Make the most out of Business Central on Docker

Tobias Fenster

When you are passionate about
Microsoft Dynamics NAV/365 Business Central

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COSMO CONSULT

Business-Software for People

Introduction to the scenario

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Assumption: You know roughly what Docker is

Docker containers allow running multiple versions / CUs of Business Central on the same VM

Docker containers have a much lower resource overhead than full VMs

Creating / starting and stopping / deleting containers is a lot quicker than full VMs

→ You want to run multiple containers "somewhere" to save resources and scale better

→ But how can you connect your development / test / etc. machines to those containers?

Agenda

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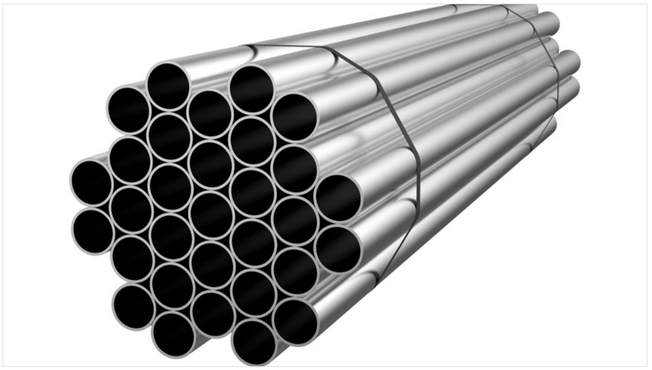
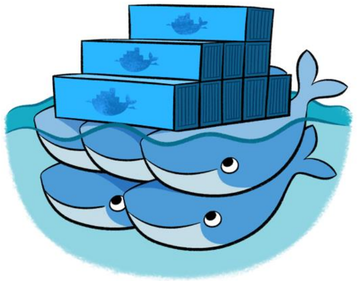
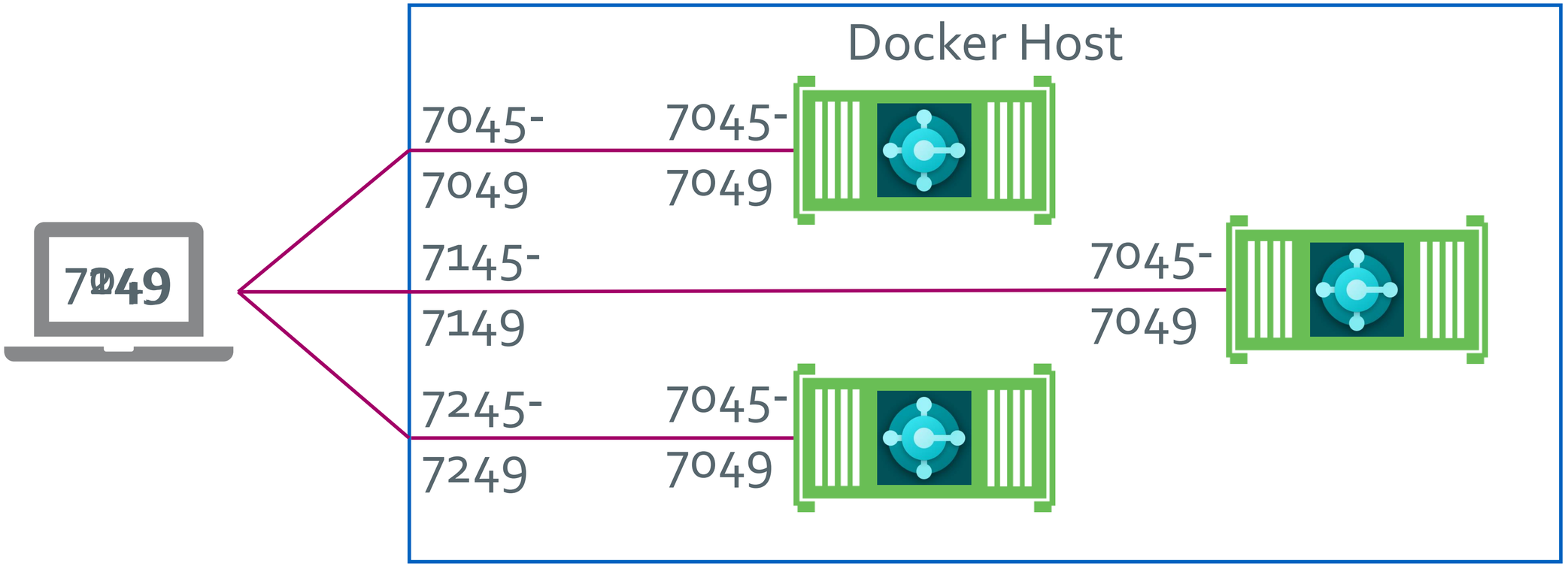





Handle every
network port
individually

Solution 1: Port mapping

Run your containers and map their ports to different host ports



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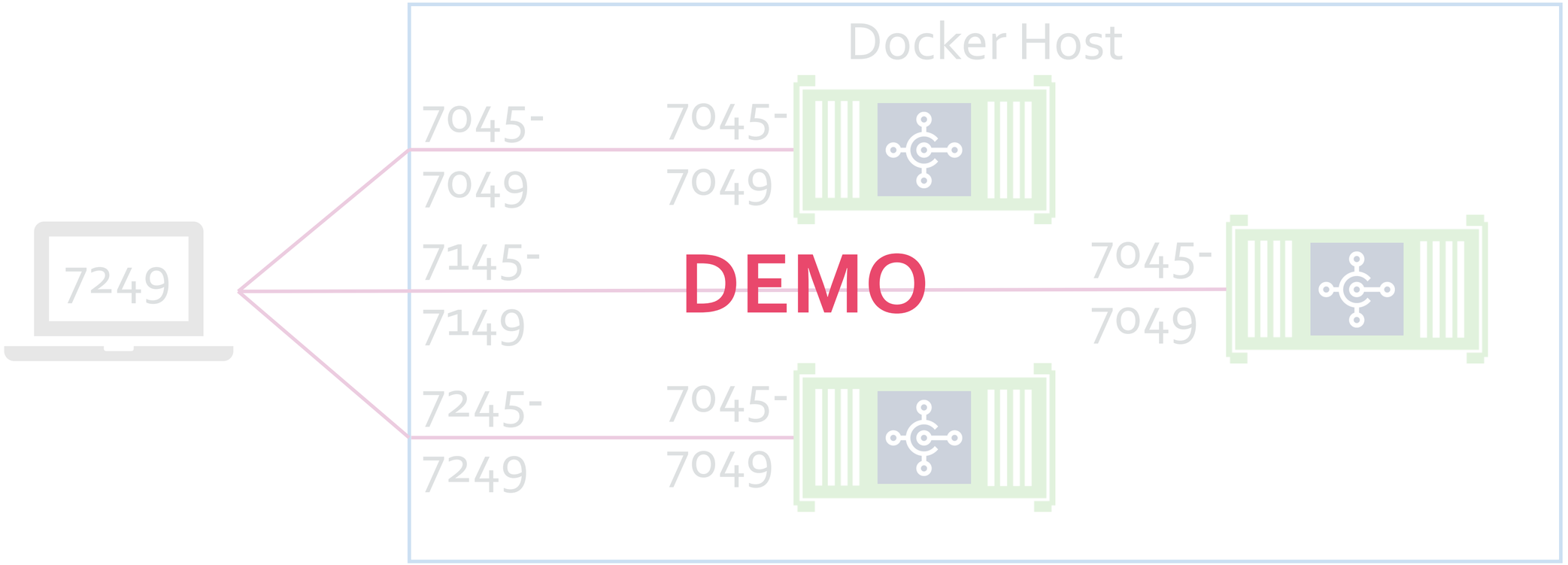

