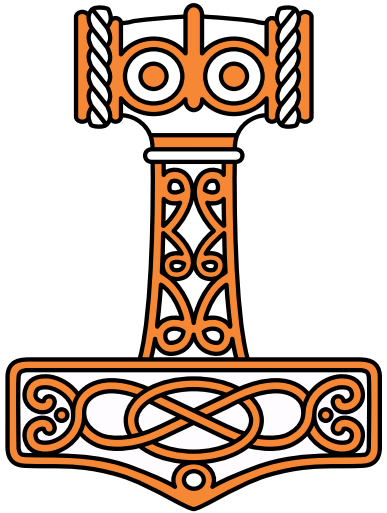
DYALOG

Olhão 2022

Deploying Services
(SP2)



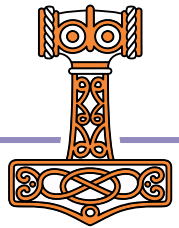
Brian Becker

Morten Kromberg

Goals

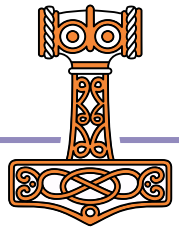
Give a quick introduction to:

- Jarvis – Dyalog's Web Service Framework – to expose APL functions as services
- Docker: to create lightweight Virtual Machines known as "Containers"
- Docker Compose: to launch and manage multiple inter-connected containers
- Amazon Web Services "Elastic Container Service": to allow Docker Compose to launch containers directly to the cloud (so-called "serverless" deployment)
- How to scale the system by running multiple copies of selected services
- How to assign your own domain name and a certificate to your service



Disclaimer

- This workshop covers a lot of material with which we expect most of you will be somewhat unfamiliar. (we learned **a lot** ourselves in preparing the material ☺)
- Our intent is to show what is possible and roughly how complicated it is.
- Work together through the exercises and don't be afraid to ask questions.
- The workshop materials contain a working system which you can continue to work with when you get home.
- We plan to follow up with a series of webcasts that will present the material in more "bite-sized" chunks.
- We expect the examples and configuration files will continue to evolve and updates will be available on GitHub.
- You are welcome to contact us after Dyalog'22 for some free assistance.



The Plan

14:00-15:00 Setting the Scene

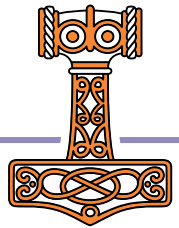
- Introduction to Jarvis, Docker – and the "Phonebook Service"
- Limbering up: running and calling the Service from APL
- Building and launching a local Docker container

15:15-16:15 Cloud Storage

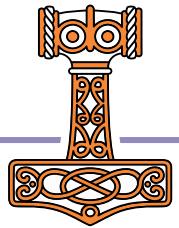
- Creating a two-tier application in preparation for scaling the system
- Introduction to "docker compose"
- Building, launching and debugging the two-tier solution

16:30-17:30 Scalable Execution on the Cloud

- Installing the Amazon Command Line Interface (CLI)
- Launching the application on "Serverless" Amazon Fargate
- Wrap up: Using your own domain, and adding a certificate (or not)

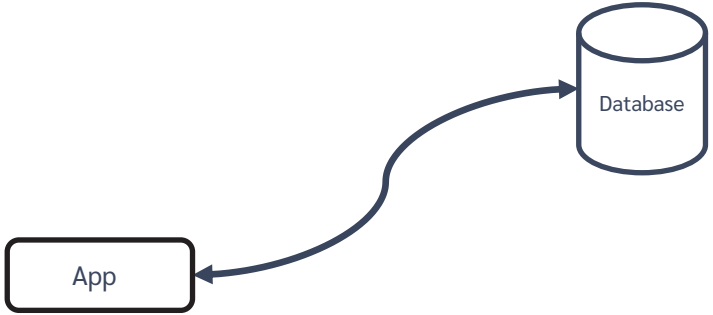


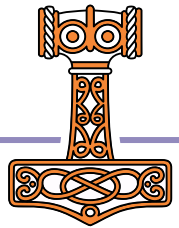
The Plan Visualized...



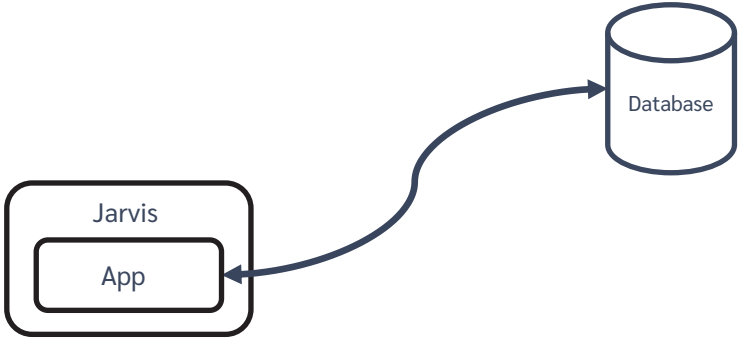
The Plan Visualized...

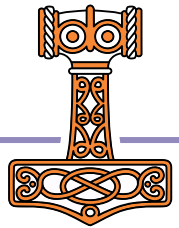
In the beginning, there was an Application...



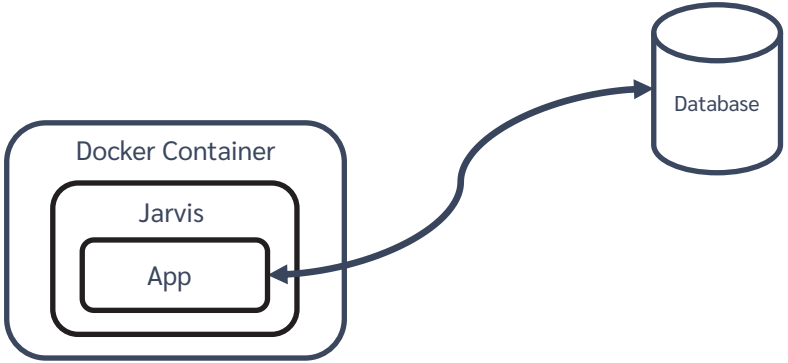


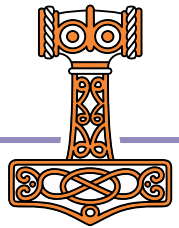
Run the app as a service





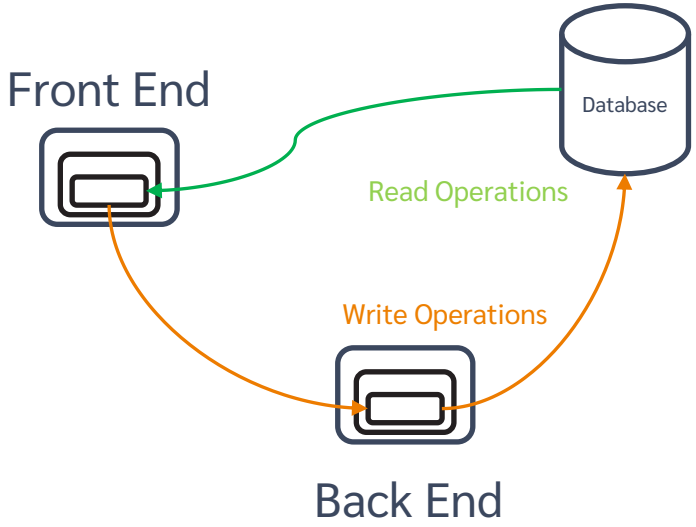
Run it in a container

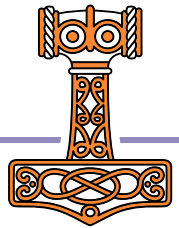




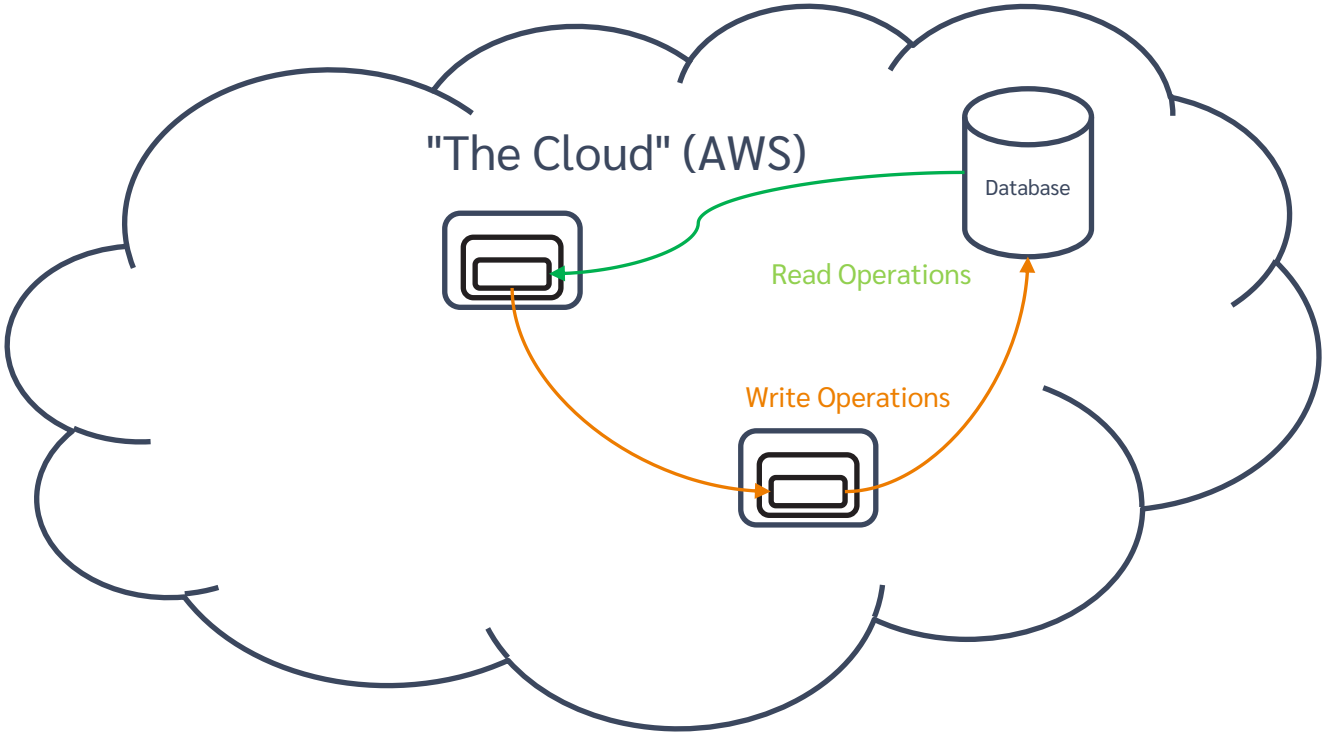
Split into Front and Back Ends

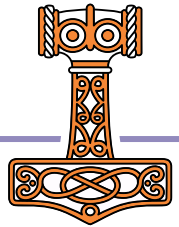
We'll call this "Two-Tier"



