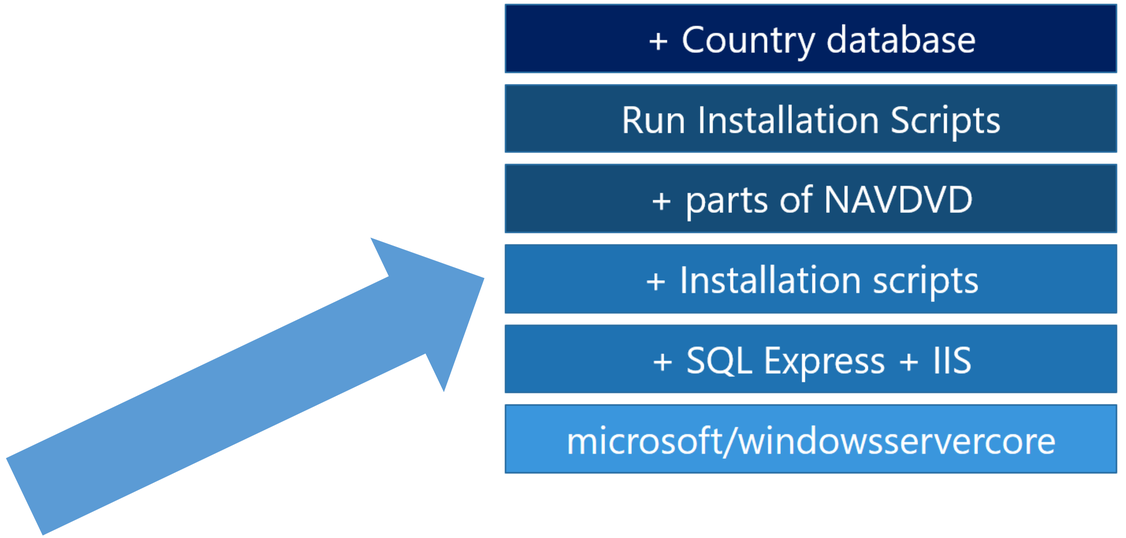
Insider
ONLY ON

docker

docker

Communication on the team blog
Collaboration on github
http://www.github.com/microsoft/nav-docker
Documentation on MSDN
HOLs also on github





Questions?

You also might want to check
https://blogs.msdn.microsoft.com/freddyk/ (Freddy's blog)
https://github.com/Koubek/nav-docker-examples (Jakub's Github repo)
https://navblog.axians-infoma.de (Tobias' blog)

Just a glimpse: advanced topics

Advanced topics (only a select few)

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Docker compose allows you to configure and start multiple connected / dependend containers at once (on the same machine)

Docker swarm allows you to scale your compose "groups" as services over multiple hosts and have docker maintain multiple instances of the same container → scaling and failure resistance

Other orchestrators include Kubernetes, Mesos, and DC/OS (Marathon)

Azure Container Instances allow you to on-demand deploy containers without maintaining the Docker infrastructure

Azure Container Services allow orchestration and scaling (currently only Kubernetes for Windows containers)

Demo

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A GUI for Docker: Portainer