Port mapping – the good and the bad

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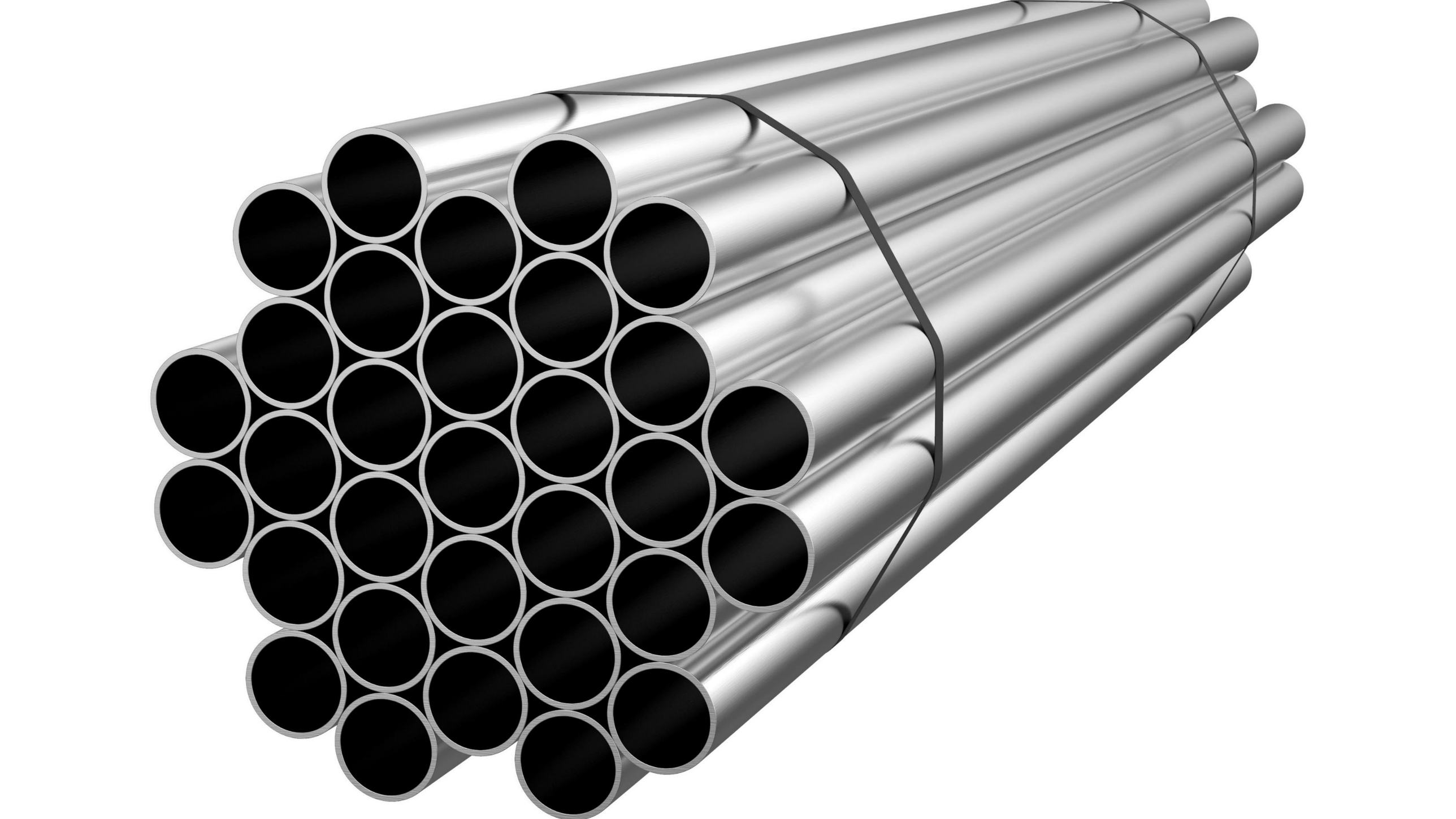
Good:

- Easy to connect to from the client (if you know the right port)

Bad:

- Always need to determine which ports are free for the next container
- Don't forget 80, 443, 1443, 8080
- Need to open ports on the firewall of the VM
- On Azure that becomes two firewalls (VM and Azure networking)

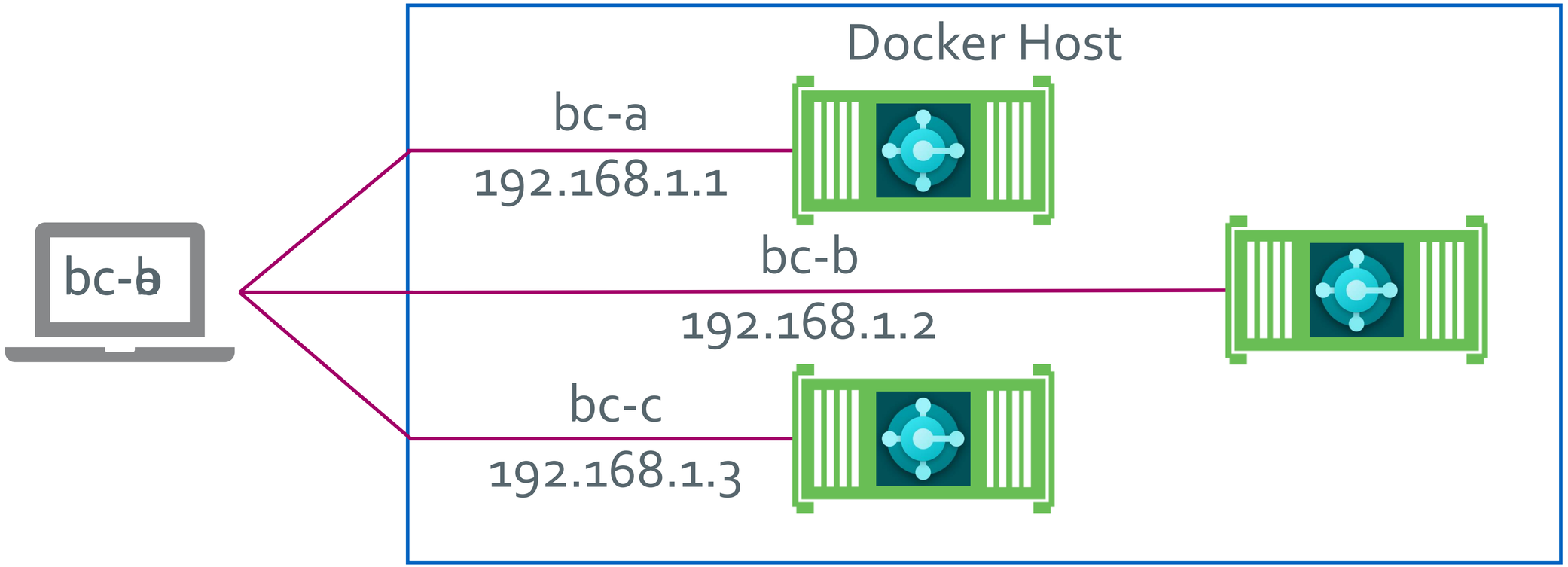
→ Possible but somewhat complicated and error prone




Handle every
container
individually

Solution 2: Transparent networking

Run every container with its own IP (and name)



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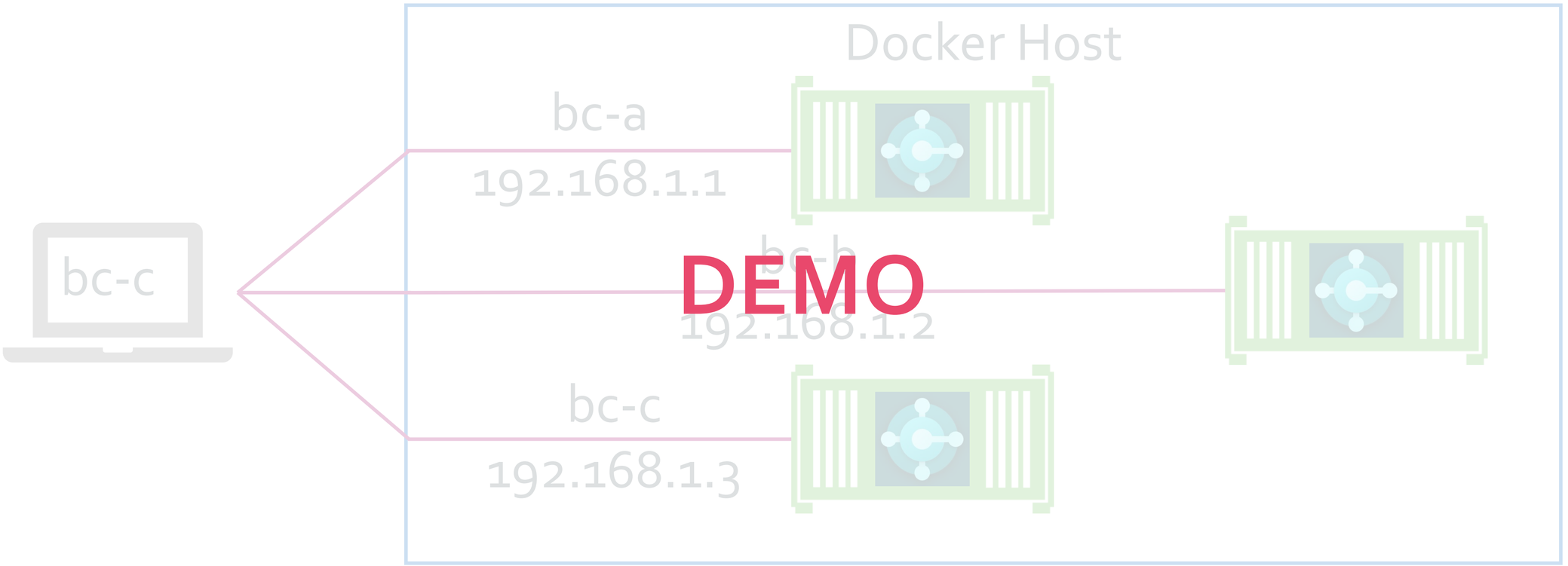

Transparent netw. – the good and the bad

Good:

- Easy to connect to from the client (you only need the name)
- Creating a new container is easy as well

Bad:

- Needs to be allowed on your network
- Needs a specific setting on your hypervisor (MAC address spoofing)
- **Not directly possible on Azure VMs**