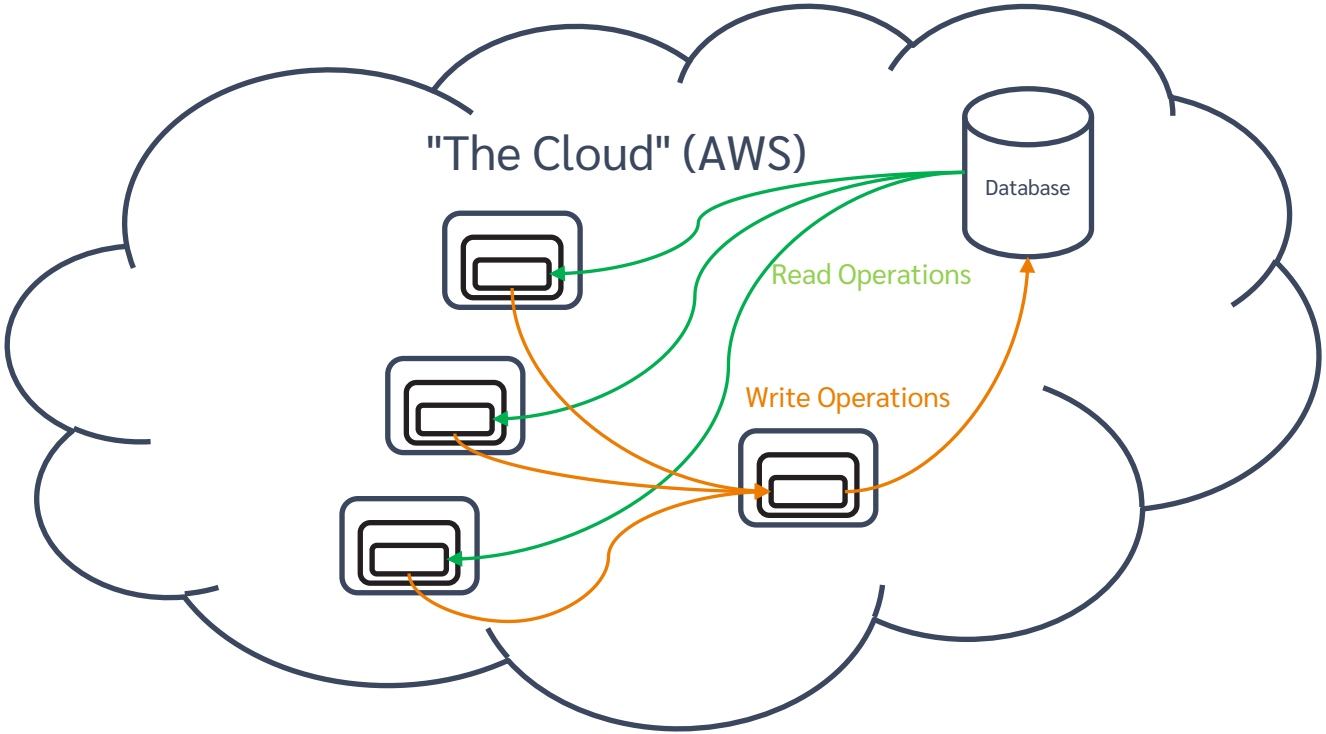


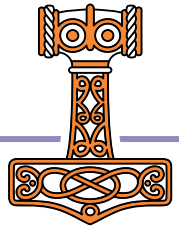
Try it in the cloud



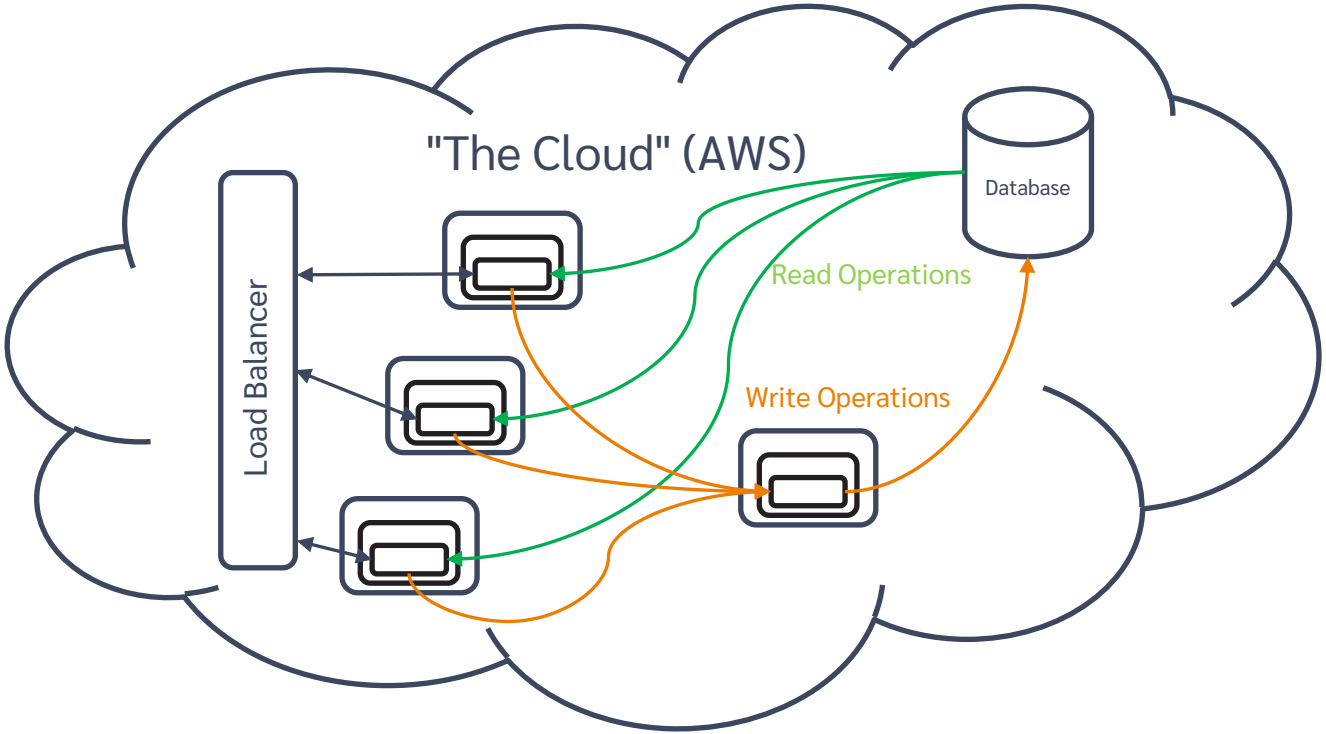


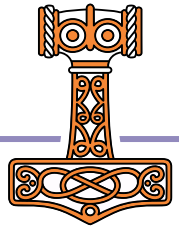
Scale it up



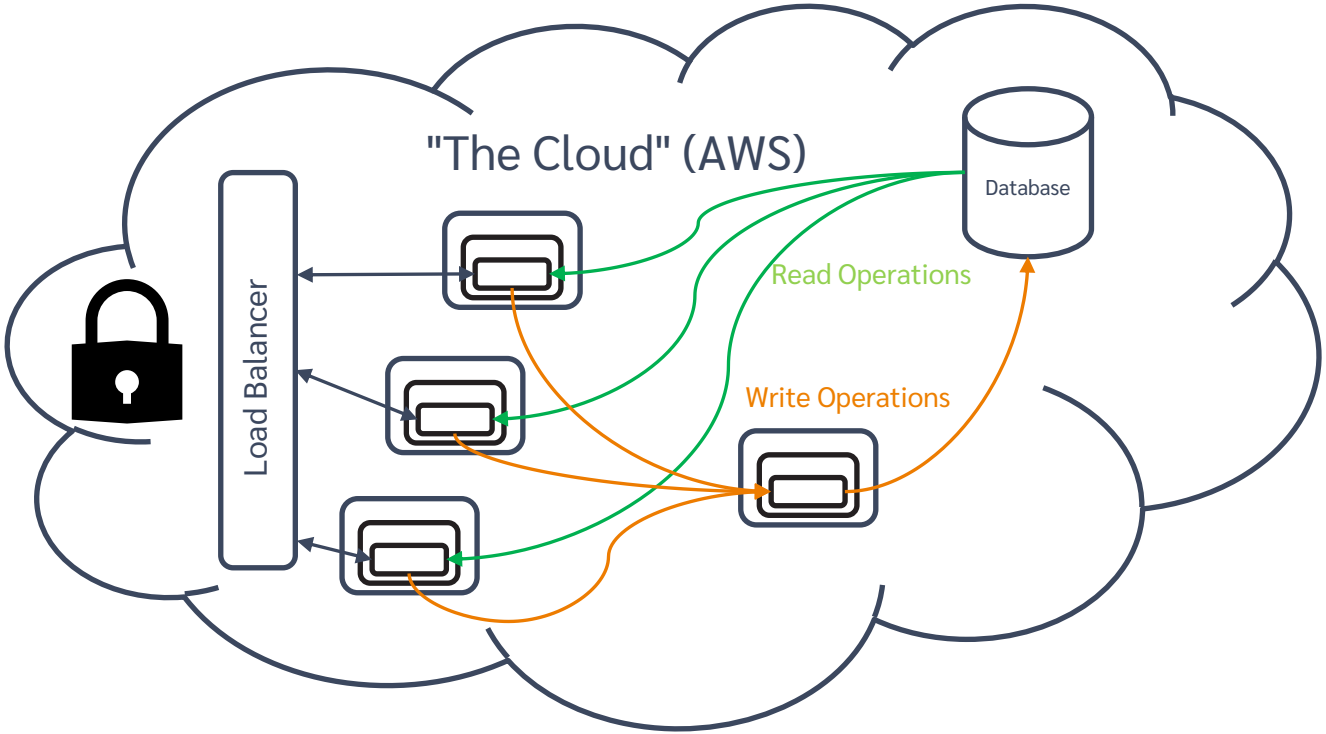


Load balance it





Secure it


"The Cloud" (AWS)
Load Balancer
Database
Read Operations
Write Operations

Check List – Have You...

- Installed Docker?
- Installed Jarvis?
- Downloaded Workshop Materials?
- Signed up for an AWS account?
  - It should cost less than one $/€ to do all the exercises
  - Around $20 / month if you leave it running
- Installed & Configured the AWS Command Line Interface?
- How many of you have a domain under your control?
- How many of you are on a non-Windows platform?
  - Apologies, all our automation uses .BAT files
  - (But real hackers like adapting and running scripts ☺)

Cost Management

us-east-1.console.aws.amazon.com/cost-management/home?region=eu-west-3#/dashboard

Apps | Link | APL | Flying & Sailing | Car | Dyalog | Cloud | SBO | Travel | Linux | Sport | Productivity | Git | Covid | Ferie 2022

aws | Services | Search for services, features, blogs, docs, and more [Alt+S] | Global | Morten Kromberg

AWS Cost Management

- Home
- Cost Explorer
- Reports
- Budgets
- Cost Anomaly Detection
- Rightsizing recommendations

Savings Plans

- Overview
- Inventory
- Recommendations
- Purchase Savings Plans
- Utilization report
- Coverage report
- Cart 0

Reservations

- Overview
- Recommendations
- Utilization report
- Coverage report

- Preferences
- Billing Console
- Documentation

AWS Cost Management > Home

Home Info

Cost summary

Current month costs Info

$3.82

Down 48% over last month

Forecasted month-end costs Info

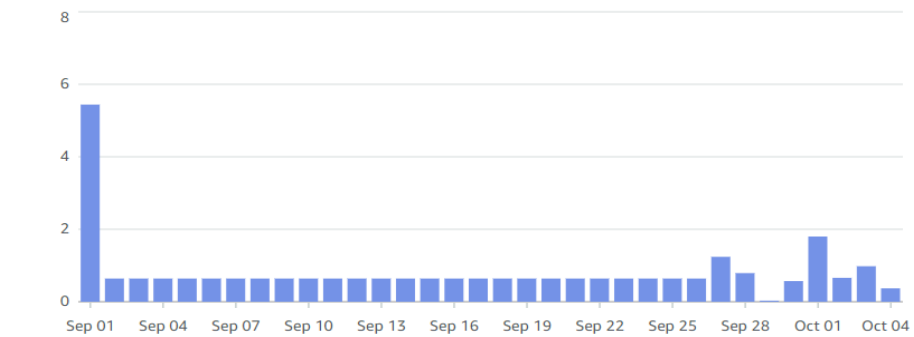
$14.09

Down 41% over last month

Daily unblended costs

View in Cost Explorer

Cost ($)



October trends Info

Account usage

Morten Kromberg (352645159704) costs are up $0.50 (19%)

More resources

What is AWS Billing and Cost Management?

Documentation

FAQ

Feedback | Looking for language selection? Find it in the new Unified Settings

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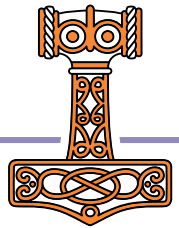
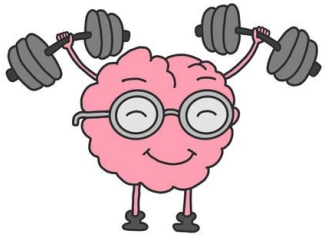
Introducing Jarvis

- APL-based web service framework (JSON and REST Service)
- Today we'll be using the JSON paradigm
  - Service "endpoints" are result-returning monadic or dyadic APL functions
  - All requests are HTTP POST, all payloads are JSON
  - Jarvis handles the conversion between JSON to APL and back again



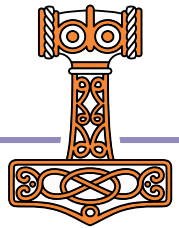
Exercise 0
A Web Service in 5 Minutes

```
⍝ NOTE: All examples assume (⎕IO ⎕ML)←1

⍝ [SP2] is the folder with the SP2 workshop materials

⍝ Start a Dyalog session
      ]load [SP2]/Jarvis
      sum←⊃+/
      reverse←⌽
      Server←⊃Jarvis.Run 8083 #
      ]open http://localhost:8083

⍝ Hint: Try [1,2,3,4,5] as input data
```

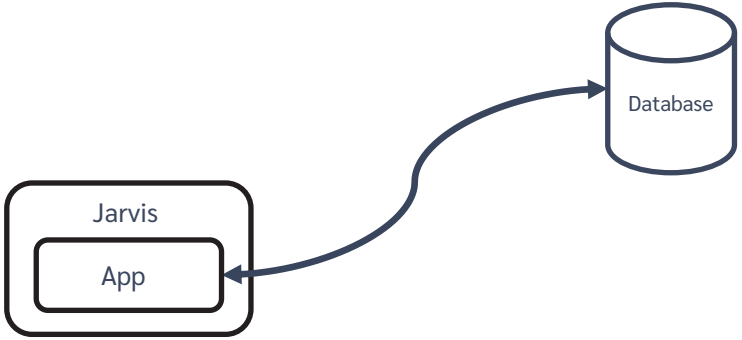


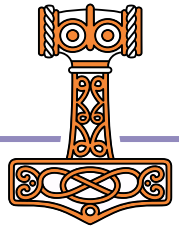
The Phonebook Application

- The database
  - Two tables – users and phonebook
  - Stored in .json files (a real app would likely use a DBMS)
- Users can edit both tables
- Phonebook entry "owners" can edit their own entry
- Anyone can read entries



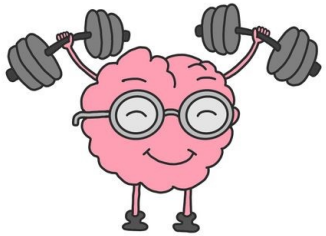
Run the app as a service

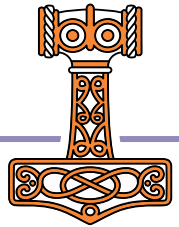




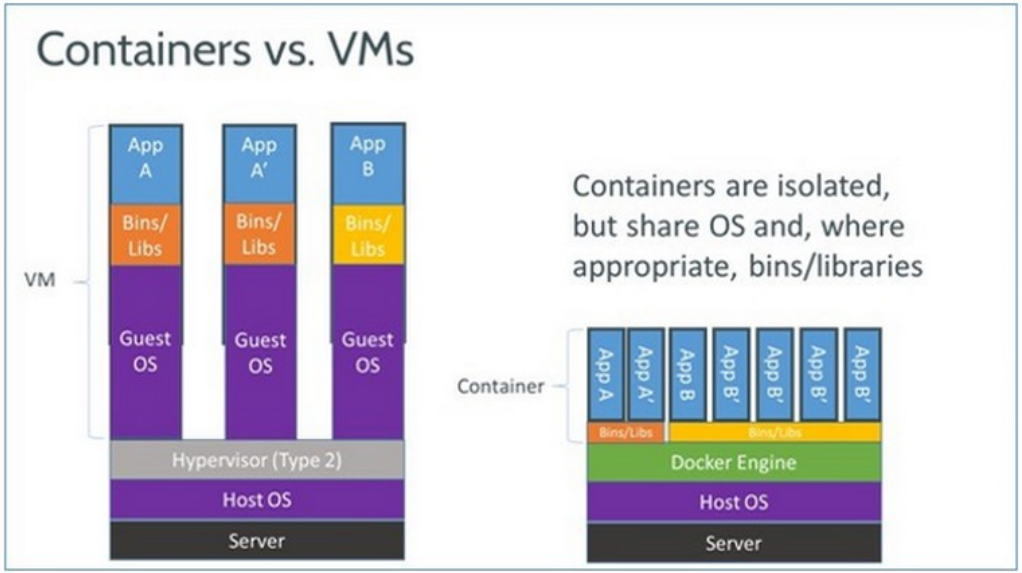
Exercise 1
Test the Phonebook Application

```
⍝ [SP2] is the folder with the SP2 workshop materials

⍝ Start a Dyalog session
      ]load [SP2]/Jarvis
      Server←Jarvis.New '[SP2]/single-tier/app/jarvis.json'
      Server.Start

⍝ Start another Dyalog
      ]load [SP2]/single-tier/HttpCommand
      HttpCommand.Version ⍝ should be 5.1.5 or later
      cmd←HttpCommand.New 'post' 'localhost:8080/GetUsers' '""'
      cmd.Show
      resp←cmd.Run
      resp.Data
      resp←HttpCommand.GetJSON 'post' 'localhost:8080/GetUsers' ''
      ⎕JSON resp.Data.payload
      ]open http://localhost:8080
```