→ Good solution for on prem if allowed but not for Azure


All networking
goes through
one „pipe“

Solution 3: Reverse proxy

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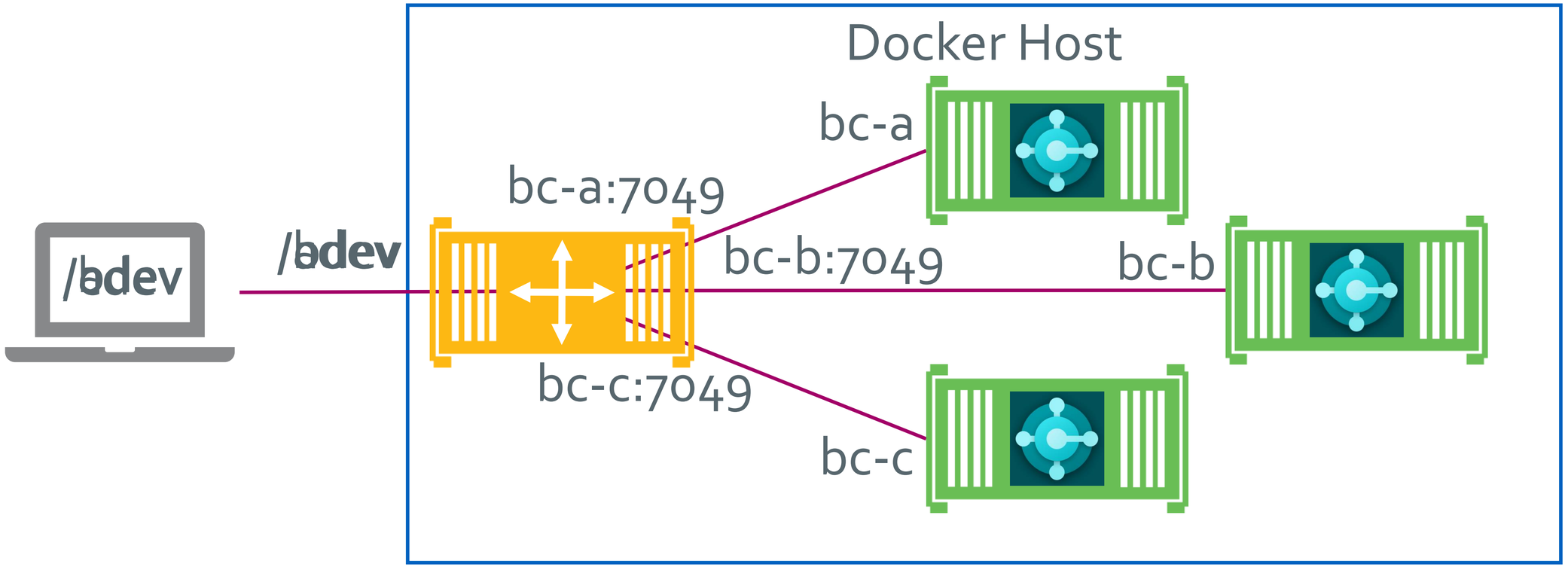
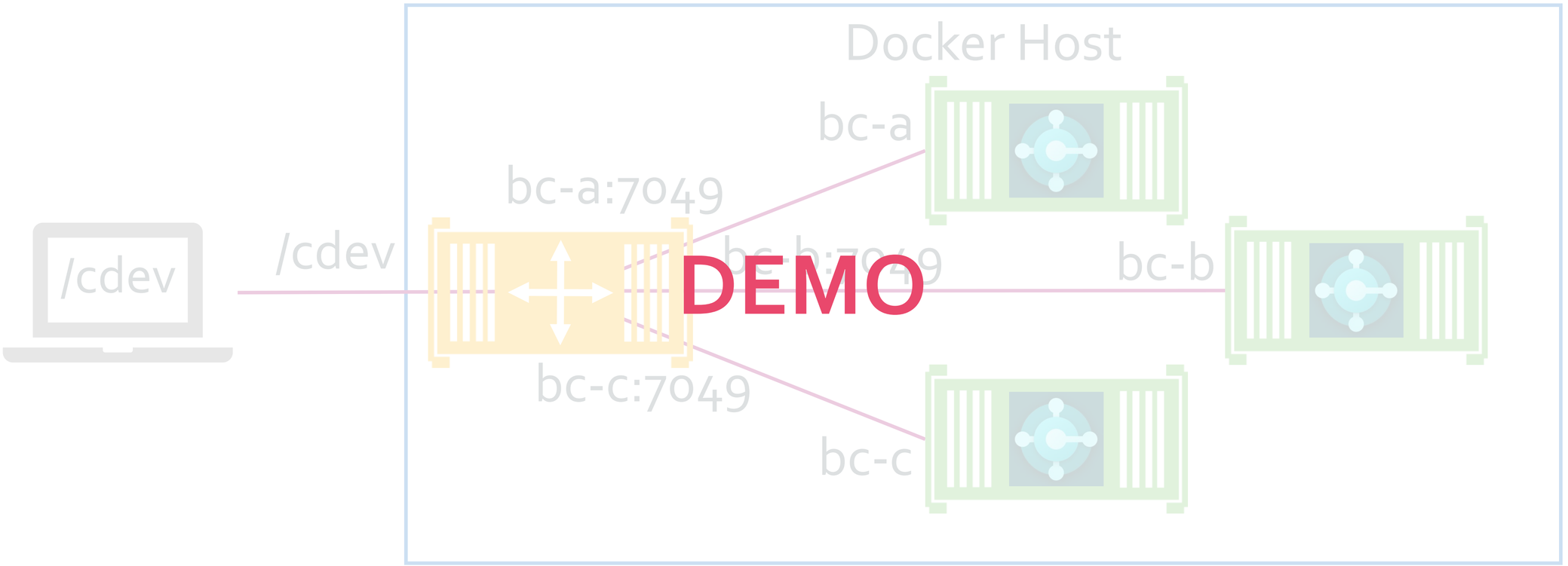
Run your containers behind a reverse proxy



Solution 3: Reverse proxy

Run your containers behind a reverse proxy



Reverse proxy – some details

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Implemented using traefik (https://traefik.io/)

- Cloud-native, container-native reverse proxy
- Easy to set up and run, e.g. integrated LetsEncrypt support
- Picks new containers up by checking their labels

Regex-based rules for the mapping, e.g.

- https://myvm.westeurope.cloudapp.azure.com/bc-arest/*
- maps to http://bc-a:7048/BC/OData/*
- https://myvm.westeurope.cloudapp.azure.com/bc-a/*
- maps to http://bc-a:80/bc-a/*

Reverse proxy – some details

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Additional config for the Business Central container:

- Set PublicODataBaseUrl, PublicSOAPBaseUrl, PublicWebBaseUrl and PublicDnsName so that Business Central knows what it is called from the outside
- Set WebServerInstance to a different name as it otherwise insists on redirecting to /NAV or /BC
- Health check needs to be different: Traefik only picks up healthy containers but for the regular health check to work, traefik routing needs to be in place…

Traefik needs a setup file called traefik.toml

Reverse proxy – some details

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Integrated into

- aka.ms/getbc and related Azure ARM templates with a „Add Traefik“ toggle

- navcontainerhelper with -useTraefik

Base setup needed

- New containerhelper cmdlet Setup-TraefikContainerForBCContainers

→ Let’s check the connection and look at some of the details

Reverse proxy – the good and the bad

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Good:

- Easy to connect to from the client (you only need the path)
- Creating a new container is easy and it works on Azure
- You only need one entry point per reverse proxy in the firewalls

Bad:

- One more component to set up and maintain
- Non-HTTP-traffic needs more work (RTC and SQL/finsql) → traefik 2.0 supports that, but I haven't tested yet
- URLs returned from SOAP and REST endpoints not correct

→ Good solution for both worlds, especially with automated setup

Limitations of our previous approaches

Bound to 1 host

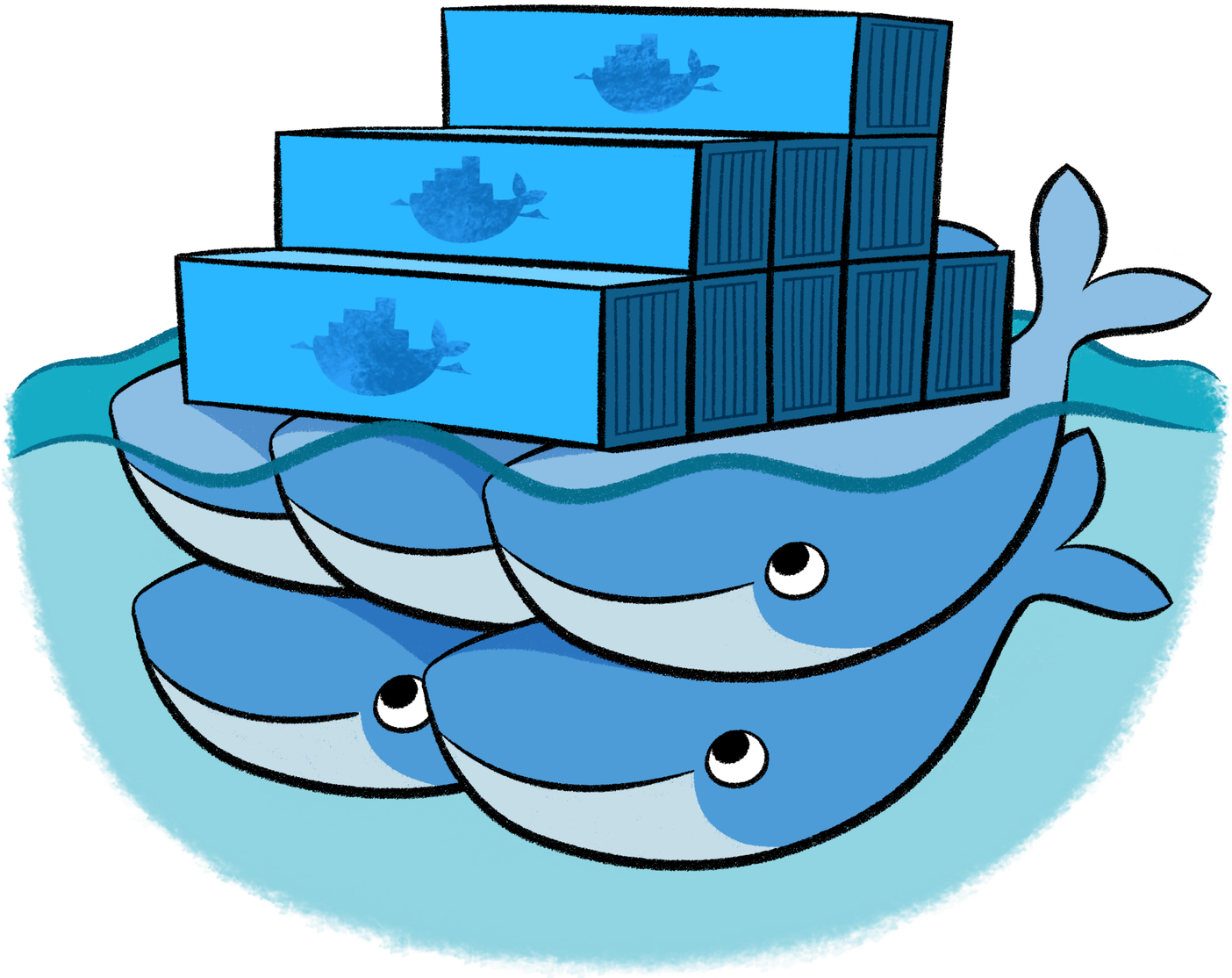
- What happens when we run out of resources?

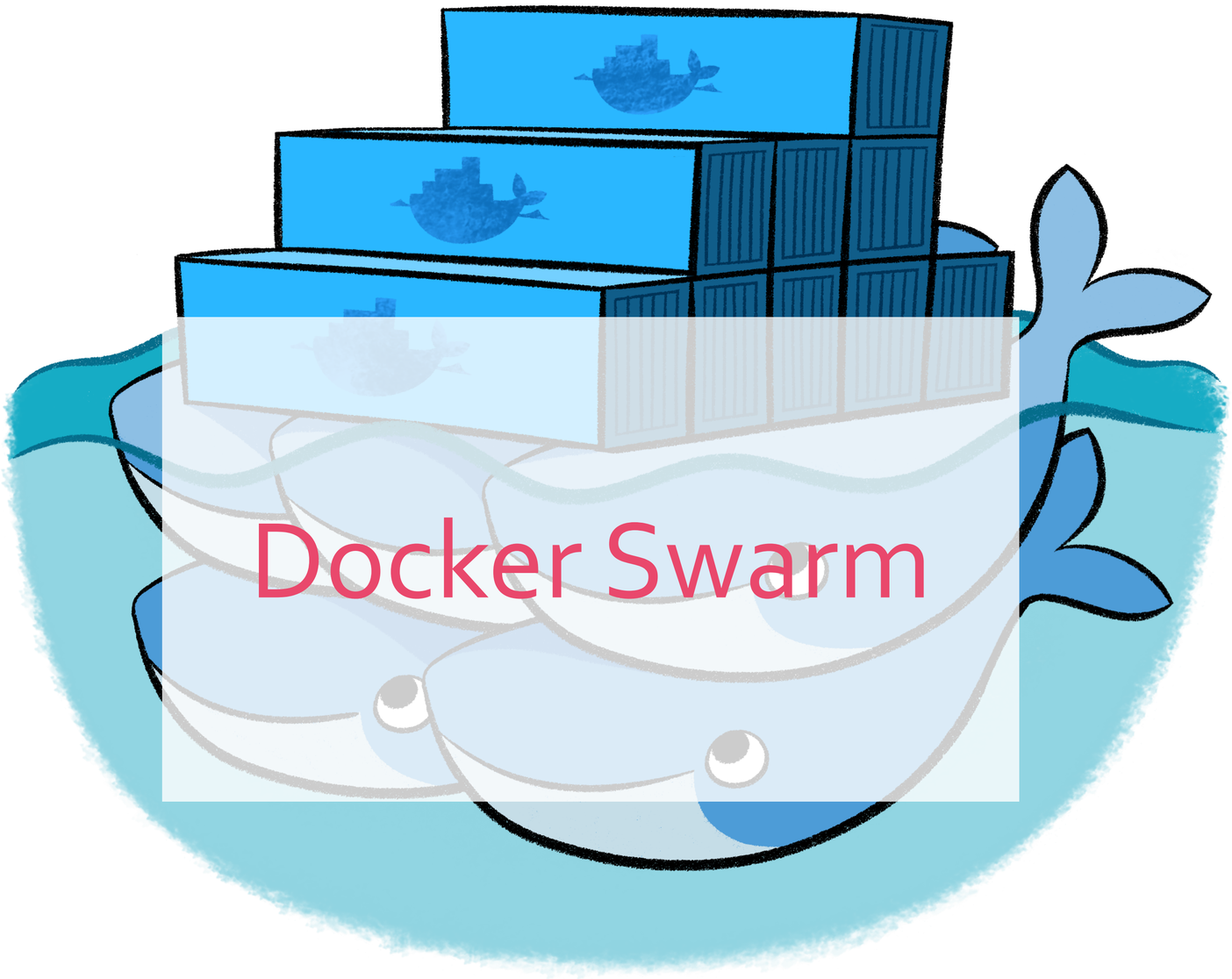
If we use multiple hosts, how to figure out what to put where?

- How to let users know what is running where and how to reach it?
- Scaling up and down still is problematic

Still running 1 SQL Server per container

- Not very efficient
- Scaling limits as above
- And it's SQL Server Express (max 10GB database size)





Docker Swarm

Part 1 of the solution: Docker Swarm

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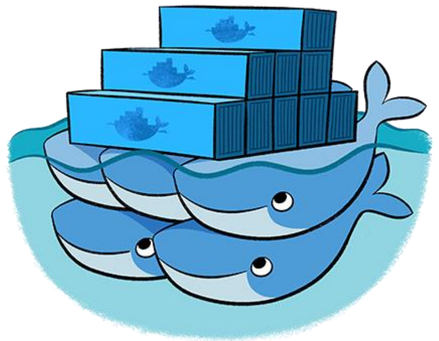
Built-in container orchestrator from Docker

Main benefits / features:

- Brings resources of multiple container hosts together
- Central management and control
- Share configuration and secrets across the swarm
- Declarative service model
- Automatic "self-healing" concepts
- Advanced networking for resiliency



What about Kubernetes and the recent Mirantis deal?

Part 1 of the solution: Docker Swarm

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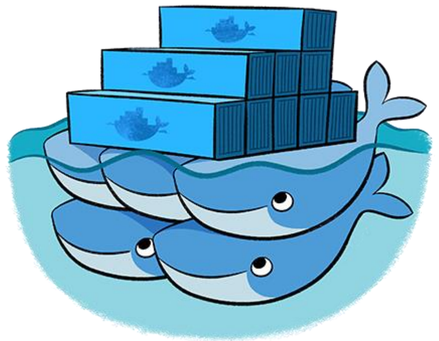
Some basics in the Docker Swarm world:

- Service = declaration of the images, number of containers (tasks) and configurations you want to run; can be replicated or global
- Node = container host / engine that joined the swarm
- Manager = node with control rights
- Worker = node that executes tasks