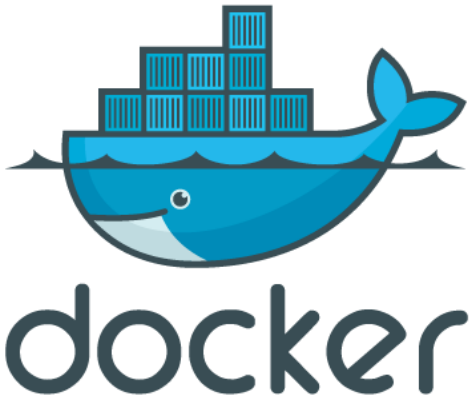


Introduction to Docker



From:
http://www.zdnet.com/article/what-is-docker-and-why-is-it-so-darn-popular/

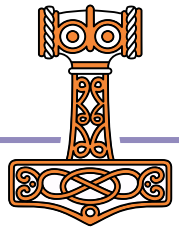
Efficient and Simple



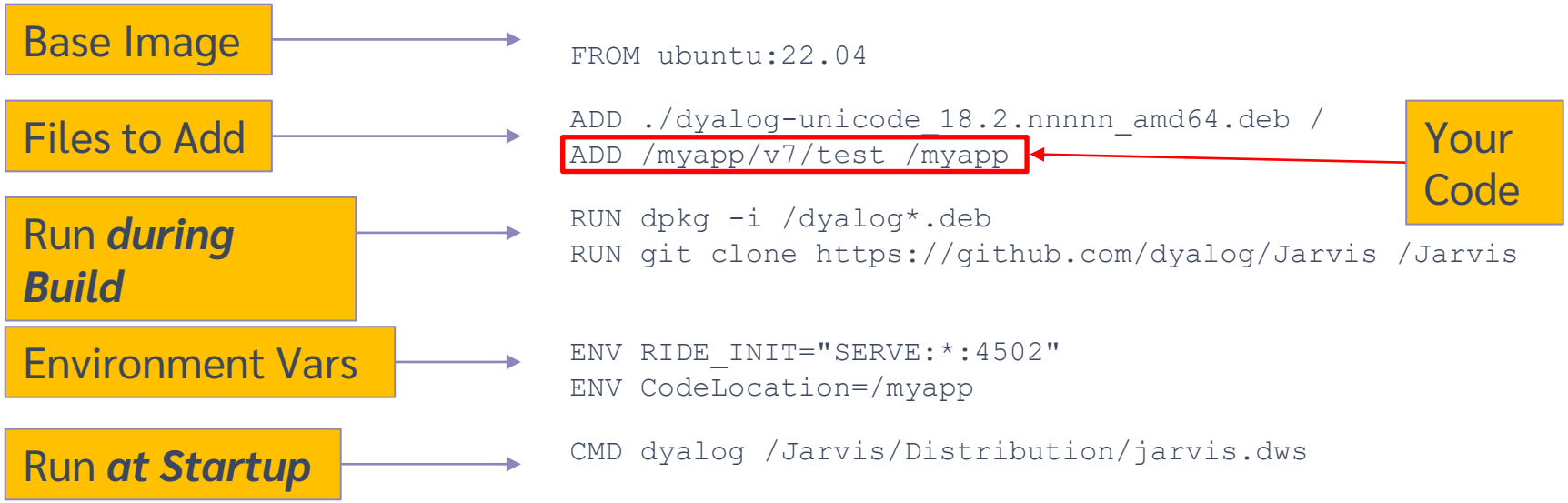
The really stunning thing is that
Docker Containers have a

- very simple
- text based
- description of the contents of a container

... and they start in seconds
(at least if they are Linux-based)



A "Dockerfile" describes the Container



This "Dockerfile" completely describes a machine which will run "myapp".

Building and Running the Docker Image

Dockerfile

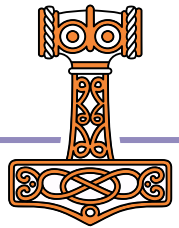
```
FROM ubuntu:22.04

ADD ./dyalog-unicode_18.2.nnnnn_amd64.deb /
ADD /myapp/v7/test /myapp

RUN dpkg -i /dyalog*.deb
RUN git clone https://github.com/dyalog/Jarvis /Jarvis

ENV RIDE_INIT="SERVE:*:4502"
ENV CodeLocation=/myapp

CMD dyalog /Jarvis/Distribution/jarvis.dws
```

Build

```
docker build -t myco/myapp-test .
```

Run

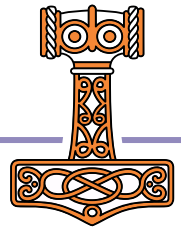
```
docker run -p 8081:8080 -v /somefolder:/data -e DEBUG=1 myco/myapp-test
```



docker run syntax & common switches

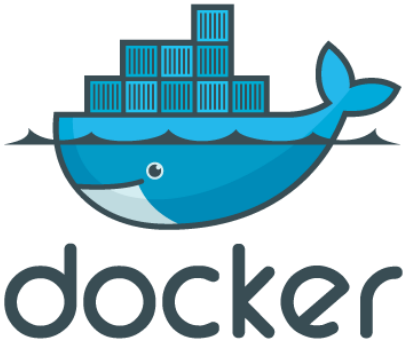
```
docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

docker run -p 8081:8080 -v /somefolder:/data -e DEBUG=1 myco/myapp-test
```

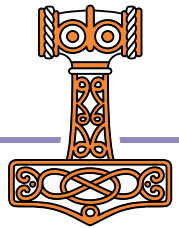
Switch	Description
`-p hhhh:cccc`	Make TCP port cccc in container visible on the host as hhhh
`-e name=value`	Set environment variable inside the container
`-v /hfolder:/cfolder`	Mount /hfolder in container as /cfolder NB Under Windows, /hfolder must be a full pathname using Windows conventions (C:\...)
`--rm`	Discard changes when container terminates



Container Distribution

- DockerHub is to Docker as GitHub is to Git
- A public repository of container images
  - Unlimited public images for free
  - You can store one free private image
  - You can install private servers "in house"
- Today, we will use Amazon Elastic Container Registry
  - ECR is a repository integrated with Amazon Web Services





Distributing the Image via DockerHub

Build

```
docker build -t myco/myapp-test .
```

Push

```
docker login
docker push myco/myapp-test
```

You need an account

Run

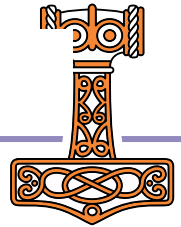
```
docker run -p 8081:8080 -v /somefolder:/data -e DEBUG=1 myco/myapp-test
```

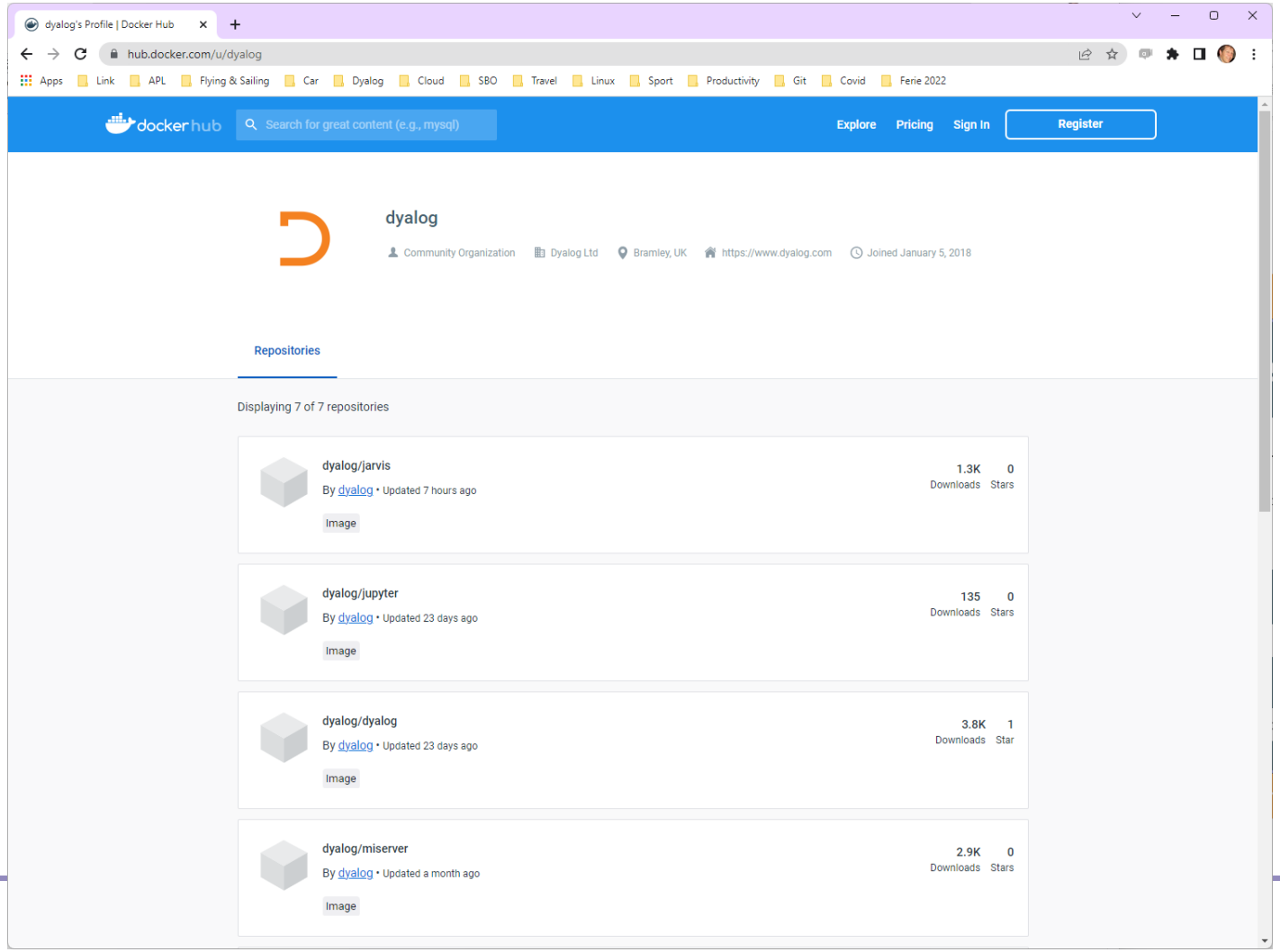
Public Dyalog Images

Image	Description
`dyalog/dyalog`	Just Dyalog APL
`dyalog/jarvis`	Dyalog APL + Jarvis
`dyalog/miserver`	Dyalog APL + MiServer
`dyalog/jupyter`	Dyalog APL + Jupyter Notebook framework

NB all public images assume/provide you have a basic Dyalog licence.

```
docker run -p 8081:8080 -v /my/web/service:/app dyalog/jarvis
```




dyalog's Profile | Docker Hub
hub.docker.com/u/dyalog
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
docker hub
Search for great content (e.g., mysql)
Explore Pricing Sign In Register
dyalog
Community Organization Dyalog Ltd Bramley, UK https://www.dyalog.com Joined January 5, 2018
Repositories
Displaying 7 of 7 repositories
dyalog/jarvis
By dyalog • Updated 7 hours ago
Image
1.3K Downloads 0 Stars
dyalog/jupyter
By dyalog • Updated 23 days ago
Image
135 Downloads 0 Stars
dyalog/dyalog
By dyalog • Updated 23 days ago
Image
3.8K Downloads 1 Star
dyalog/miserver
By dyalog • Updated a month ago
Image
2.9K Downloads 0 Stars

dyalog/jarvis - Docker Image | D

hub.docker.com/r/dyalog/jarvis

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docker hub | Search for great content (e.g., mysql) | Explore | Pricing | Sign In | Register

Explore > dyalog/jarvis

dyalog/jarvis ☆

By dyalog • Updated 7 hours ago

Image

Pulls 1.3K

Overview | Tags

Jarvis web service framework

Jarvis is Dyalog's web service framework, written in Dyalog APL. For more information about Jarvis, see (the Jarvis GitHub repository)[https://github.com/Dyalog/jarvis]. The `dyalog/jarvis` container is built from the Docker subdirectory in that repository, and is designed to make it very easy to deploy Jarvis-based applications.

Using the container

If `/path/to/app` contains the application that Jarvis is to serve and `7777` is the port that you would like the service to appear on, then all you need to do to start running a containerised Jarvis server is to use docker run to start the `dyalog/jarvis` container, using the `-v` switch to mount the directory under the name `/app` and `-p` to map the port number to 8080, which is the port number that Jarvis will use inside the container:

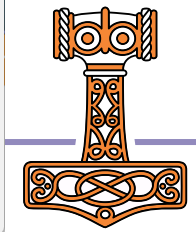
```
docker run -p 7777:8080 -v /path/to/app:/app dyalog/jarvis
```

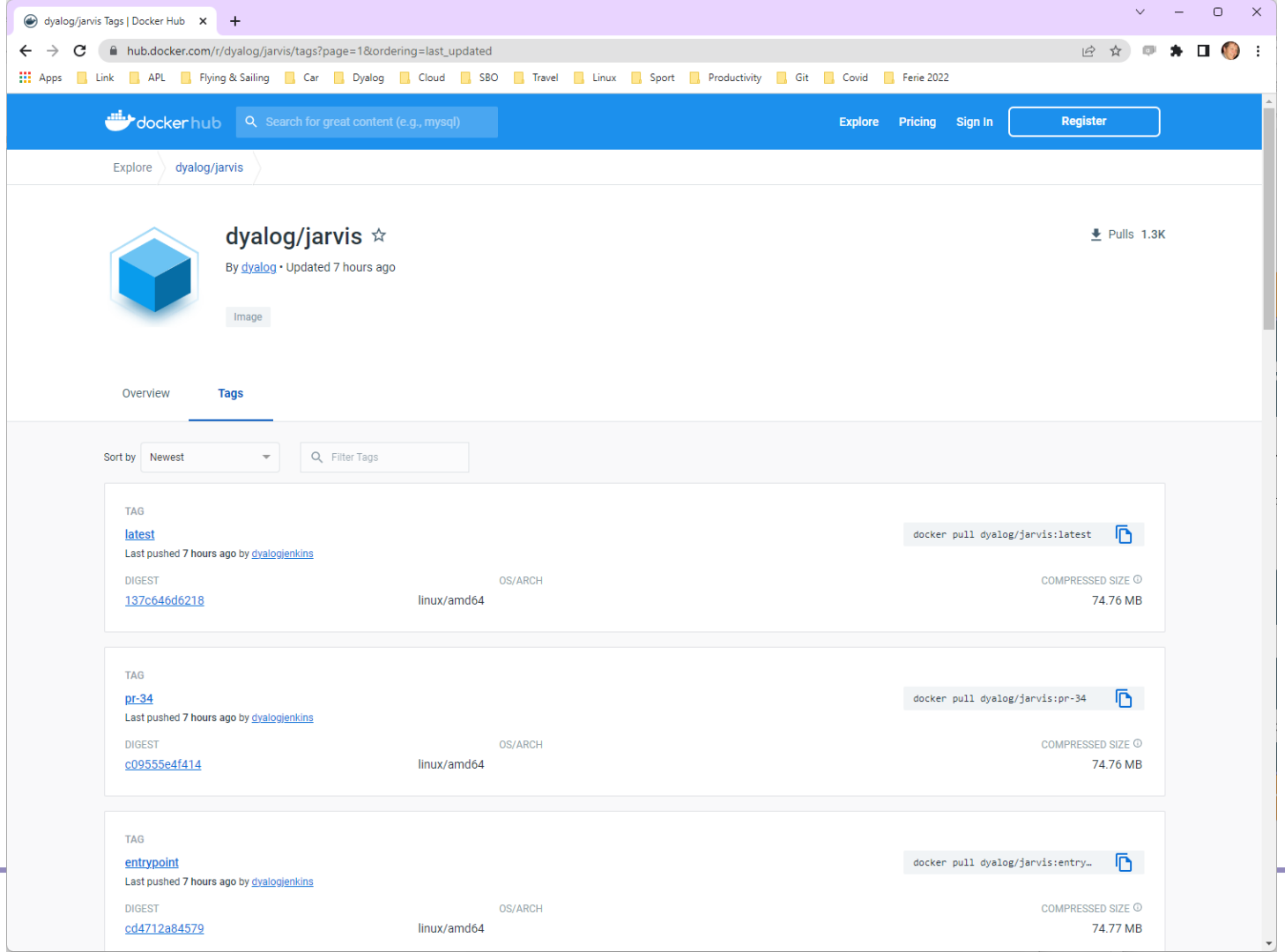
Demo Application

If you do not map a directory into the container, it will serve up the default application which can be found in the `Samples\JSON` folder in the Jarvis repository. If you direct a web browser at the exposed port, Jarvis will present a simple interactive interface. You can test that it is working by entering "GetSign" as the method to execute, and a date of birth in the form "[mm,dd]" as JSON data, and clicking "send".

Docker Pull Command

```
docker pull dyalog/jarvis
```




dyalog/jarvis Tags | Docker Hub
hub.docker.com/r/dyalog/jarvis/tags?page=1&ordering=last_updated
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
docker hub
Search for great content (e.g., mysql)
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Explore dyalog/jarvis
dyalog/jarvis
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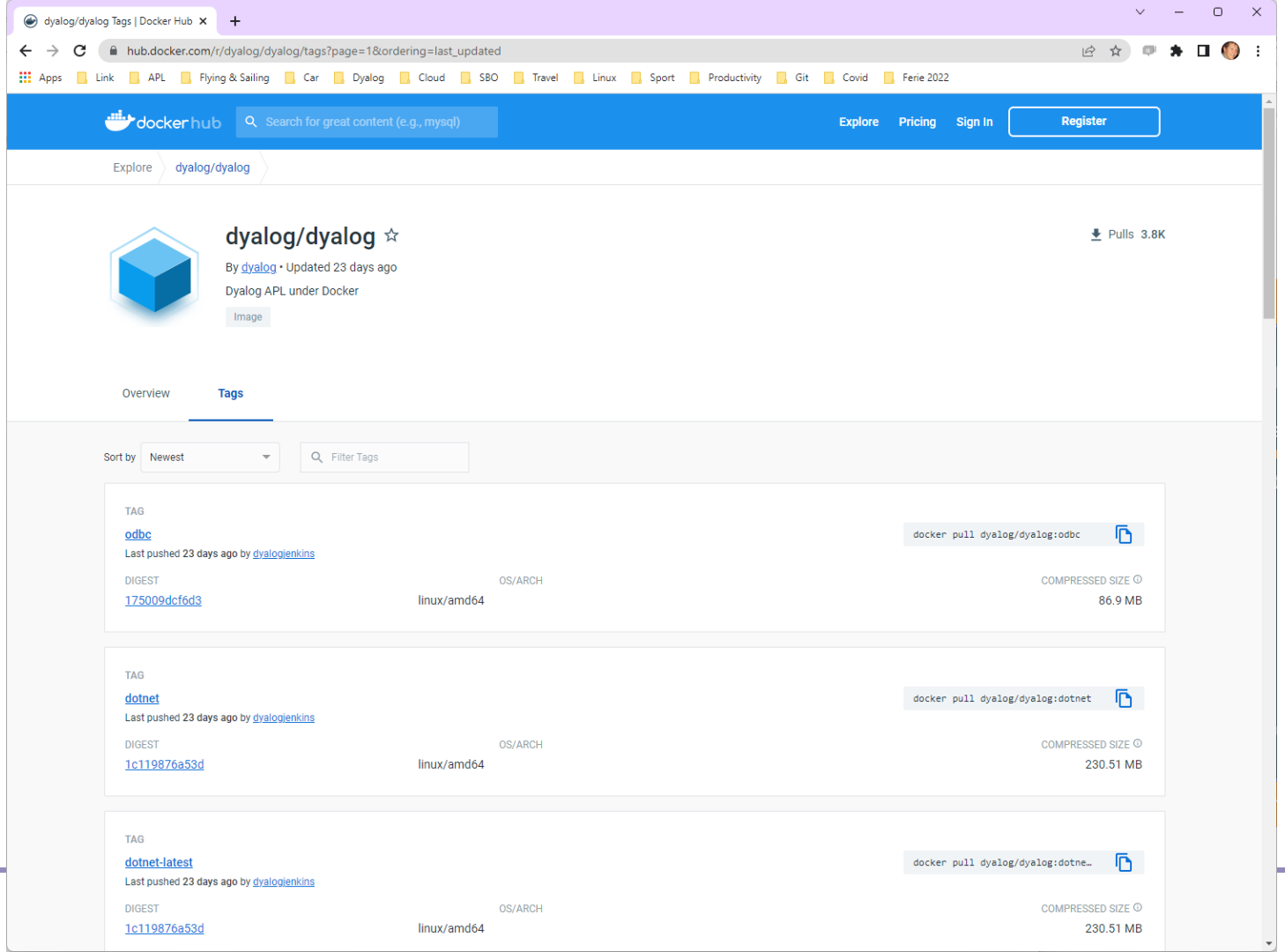
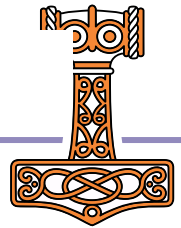
Image
Pulls 1.3K
Overview Tags
Sort by Newest
Filter Tags
TAG
latest
Last pushed 7 hours ago by dyalogjenkins
docker pull dyalog/jarvis:latest
DIGEST
137c646d6218
OS/ARCH
linux/amd64
COMPRESSED SIZE
74.76 MB
TAG
pr-34
Last pushed 7 hours ago by dyalogjenkins
docker pull dyalog/jarvis:pr-34
DIGEST
c09555e4f414
OS/ARCH
linux/amd64
COMPRESSED SIZE
74.76 MB
TAG
entrypoint
Last pushed 7 hours ago by dyalogjenkins
docker pull dyalog/jarvis:entry…
DIGEST
cd4712a84579
OS/ARCH
linux/amd64
COMPRESSED SIZE
74.77 MB


dyalog/dyalog Tags | Docker Hub
hub.docker.com/r/dyalog/dyalog/tags?page=1&ordering=last_updated
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
docker hub
Search for great content (e.g., mysql)
Explore Pricing Sign In Register
Explore dyalog/dyalog
dyalog/dyalog
By dyalog • Updated 23 days ago
Dyalog APL under Docker
Image
Pulls 3.8K
Overview Tags
Sort by Newest
Filter Tags
TAG
odbc
Last pushed 23 days ago by dyalogjenkins
docker pull dyalog/dyalog:odbc
DIGEST OS/ARCH COMPRESSED SIZE
175009dcf6d3 linux/amd64 86.9 MB
TAG
dotnet
Last pushed 23 days ago by dyalogjenkins
docker pull dyalog/dyalog:dotnet
DIGEST OS/ARCH COMPRESSED SIZE
1c119876a53d linux/amd64 230.51 MB
TAG
dotnet-latest
Last pushed 23 days ago by dyalogjenkins
docker pull dyalog/dyalog:dotne…
DIGEST OS/ARCH COMPRESSED SIZE
1c119876a53d linux/amd64 230.51 MB

Typical Switches settings when using public Dyalog Images

Switch	Description
`-p 80:8080`	Expose default Jarvis/MiServer port as port 80
`-e RIDE_INIT=HTTP:*:8088`	Enable "Zero Footprint" RIDE on port 8088
`-p 8088:8088`	Expose port 8088 to the outside world
`-v /my/web/service:/app`	Mount /my/web/service in container as /app

```
docker run -p 8081:8080 -v /somefolder:/app dyalog/jarvis:latest
```



Benefits of Public Containers

Without Public Containers

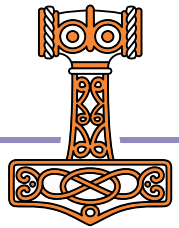
```
FROM ubuntu:22.04
ADD ./dyalog-unicode_18.2.nnnnn_amd64.deb /
RUN dpkg -i /dyalog*.deb
RUN git clone https://github.com/dyalog/Jarvis /Jarvis
ADD /myapp/v7/test /app
CMD dyalog /Jarvis/Distribution/jarvis.dws
```

With Public Containers

```
FROM dyalog/jarvis
ADD /myapp/v7/test /app
```

Or without building a container at all

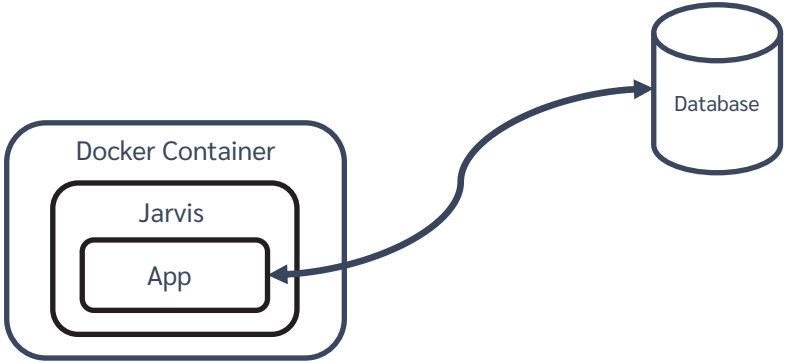
```
docker run -p 8080:8080 -v /myapp/v7/test:/app dyalog/jarvis
```