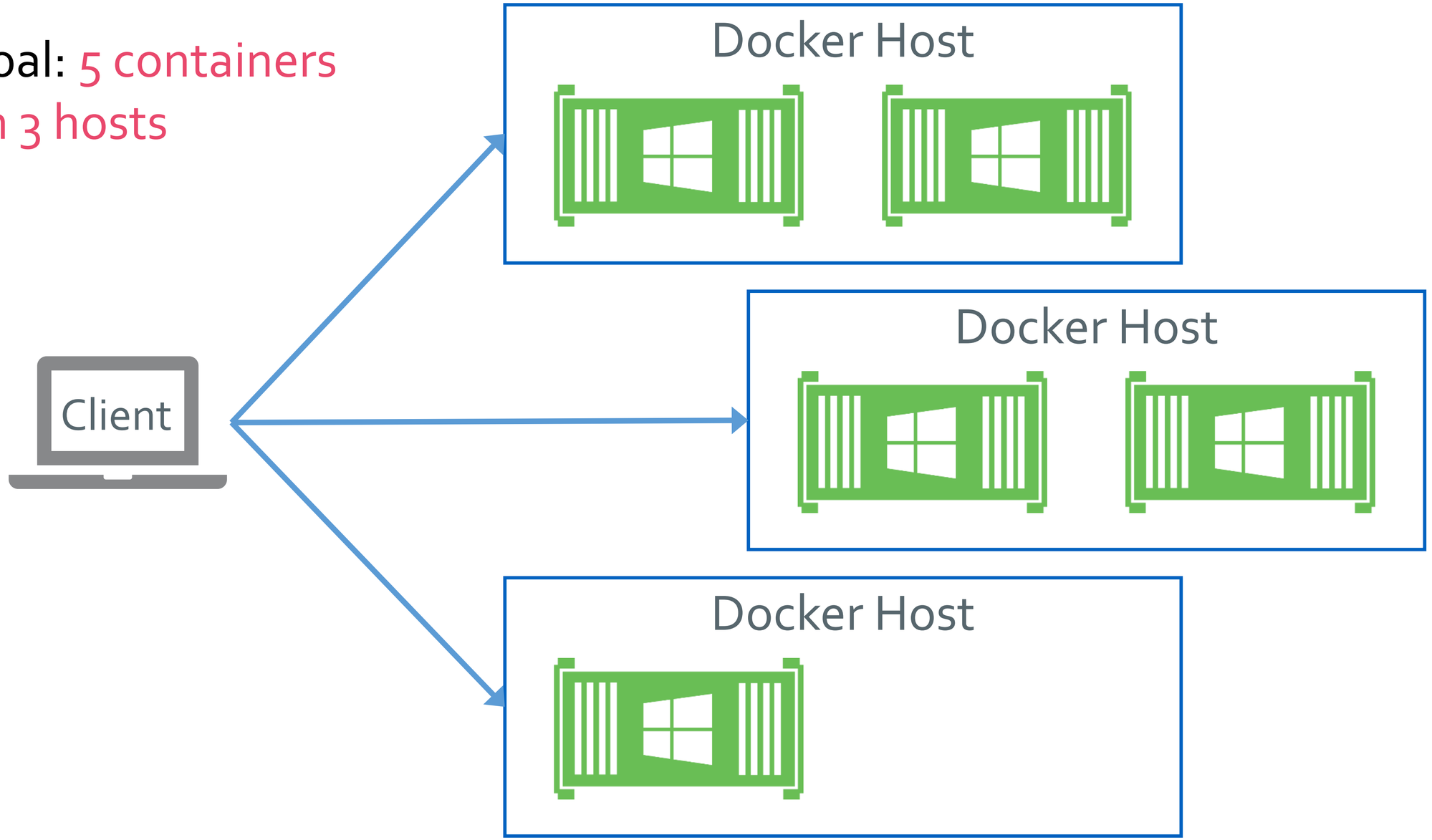


How to "run" something:

1. Declare your service
2. Submit that to a manager node
3. Swarm creates necessary tasks on nodes and keeps desired state

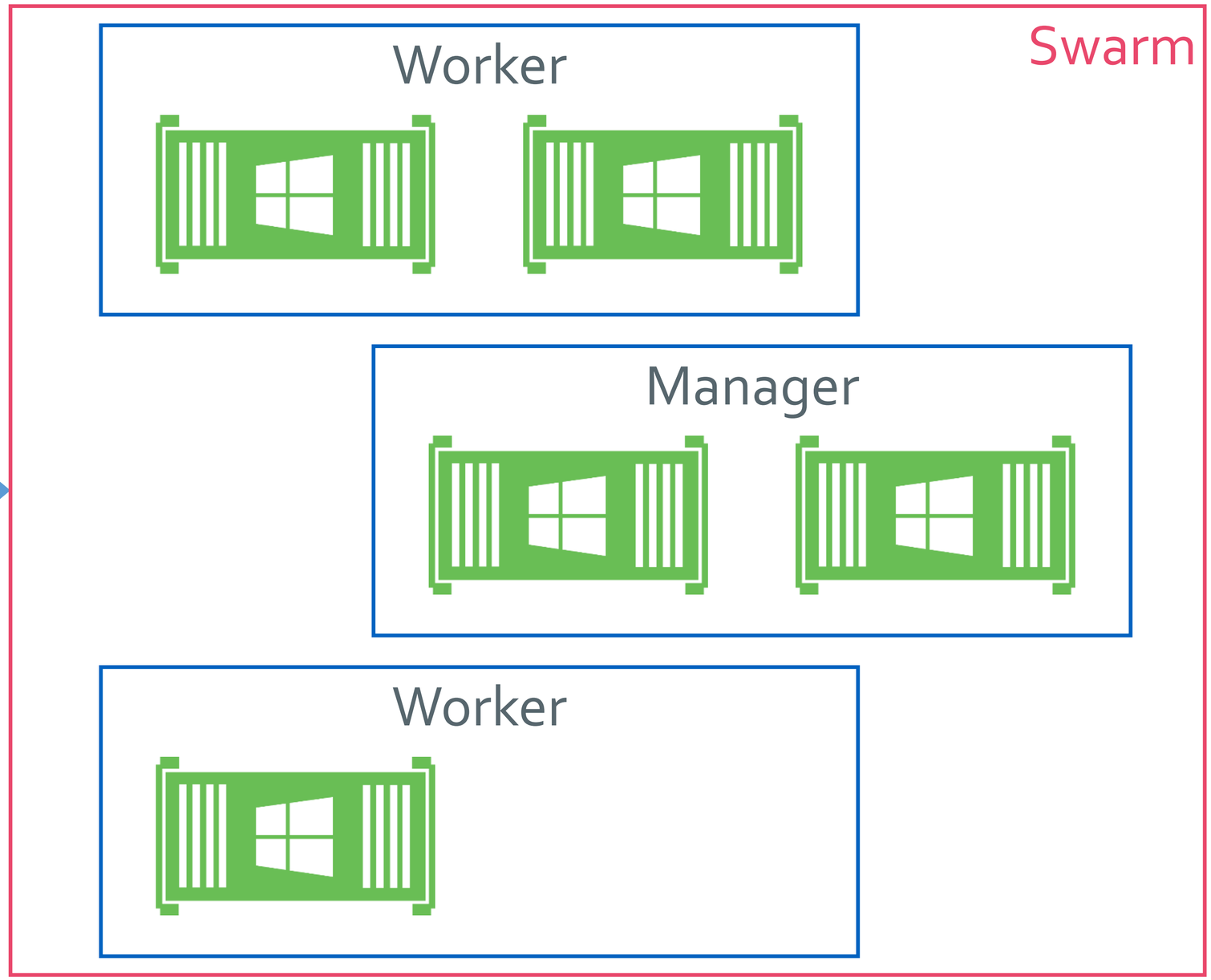
Part 1 of the solution: Docker Swarm

Goal: 5 containers on 3 hosts



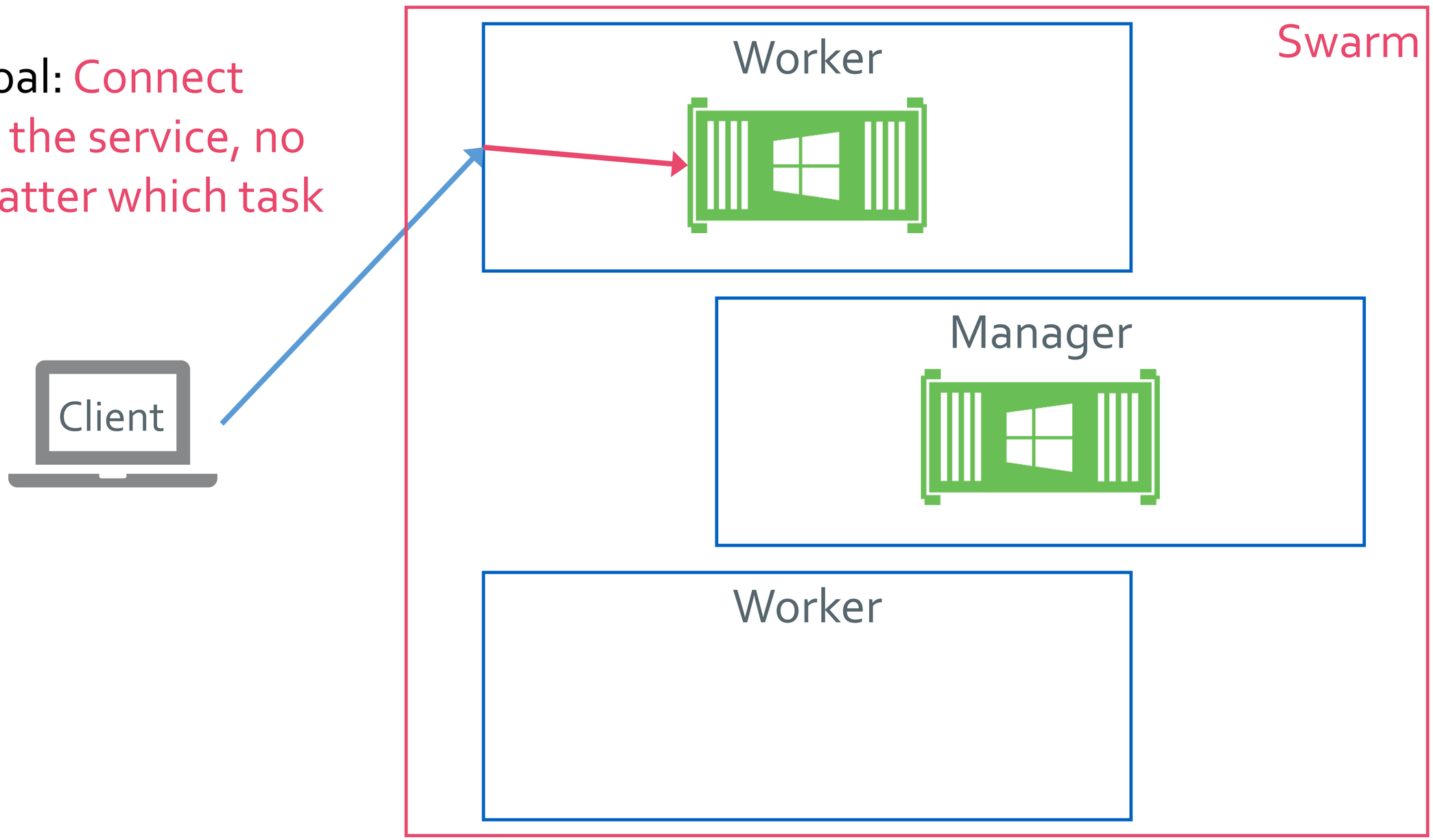
Part 1 of the solution: Docker Swarm

Goal: 5 containers **on a Swarm** with 3 hosts



Part 1 of the solution: Docker Swarm

Goal: Connect to the service, no matter which task



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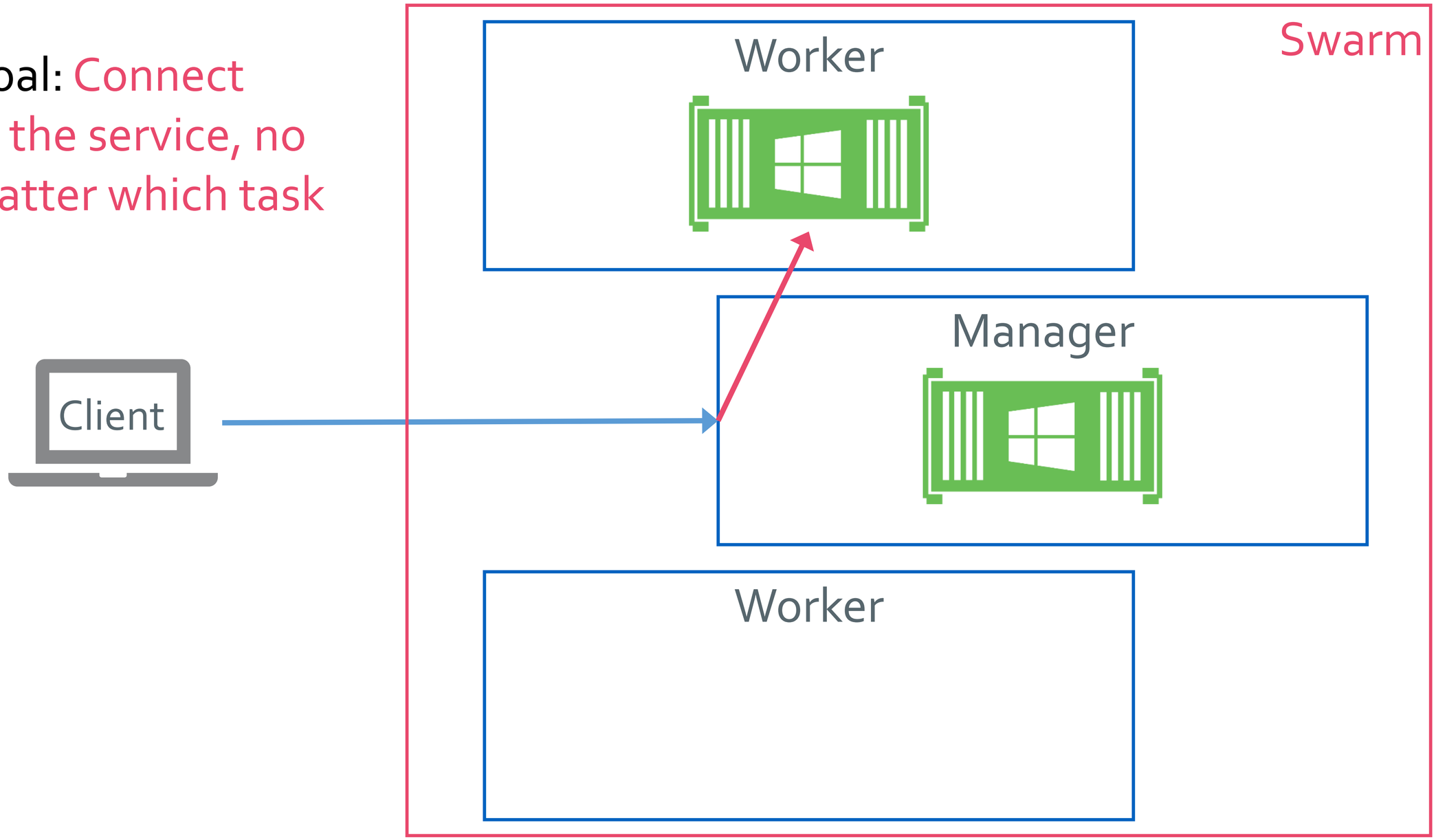

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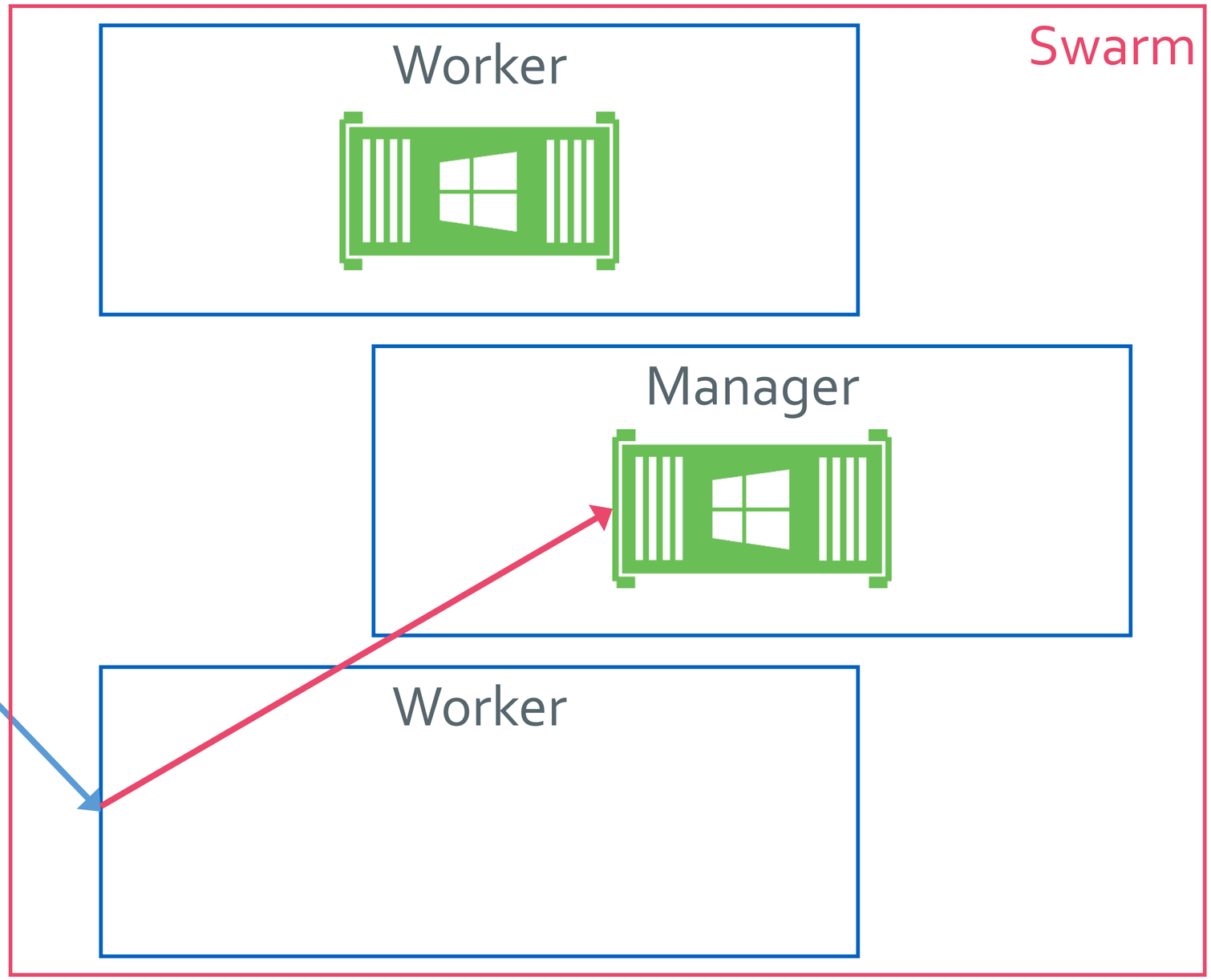