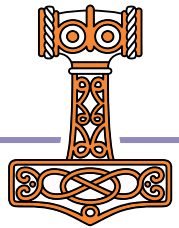


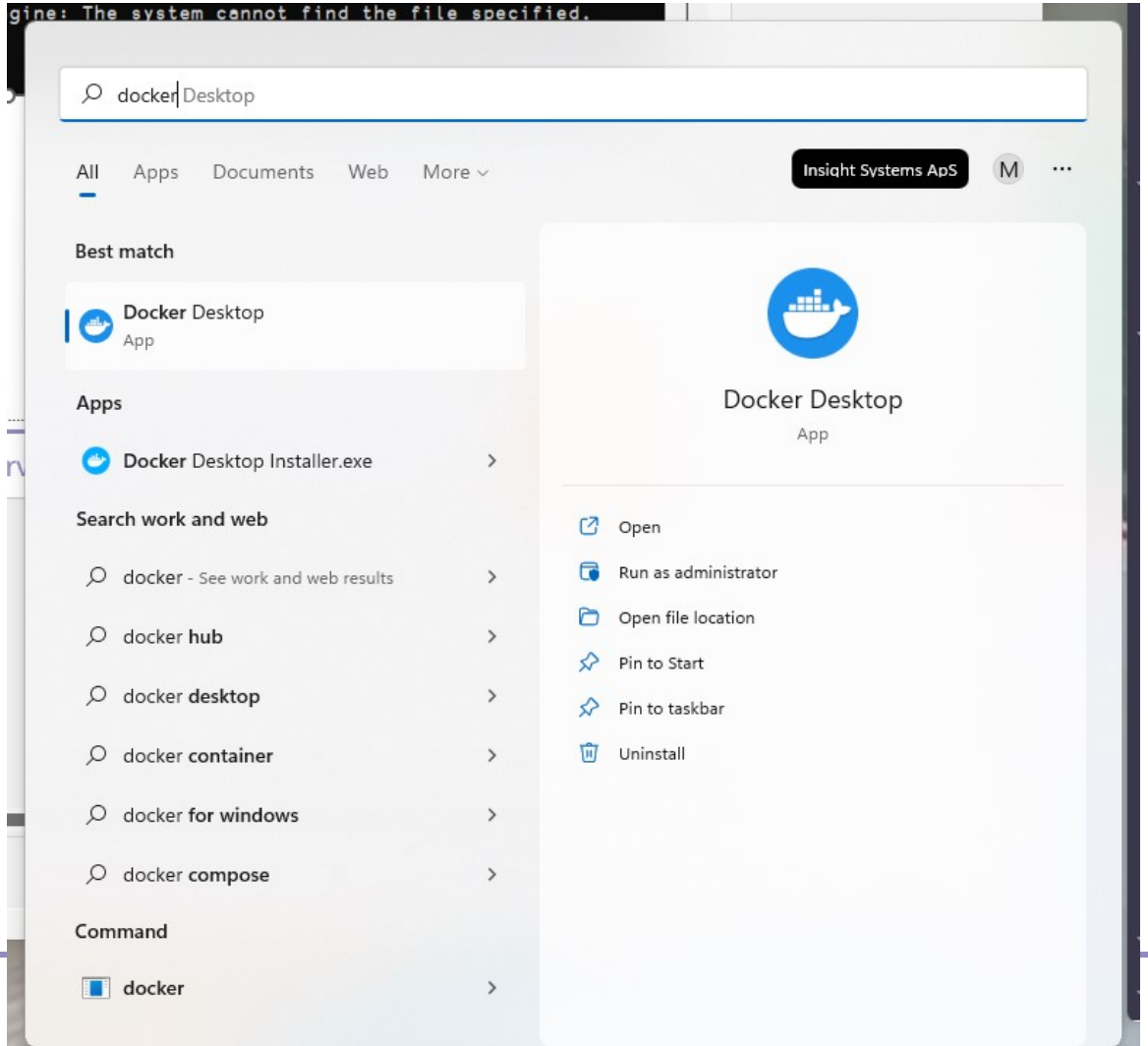
Warning: Public Containers

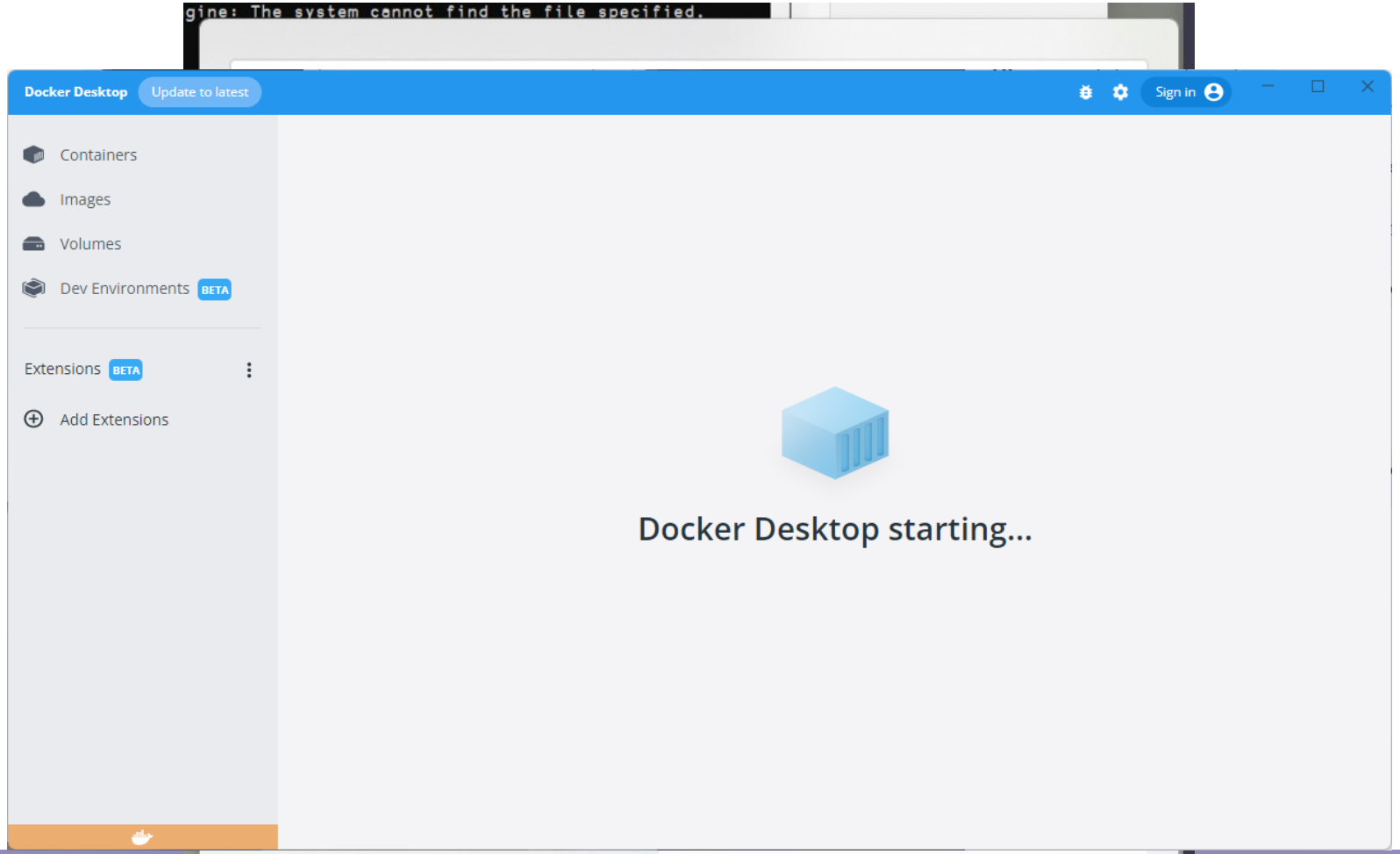
- The public containers are for experimentation and prototyping
- For production use, you should build your own container
  - Otherwise, the version of the interpreter or Jarvis might change under your feet

Run it in a container



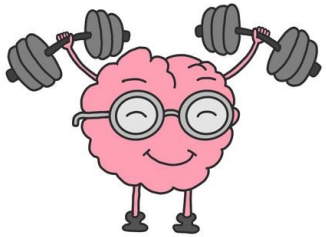



gine: The system cannot find the file specified.
docker Desktop
All
Apps
Documents
Web
More
Insight Systems ApS
M
Best match
Docker Desktop
App
Apps
Docker Desktop Installer.exe
Search work and web
docker - See work and web results
docker hub
docker desktop
docker container
docker for windows
docker compose
Command
docker
Docker Desktop
App
Open
Run as administrator
Open file location
Pin to Start
Pin to taskbar
Uninstall


gine: The system cannot find the file specified.
Docker Desktop
Update to latest
Sign in
Containers
Images
Volumes
Dev Environments
BETA
Extensions
BETA
Add Extensions
Docker Desktop starting...
docker

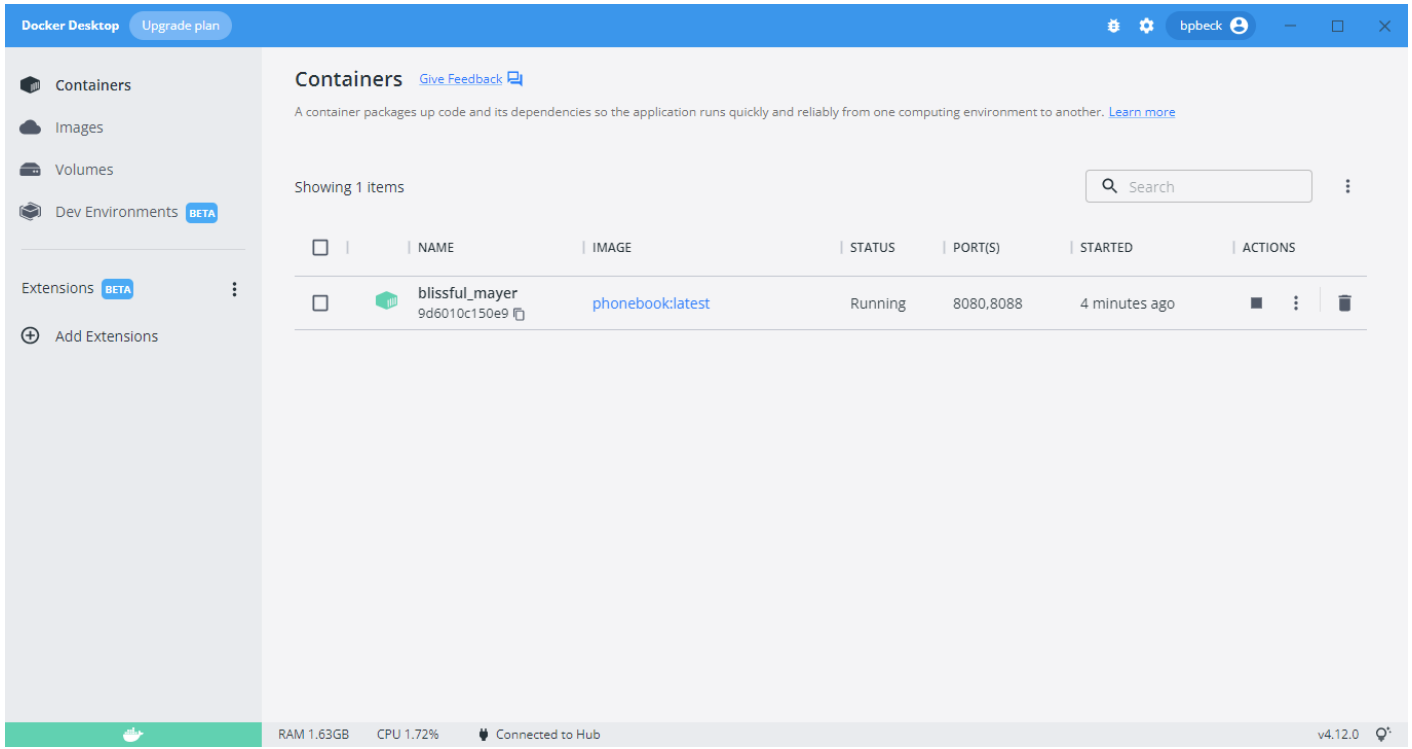
Exercise 2
Running Phonebook in Docker

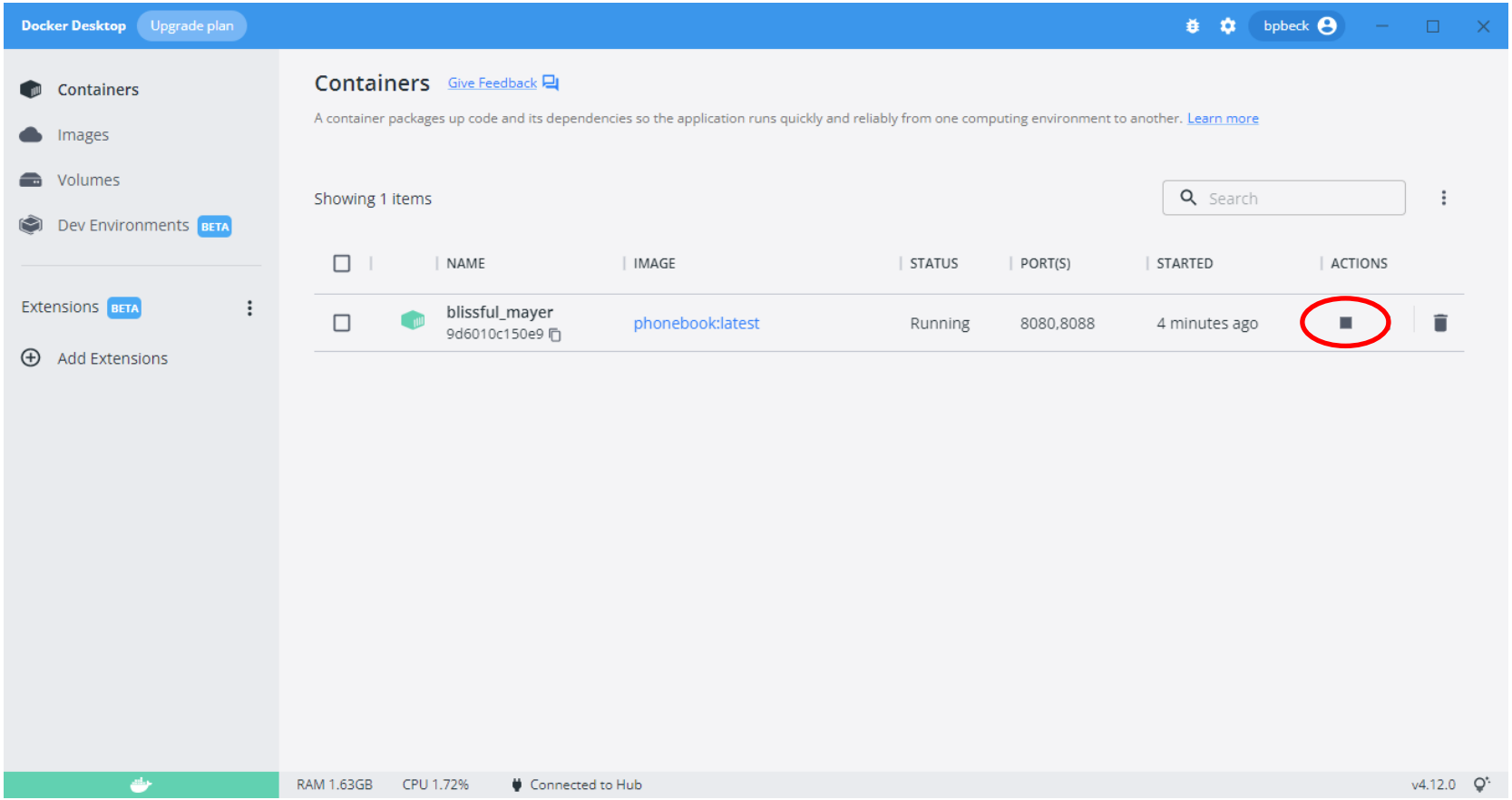
- Start Docker / Docker Desktop
- Build & start docker container
- Make a request
- Debug with RIDE

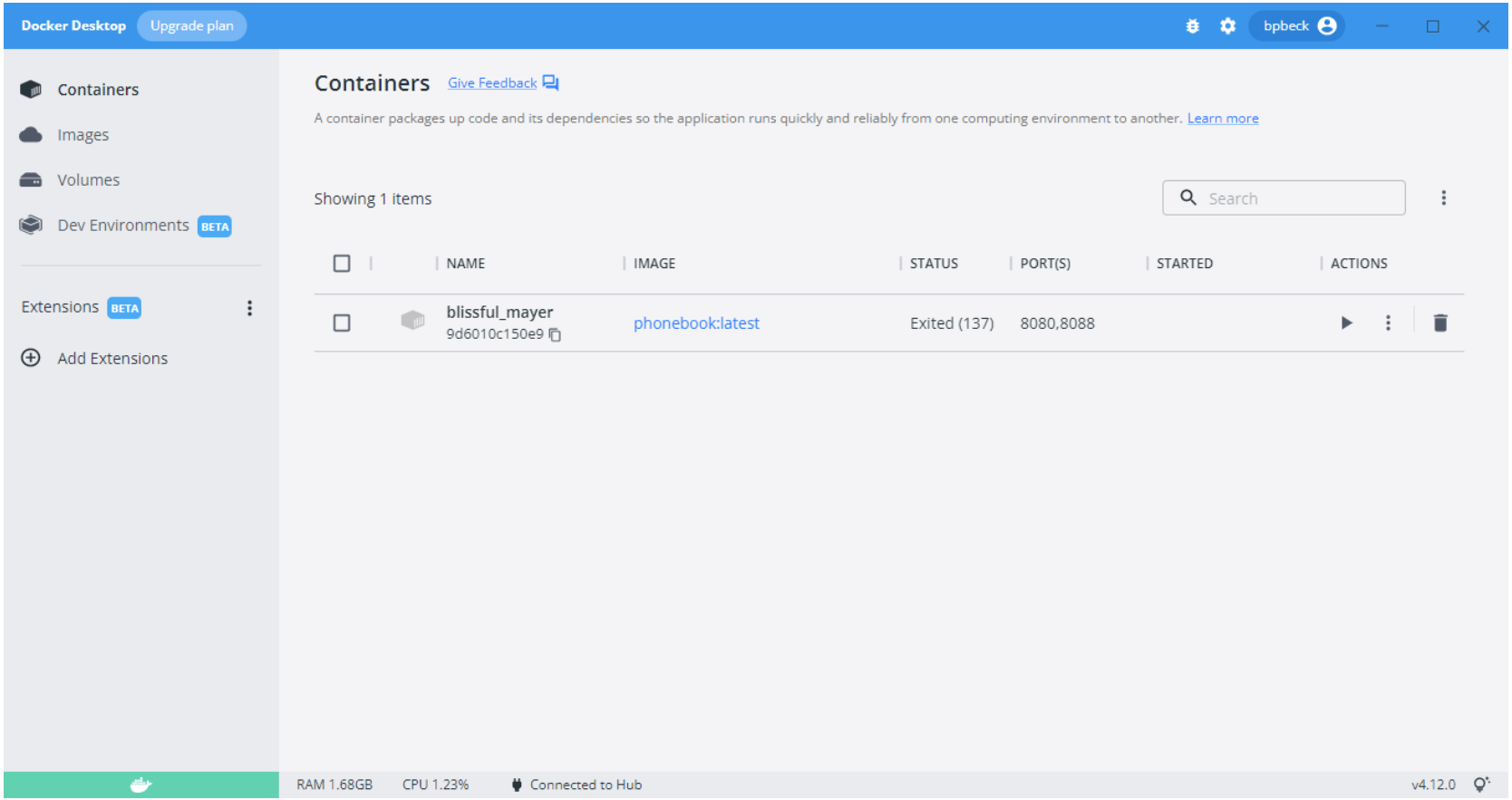


Hint: See `build.bat` and `start-local.bat` in the single-tier folder

Putting a stop to things using Docker Desktop

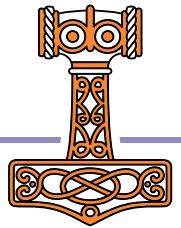



Docker Desktop
Upgrade plan
bpbeck
Containers
Images
Volumes
Dev Environments
BETA
Extensions
BETA
Add Extensions
Containers
Give Feedback
A container packages up code and its dependencies so the application runs quickly and reliably from one computing environment to another. Learn more
Showing 1 items
Search
NAME
IMAGE
STATUS
PORT(S)
STARTED
ACTIONS
blissful_mayer
9d6010c150e9
phonebook:latest
Running
8080,8088
4 minutes ago
RAM 1.63GB
CPU 1.72%
Connected to Hub
v4.12.0