Note: Doesn't directly work with BC as it requires a stateless service

Part 1 of the solution: Docker Swarm

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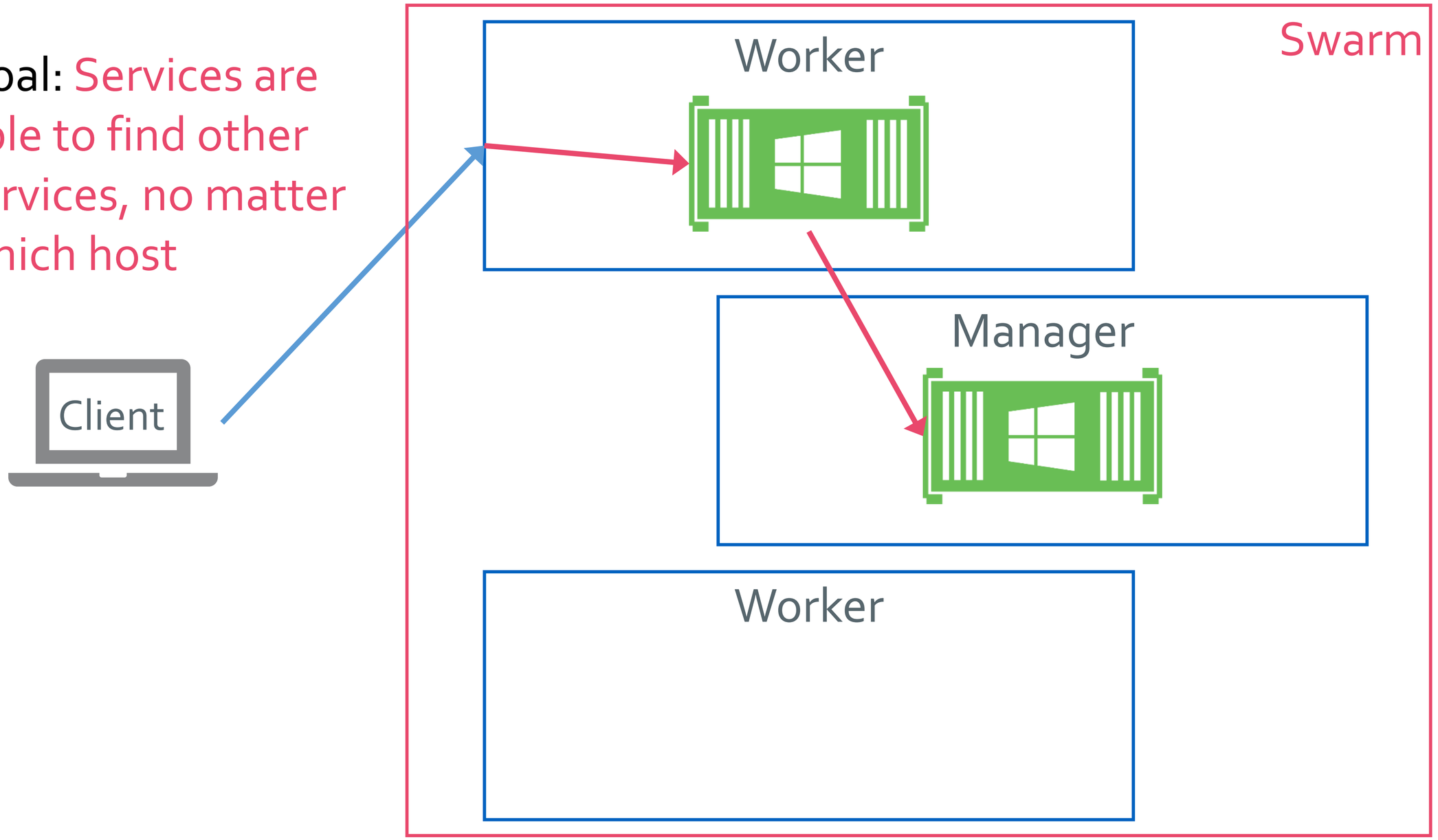
Goal: Services are able to find other services, no matter which host



Part 1 of the solution: Docker Swarm

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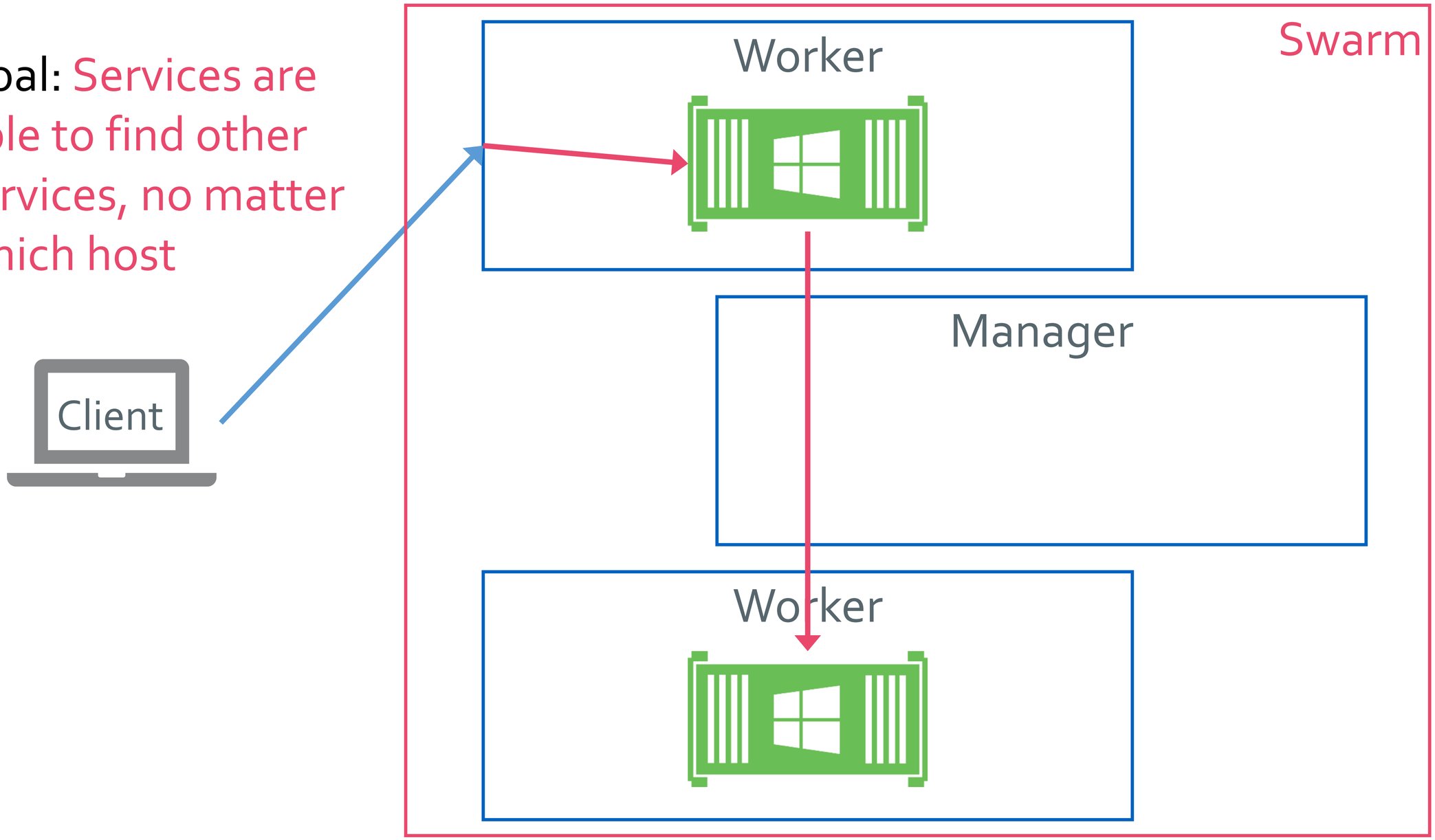