Docker Desktop
Upgrade plan
bpbeck
Containers
Images
Volumes
Dev Environments
BETA
Extensions
BETA
Add Extensions
Containers
Give Feedback
A container packages up code and its dependencies so the application runs quickly and reliably from one computing environment to another. Learn more
Showing 1 items
Search
NAME
IMAGE
STATUS
PORT(S)
STARTED
ACTIONS
blissful_mayer
9d6010c150e9
phonebook:latest
Exited (137)
8080,8088
RAM 1.68GB
CPU 1.23%
Connected to Hub
v4.12.0

Command Prompt - start-local

```
C:\devt\2022-SP2\single-tier>
C:\devt\2022-SP2\single-tier>
C:\devt\2022-SP2\single-tier>build

C:\devt\2022-SP2\single-tier>docker context use default
default

C:\devt\2022-SP2\single-tier>docker build -t "phonebook" .
[+] Building 0.1s (8/8) FINISHED
 => [internal] load build definition from Dockerfile                                0.0s
 => => transferring dockerfile: 31B                                                 0.0s
 => [internal] load .dockerignore                                                   0.0s
 => => transferring context: 2B                                                     0.0s
 => [internal] load metadata for docker.io/dyalog/jarvis:latest                     0.0s
 => [1/3] FROM docker.io/dyalog/jarvis:latest                                       0.0s
 => [internal] load build context                                                   0.0s
 => => transferring context: 1.68kB                                                 0.0s
 => CACHED [2/3] ADD ./app /app                                                     0.0s
 => CACHED [3/3] ADD ./HttpCommand.dyalog /opt/mdyalog/Jarvis/Source                0.0s
 => exporting to image                                                              0.0s
 => => exporting layers                                                             0.0s
 => => writing image sha256:9e76084cd2e6b13e115cf6bc6371938a7de8316d512eebcb60099ec10d254d32  0.0s
 => => naming to docker.io/library/phonebook                                        0.0s

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

C:\devt\2022-SP2\single-tier>start-local

C:\devt\2022-SP2\single-tier>docker context use default
default

C:\devt\2022-SP2\single-tier>SET DATA=C:\devt\2022-SP2\single-tier\\phonebook-data:/phonebook

C:\devt\2022-SP2\single-tier>SET RIDE=RIDE_INIT=HTTP:*:8088

C:\devt\2022-SP2\single-tier>SET JT=DYALOG_JARVIS_THREAD=DEBUG

C:\devt\2022-SP2\single-tier>docker run -v C:\devt\2022-SP2\single-tier\\phonebook-data:/phonebook -p 8080:808
0 -p 8088:8088 -e RIDE_INIT=HTTP:*:8088 -e DYALOG_JARVIS_THREAD=DEBUG phonebook
 _______     __       _      ____    _____
|  __  \ \   / //\    | |    / __ \ / ____|
|_|  | \ \_/ //  \   | |   | |  | | |
```

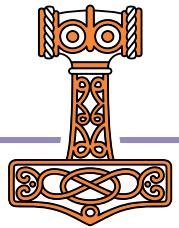


Command Prompt - start-local

```
C:\devt\2022-SP2\single-tier>docker context use default
default

C:\devt\2022-SP2\single-tier>SET DATA=C:\devt\2022-SP2\single-tier\\phonebook-data:/phonebook

C:\devt\2022-SP2\single-tier>SET RIDE=RIDE_INIT=HTTP:*:8088

C:\devt\2022-SP2\single-tier>SET JT=DYALOG_JARVIS_THREAD=DEBUG

C:\devt\2022-SP2\single-tier>docker run -v C:\devt\2022-SP2\single-tier\\phonebook-data:/phonebook -p 8080:808
0 -p 8088:8088 -e RIDE_INIT=HTTP:*:8088 -e DYALOG_JARVIS_THREAD=DEBUG phonebook
 _______      __      _      ____
|  __  \ \    / //\    | |    / __
|_|  | \ \  / //  \   | |   | |
     | |\ \/ // /\ \  | |   | |
 ____| | | |/ /  \ \| |___| |__
|_____/  |_/_/    \_\_____\____|

https://www.dyalog.com

Application config found in /ap
Dyalog APL/S-64 Version 18.2.45
Serial number: UNREGISTERED - n
+-------------------------------
| Dyalog is free for non-commer
| A basic licence can be used f
| concept until the point in ti
| For further information visit
| https://www.dyalog.com/prices-and-licences.htm                |
+---------------------------------------------------------------+
Thu Oct  6 13:09:49 2022
Link Warning: SE.Link.Create: .NET or .NetCore not available - watch defaults
      to 'ns'
Linked: # → /opt/mdyalog/Jarvis/Source
2022/10/06 @ 13:09:49 - Starting  Jarvis  1.11.2
2022/10/06 @ 13:09:49 - Conga copied from /opt/mdyalog/18.2/64/unicode/ws/conga
2022/10/06 @ 13:09:49 - Local Conga reference is #.Jarvis.[LIB]
2022/10/06 @ 13:09:49 - Jarvis starting in "JSON" mode on port 8080
2022/10/06 @ 13:09:49 - Serving code in #.CodeLocation (populated with code fro
      m "/app/phonebook")
```

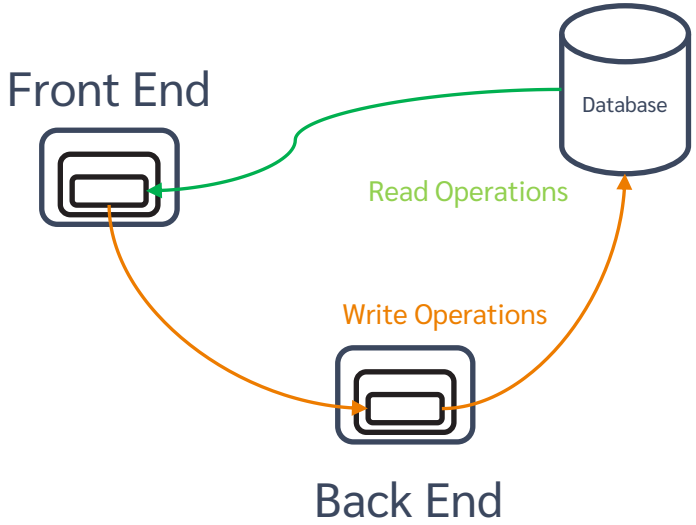
Command Prompt

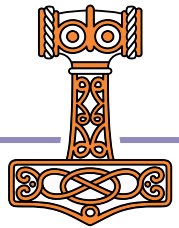
```
Microsoft Windows [Version 10.0.22000.978]
(c) Microsoft Corporation. All rights reserved.

C:\Users\mkrom>docker ps
CONTAINER ID   IMAGE       COMMAND          CREATED              STATUS              PORTS
                                    NAMES
a5a11fed02f0   phonebook   "/entrypoint"    About a minute ago   Up About a minute   0.0.0.0:8080->8080/tcp,
4502/tcp, 0.0.0.0:8088->8088/tcp   stupefied_napier

C:\Users\mkrom>docker stop stupefied_napier
stupefied_napier

C:\Users\mkrom>
```



Split into Front and Back Ends

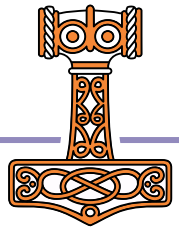
We'll call this "Two-Tier"





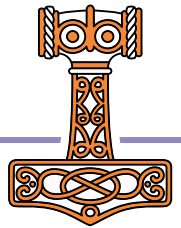
Two-Tier Phonebook

- Front-End
  - Read-only endpoints read directly from database
  - Requests for endpoints that write to the database are relayed to the Back-End
  - All authentication and validation of payloads is done in the front end
- Back-End
  - Endpoints do no authentication or payload validation
- All endpoints return an namespace with
  - rc – return code: 0 means "no error"
  - msg – informational message if applicable
  - payload – response payload, if any



```
     ∇ resp←req AddUser ns;user;rc;msg;users
[1]    →endρ⍤0≠(resp←ns utils.checkPayload'"login' '"password').rc
[2]    resp←utils.initializeResponse
[3]
[4]    :Hold 'database'
[5]        :If 0≠⊃(rc msg users)←dbapi.readUsers
[6]            →end⊣resp.(rc msg)←rc msg
[7]        :EndIf
[8]
[9]        :If 0≠users.login utils.indexOf⊆,ns.login
[10]            →fail⊣resp.(rc msg)←400('user ',ns.login,' already exists')
[11]       :EndIf
[12]
[13]       ns.password←utils.hashPassword ns.password
[14]       ns.updatedAt←utils.now
[15]       users,←ns
[16]       →endρ⍤0≠(resp←dbapi.writeUsers users).rc
[17]
[18]       resp.(rc msg)←0('user ',ns.login,' added')
[19]   :EndHold
[20]   →0
[21]  end:
[22]   :If 0≠resp.rc ⋄ req.Fail resp.rc ⋄ :EndIf
     ∇
```

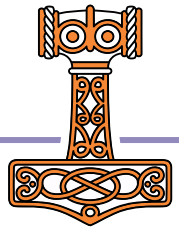
Single-Tier



```
     ∇ resp←req AddUser ns;user;rc;msg;users
[1]    →endp⍣¯1⊢0≠(resp←ns utils.checkPayload'"login' '"password').rc
[2]    resp←req utils.callBackEnd ns
[3]   end:
[4]    :If 0≠resp.rc ⋄ req.Fail resp.rc ⋄ :EndIf
     ∇
```

Front End

Two-Tier

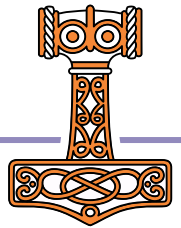


```
     ∇ resp←req AddUser ns;user;rc;msg;users
[1]    →endp⍨~0≠(resp←ns utils.checkPayload'"login' '"password').rc
[2]    resp←req utils.callBackEnd ns
[3]   end:
[4]    :If 0≠resp.rc ⋄ req.Fail resp.rc ⋄ :EndIf
     ∇
```

Front End

```
     ∇ resp←req callBackEnd ns;r
[1]   ⍝ sends a call to the backend endpoint
[2]    :Trap 0
[3]        r←HttpCommand.GetJSON'post'('backend:8081',req.Endpoint)ns
[4]        :If r.rc=0
[5]        :AndIf r.HttpStatus=200
[6]            resp←r.Data
[7]            →0
[8]        :EndIf
[9]    :EndTrap
[10]   resp←initializeResponse
[11]   resp.(rc msg)←500('back end call failed')
[12]   req.Fail 500
∇
```

Two-Tier



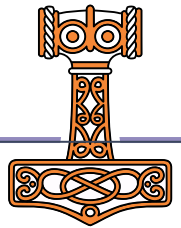
```
     ∇ resp←req AddUser ns;user;rc;msg;users
[1]    →endρ¨0≠(resp←ns utils.checkPayload'"login' '"password').rc
[2]    resp←req utils.callBackEnd ns
[3]   end:
[4]    :If 0≠resp.rc ⋄ req.Fail resp.rc ⋄ :EndIf
     ∇
```

Two-Tier

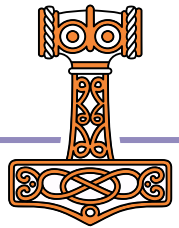
Back End

Front End

```
     ∇ resp←req AddUser ns;user;rc;msg;users
[1]    resp←utils.initializeResponse
[2]
[3]    :Hold 'database'
[4]        :If 0≠⊃(rc msg users)←dbapi.readUsers
[5]            →end⊣resp.(rc msg)←rc msg
[6]        :EndIf
[7]
[8]        :If 0≠users.login utils.indexOf⊆,ns.login
[9]            →fail⊣resp.(rc msg)←400('user ',ns.login,' already exists')
[10]       :EndIf
[11]
[12]        ns.password←utils.hashPassword ns.password
[13]        ns.updatedAt←utils.now
[14]        users,←ns
[15]        →endρ¨0≠(resp←dbapi.writeUsers users).rc
[16]
[17]        resp.(rc msg)←0('user ',ns.login,' added')
[18]   :EndHold
[19]   →0
[20]  end:
[21]   :If 0≠resp.rc ⋄ req.Fail resp.rc ⋄ :EndIf
     ∇
```