Part 1 of the solution: Docker Swarm

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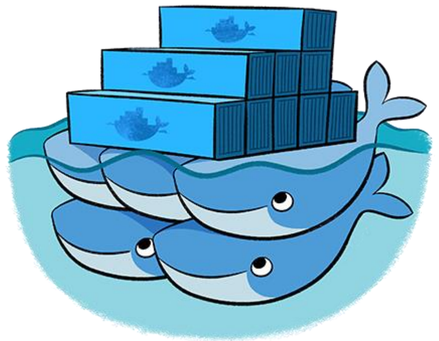
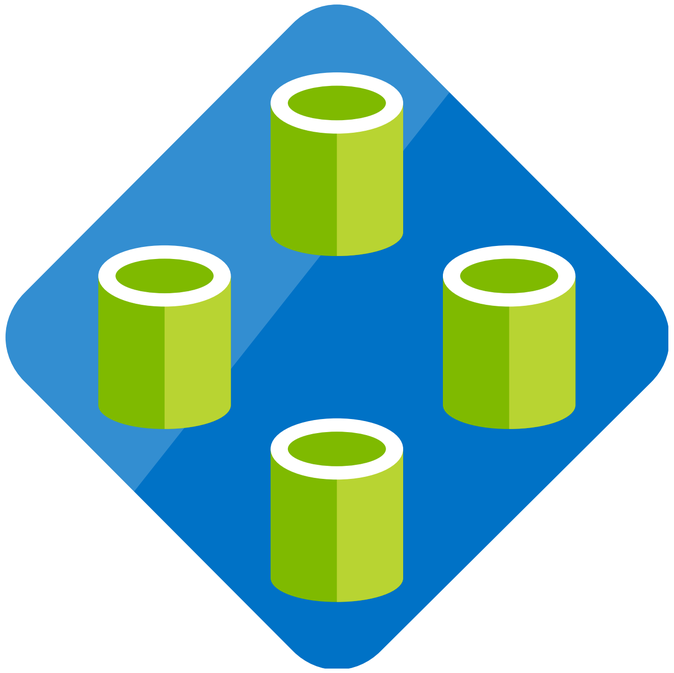
Demo scenario:

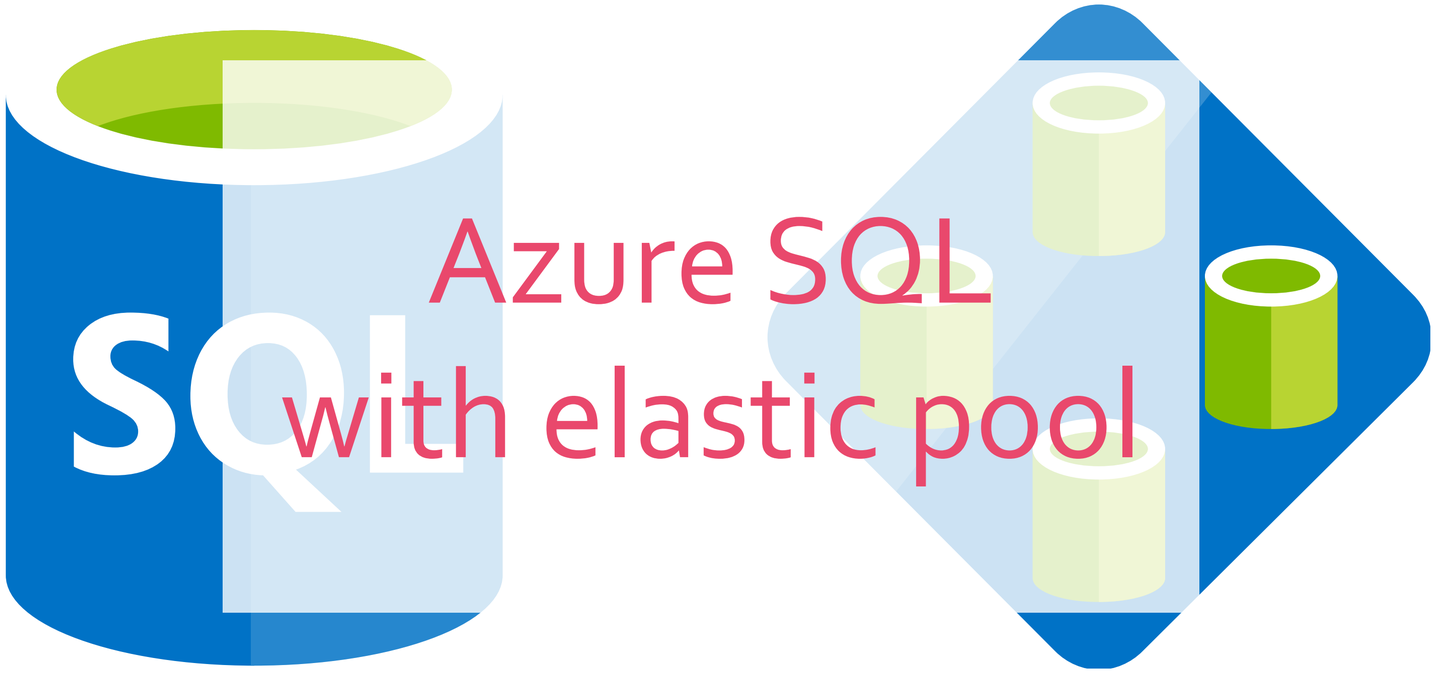
- Create 1 service consisting of 2 containers
- → Show connections
- Scale service up
- → See placement on nodes
- Remove task
- → See recovery



→ Let's see it!


SQL





Azure SQL with elastic pool

Part 2 of the solution: Azure SQL

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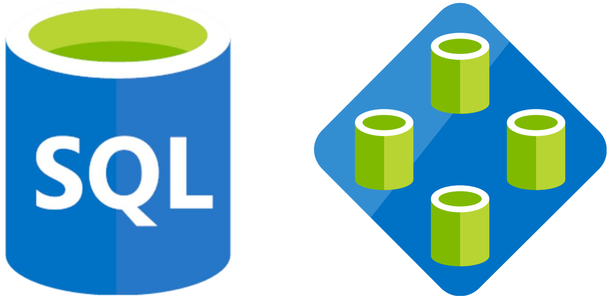
Platform as a Service (PaaS) offering

- Always kept current by Microsoft
- Scale up and down dynamically
- (Almost) no resource limits
- Elastic pools allow resource sharing across all databases (with configurable limits)

→ No server maintenance, no limits; just cost…



Limitations of our previous approaches

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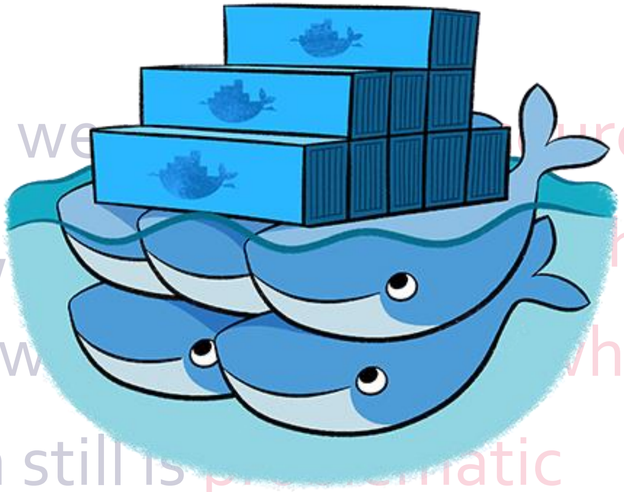

rces?

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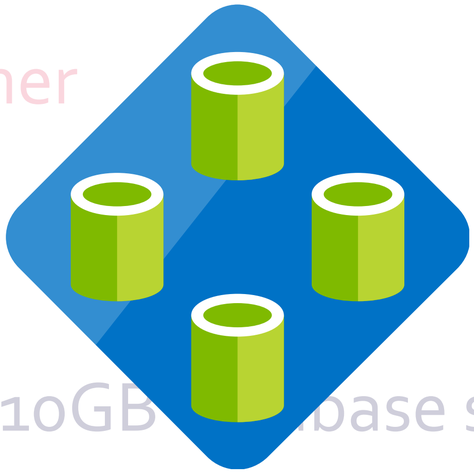
Scaling limits as a



And it's SQL Serve

max 10GB

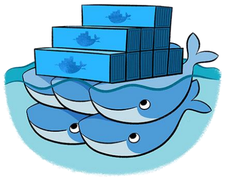
base size)

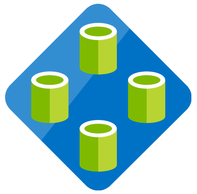
Bringing it together: Swarm & Azure SQL

Prereq: Azure SQL database with a “template” database

1 ARM template to deploy

- 1 manager VMs and x worker VMs (note: SPOF manager!)
- 1 Azure SQL server with 1 elastic pool
- Setup script to initialize the Swarm on the manager and join it on the workers, set up Traefik, prepare access credentials for template DB and target pool and share them as secrets





Specific scenario: Start a BC Swarm service and connect to a DB created on demand as copy of the template

→ Let’s see it

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Q&A

Any Questions?

Ideas I really, really like

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Thank You!