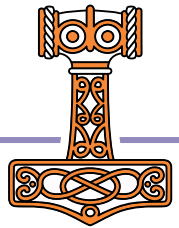


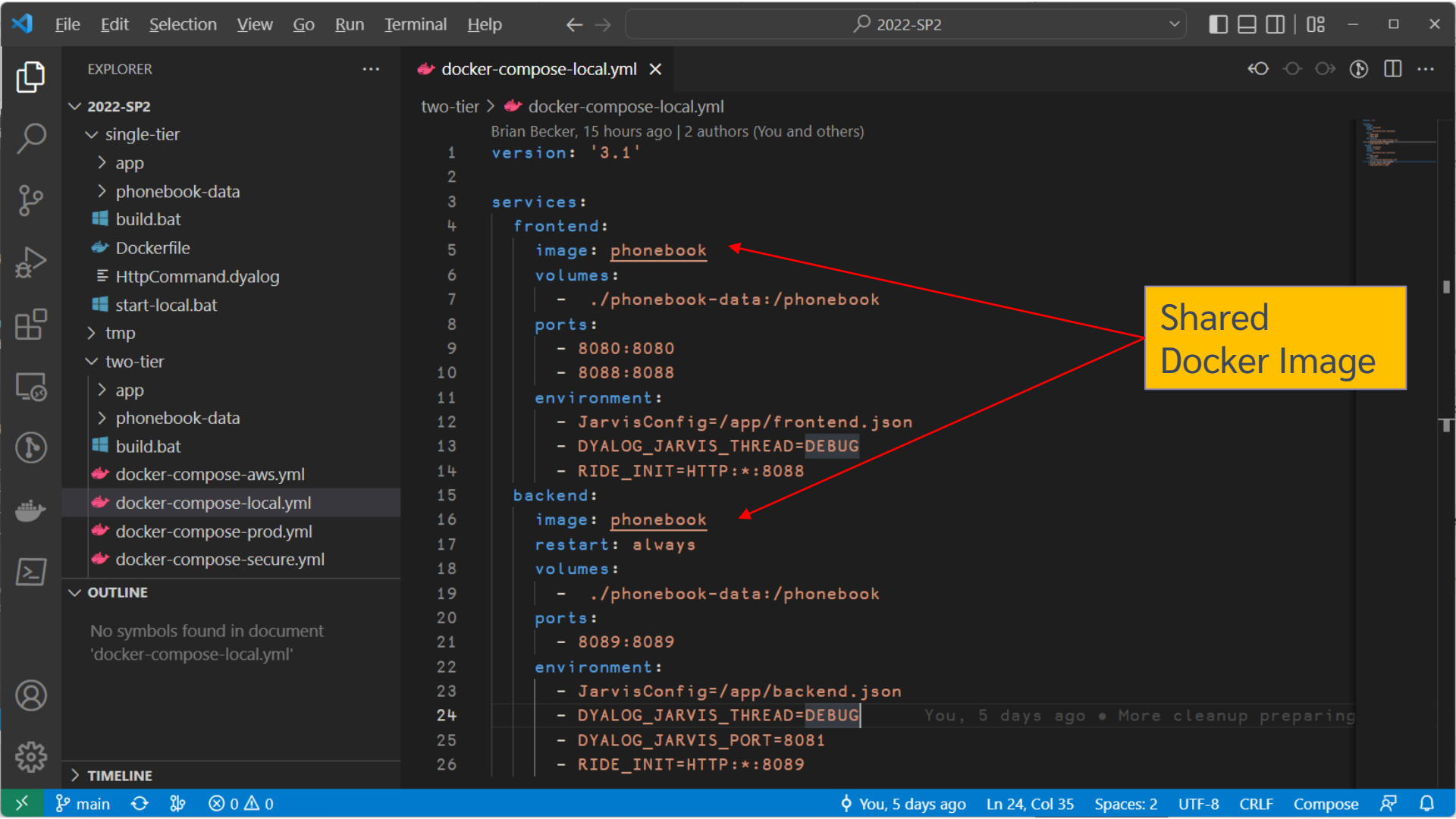
Introduction to Docker Compose

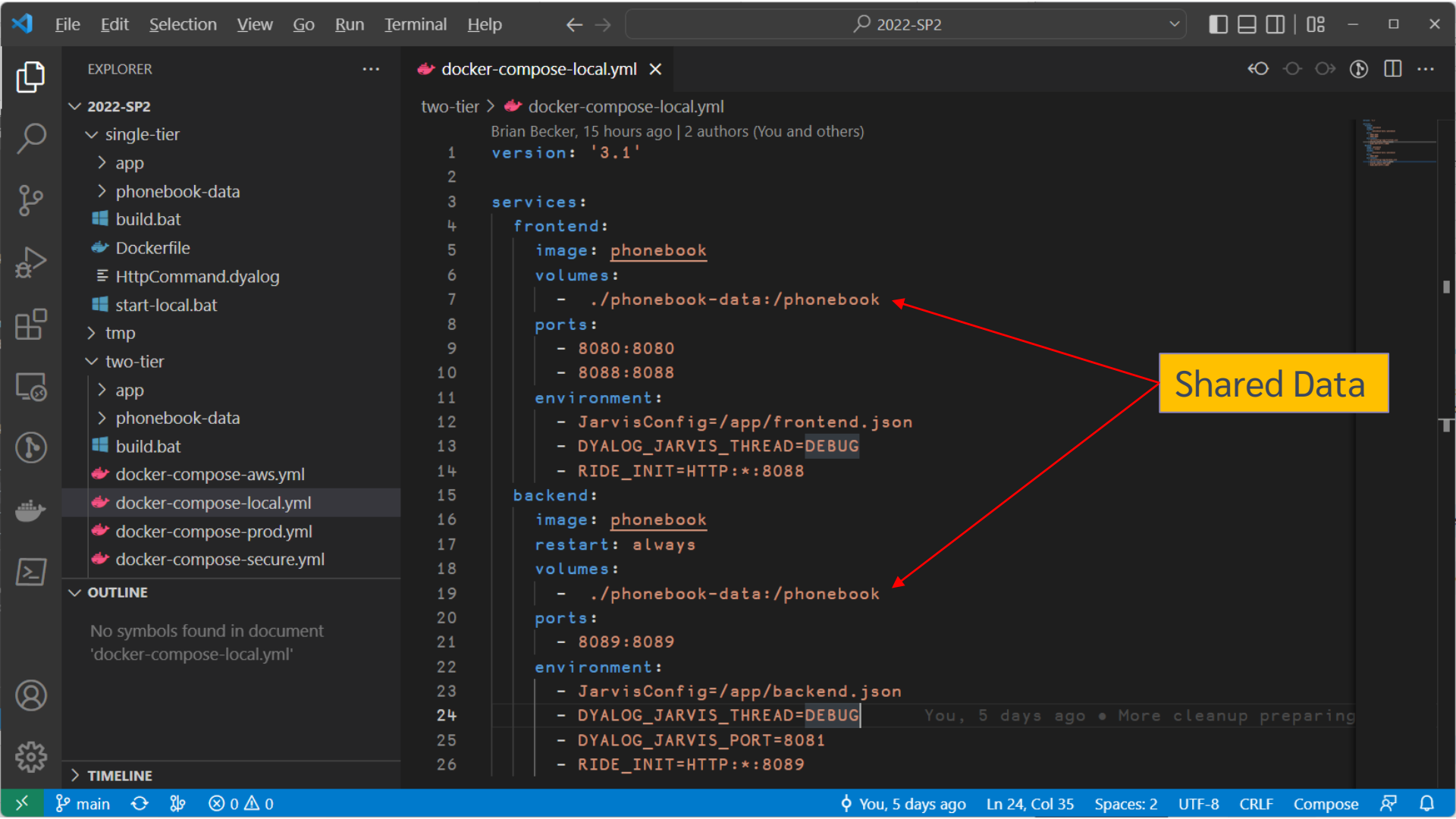


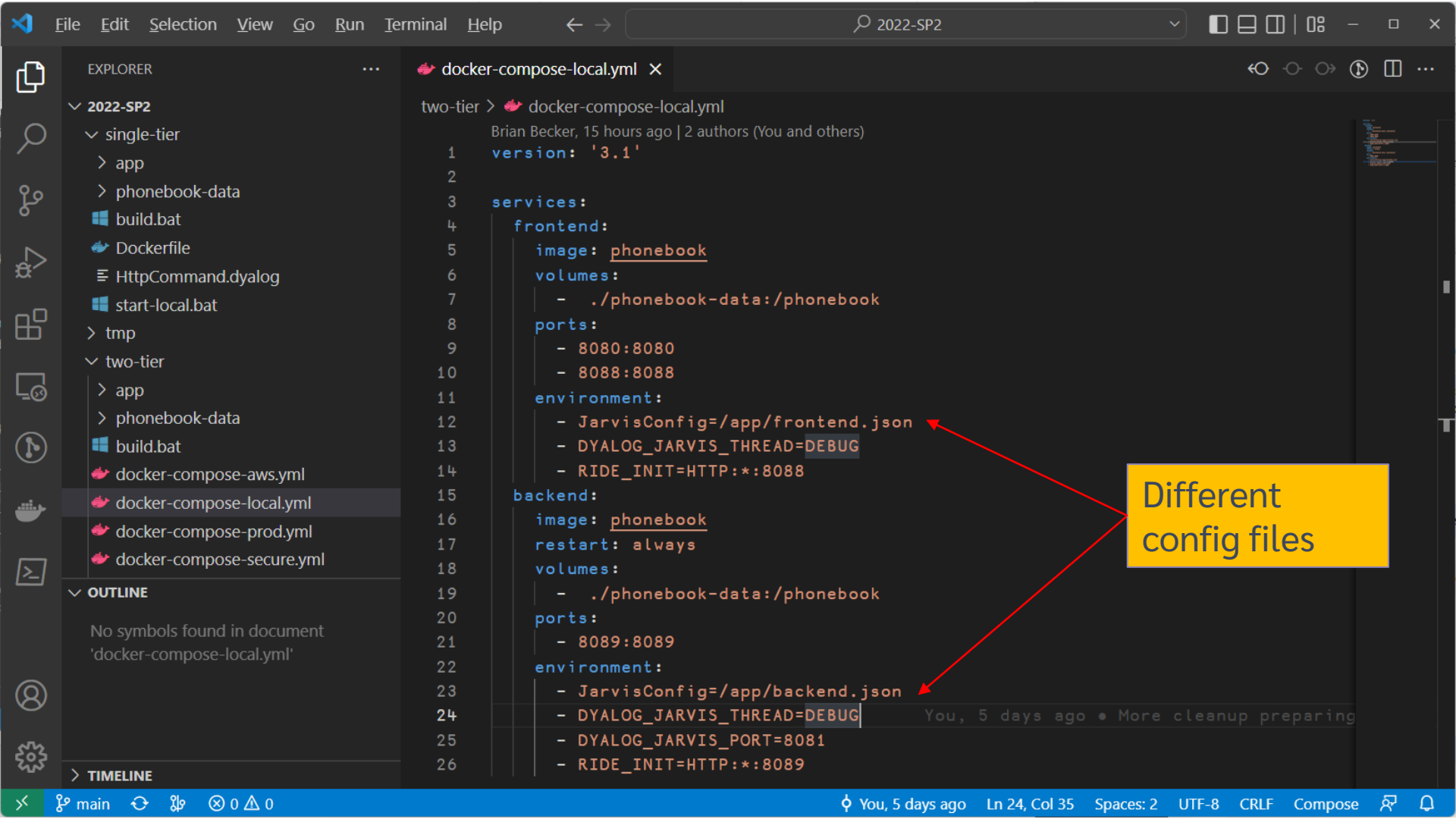
Collaborating Containers with Docker-Compose

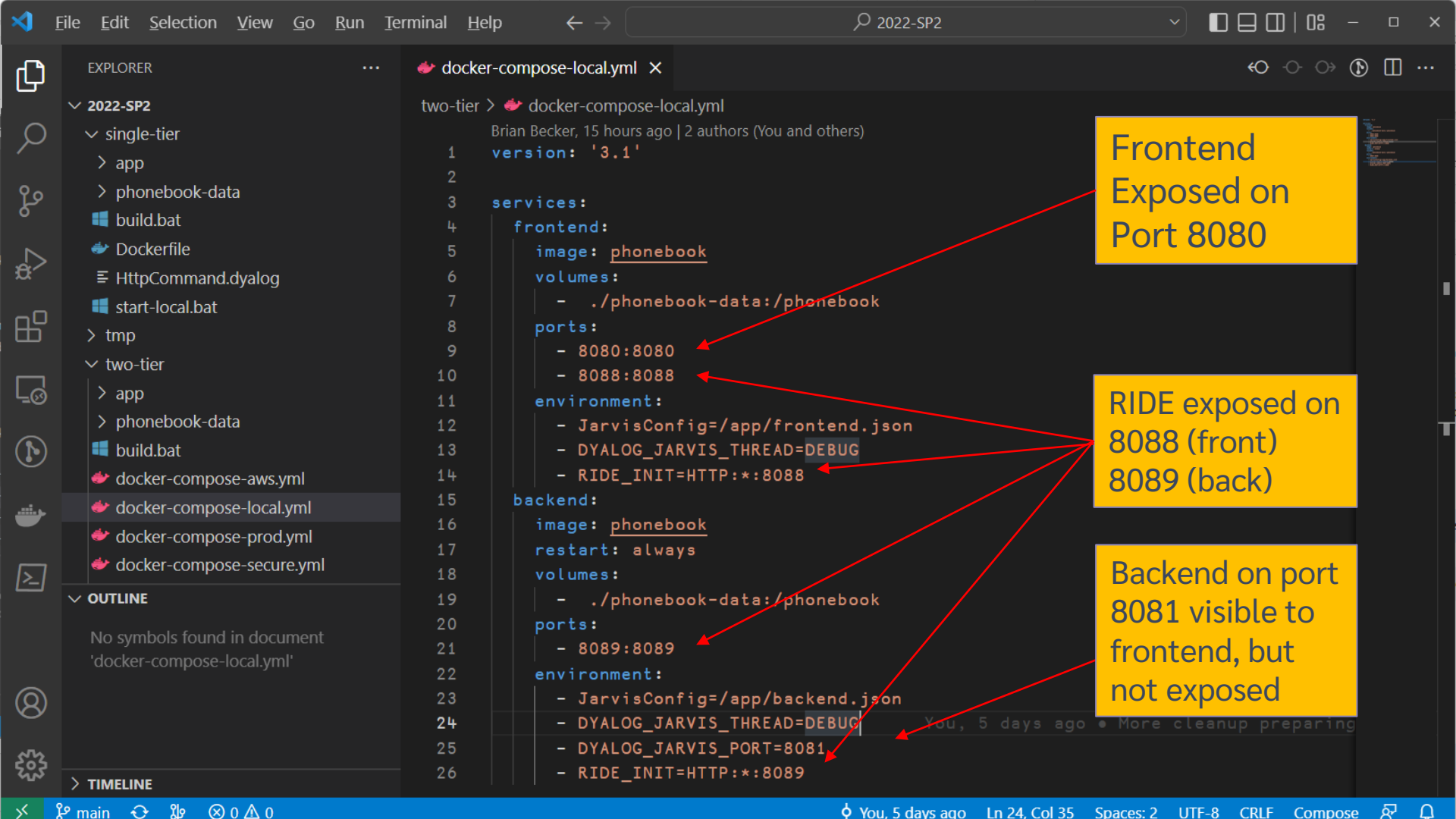
- Docker-Compose is a tool for orchestrating container images that need to work together.
- It creates a Virtual IP network that connects related images together so they can refer to each other by name.
  - In our case, "frontend" and "backend"
- It also supports replication of images and load balancing
  - We will wait with that until we deploy to the cloud




File Edit Selection View Go Run Terminal Help
2022-SP2
EXPLORER
2022-SP2
single-tier
app
phonebook-data
build.bat
Dockerfile
HttpCommand.dyalog
start-local.bat
tmp
two-tier
app
phonebook-data
build.bat
docker-compose-aws.yml
docker-compose-local.yml
docker-compose-prod.yml
docker-compose-secure.yml
OUTLINE
No symbols found in document 'docker-compose-local.yml'
TIMELINE
docker-compose-local.yml
two-tier > docker-compose-local.yml
Brian Becker, 15 hours ago | 2 authors (You and others)
version: '3.1'
services:
frontend:
image: phonebook
volumes:
- ./phonebook-data:/phonebook
ports:
- 8080:8080
- 8088:8088
environment:
- JarvisConfig=/app/frontend.json
- DYALOG_JARVIS_THREAD=DEBUG
- RIDE_INIT=HTTP:*:8088
backend:
image: phonebook
restart: always
volumes:
- ./phonebook-data:/phonebook
ports:
- 8089:8089
environment:
- JarvisConfig=/app/backend.json
- DYALOG_JARVIS_THREAD=DEBUG
You, 5 days ago • More cleanup preparing
- DYALOG_JARVIS_PORT=8081
- RIDE_INIT=HTTP:*:8089
Shared Docker Image
main
0 0
You, 5 days ago
Ln 24, Col 35
Spaces: 2
UTF-8
CRLF
Compose


File Edit Selection View Go Run Terminal Help
2022-SP2
EXPLORER
2022-SP2
single-tier
app
phonebook-data
build.bat
Dockerfile
HttpCommand.dyalog
start-local.bat
tmp
two-tier
app
phonebook-data
build.bat
docker-compose-aws.yml
docker-compose-local.yml
docker-compose-prod.yml
docker-compose-secure.yml
OUTLINE
No symbols found in document 'docker-compose-local.yml'
TIMELINE
docker-compose-local.yml
two-tier > docker-compose-local.yml
Brian Becker, 15 hours ago | 2 authors (You and others)
version: '3.1'
services:
frontend:
image: phonebook
volumes:
- ./phonebook-data:/phonebook
ports:
- 8080:8080
- 8088:8088
environment:
- JarvisConfig=/app/frontend.json
- DYALOG_JARVIS_THREAD=DEBUG
- RIDE_INIT=HTTP:*:8088
backend:
image: phonebook
restart: always
volumes:
- ./phonebook-data:/phonebook
ports:
- 8089:8089
environment:
- JarvisConfig=/app/backend.json
- DYALOG_JARVIS_THREAD=DEBUG
You, 5 days ago • More cleanup preparing
- DYALOG_JARVIS_PORT=8081
- RIDE_INIT=HTTP:*:8089
Shared Data
main
0 0
You, 5 days ago
Ln 24, Col 35
Spaces: 2
UTF-8
CRLF
Compose


File Edit Selection View Go Run Terminal Help
2022-SP2
EXPLORER
2022-SP2
single-tier
app
phonebook-data
build.bat
Dockerfile
HttpCommand.dyalog
start-local.bat
tmp
two-tier
app
phonebook-data
build.bat
docker-compose-aws.yml
docker-compose-local.yml
docker-compose-prod.yml
docker-compose-secure.yml
OUTLINE
No symbols found in document 'docker-compose-local.yml'
TIMELINE
docker-compose-local.yml
two-tier > docker-compose-local.yml
Brian Becker, 15 hours ago | 2 authors (You and others)
1 version: '3.1'
2
3 services:
4 frontend:
5 image: phonebook
6 volumes:
7 - ./phonebook-data:/phonebook
8 ports:
9 - 8080:8080
10 - 8088:8088
11 environment:
12 - JarvisConfig=/app/frontend.json
13 - DYALOG_JARVIS_THREAD=DEBUG
14 - RIDE_INIT=HTTP:*:8088
15 backend:
16 image: phonebook
17 restart: always
18 volumes:
19 - ./phonebook-data:/phonebook
20 ports:
21 - 8089:8089
22 environment:
23 - JarvisConfig=/app/backend.json
24 - DYALOG_JARVIS_THREAD=DEBUG You, 5 days ago • More cleanup preparing
25 - DYALOG_JARVIS_PORT=8081
26 - RIDE_INIT=HTTP:*:8089
Different config files
main
0 0
You, 5 days ago
Ln 24, Col 35
Spaces: 2
UTF-8
CRLF
Compose


File Edit Selection View Go Run Terminal Help
2022-SP2
EXPLORER
2022-SP2
single-tier
app
phonebook-data
build.bat
Dockerfile
HttpCommand.dyalog
start-local.bat
tmp
two-tier
app
phonebook-data
build.bat
docker-compose-aws.yml
docker-compose-local.yml
docker-compose-prod.yml
docker-compose-secure.yml
OUTLINE
No symbols found in document 'docker-compose-local.yml'
TIMELINE
docker-compose-local.yml
two-tier > docker-compose-local.yml
Brian Becker, 15 hours ago | 2 authors (You and others)
version: '3.1'
services:
frontend:
image: phonebook
volumes:
- ./phonebook-data:/phonebook
ports:
- 8080:8080
- 8088:8088
environment:
- JarvisConfig=/app/frontend.json
- DYALOG_JARVIS_THREAD=DEBUG
- RIDE_INIT=HTTP:*:8088
backend:
image: phonebook
restart: always
volumes:
- ./phonebook-data:/phonebook
ports:
- 8089:8089
environment:
- JarvisConfig=/app/backend.json
- DYALOG_JARVIS_THREAD=DEBUG
You, 5 days ago • More cleanup preparing
- DYALOG_JARVIS_PORT=8081
- RIDE_INIT=HTTP:*:8089
Frontend Exposed on Port 8080
RIDE exposed on 8088 (front) 8089 (back)
Backend on port 8081 visible to frontend, but not exposed
main
0 0
You, 5 days ago
Ln 24, Col 35
Spaces: 2
UTF-8
CRLF
Compose

Our first "docker compose"

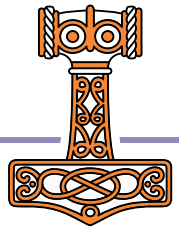
We will issue the command:

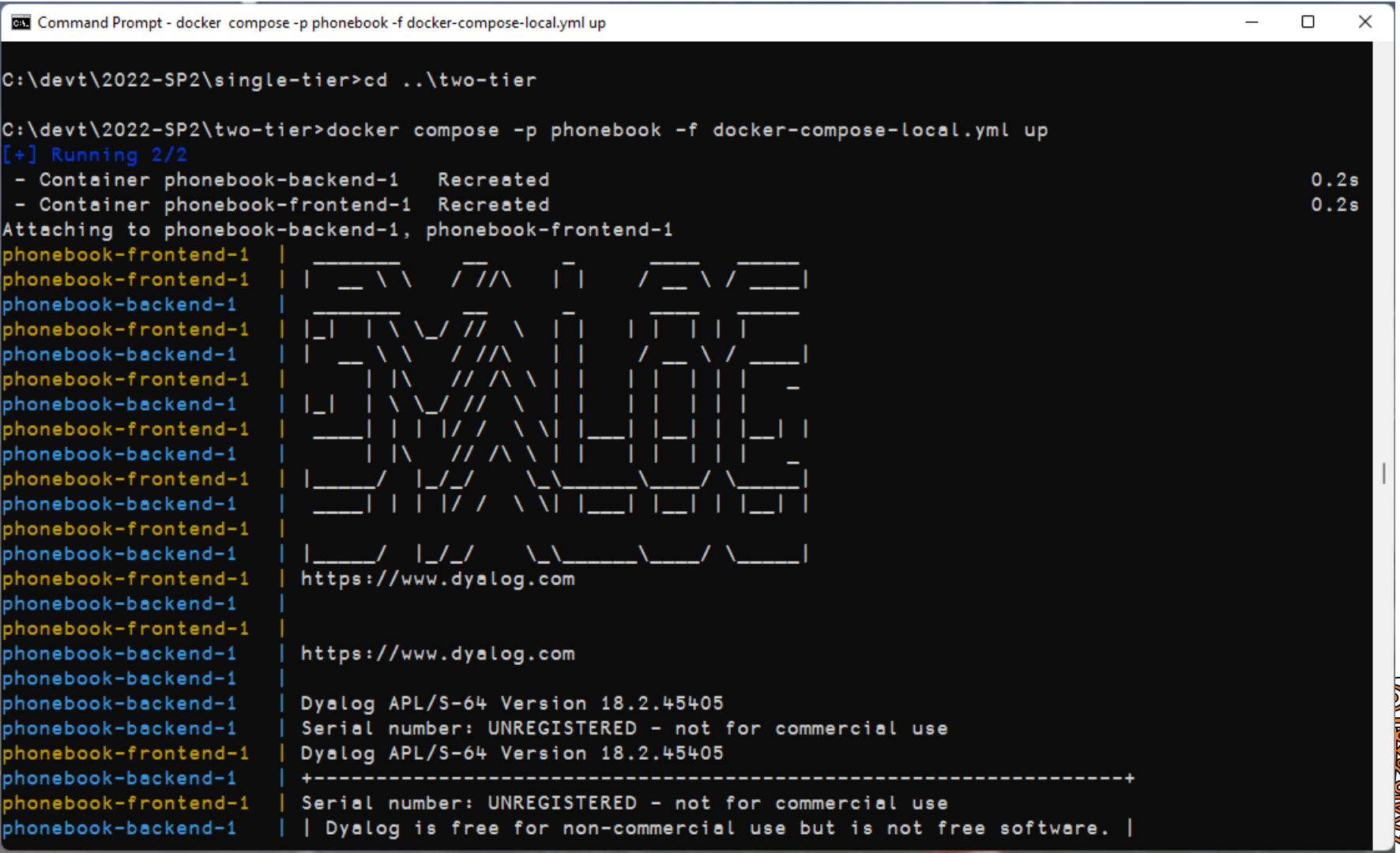
```
docker compose -p phonebook -f docker-compose-local.aws up
```

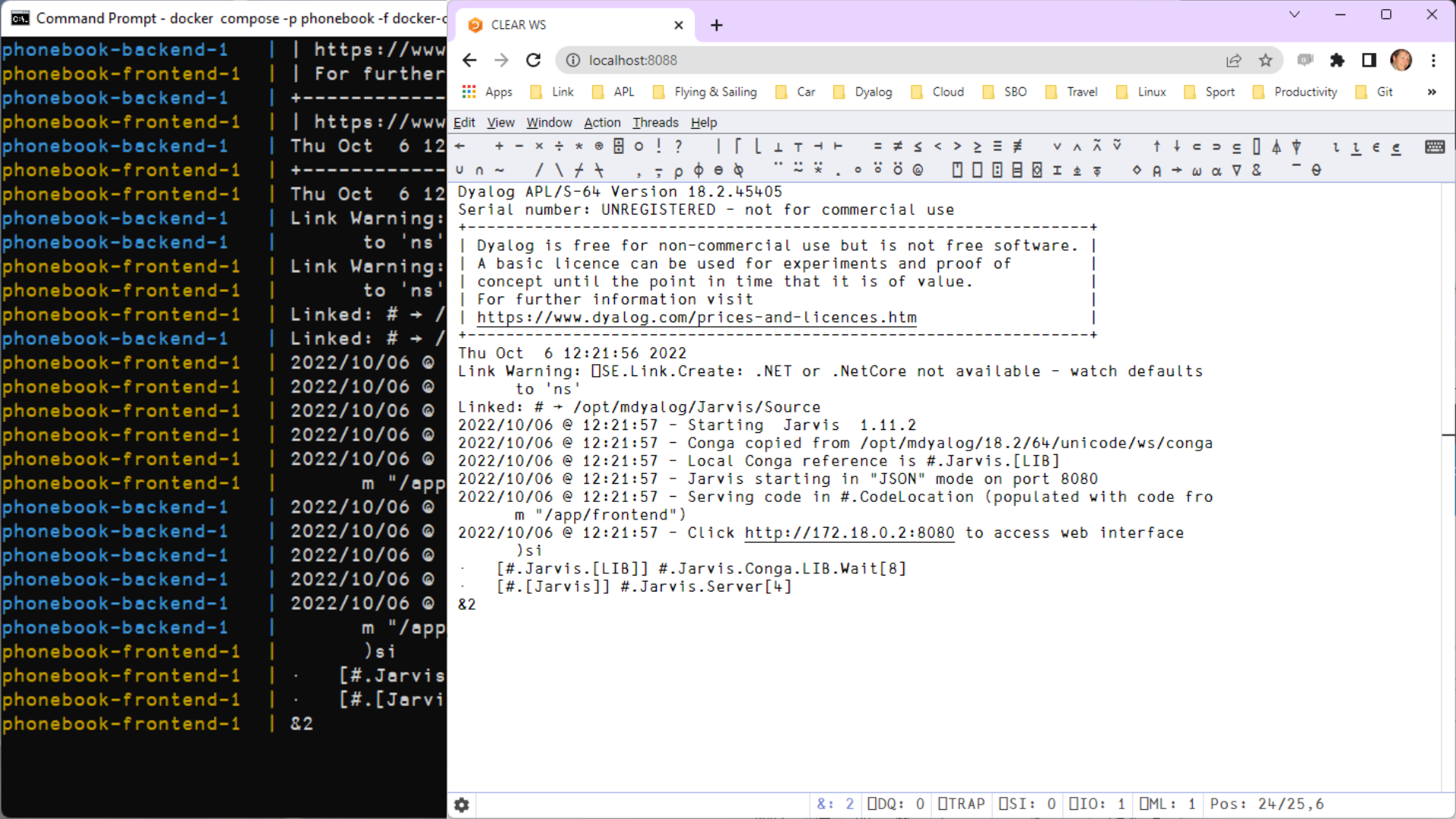
`-p`: Sets the project name. It is important to use this each time so your commands apply to the same stack. If you forget, it may start or stop the wrong stack (default is the current folder name).

`-f`: selects the docker-compose file (defaults to docker-compose.yml)

DO NOT forget –p and –f each time or you will regret it!



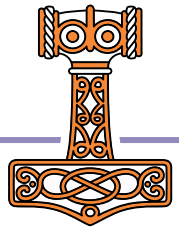

Command Prompt - docker compose -p phonebook -f docker-compose-local.yml up
C:\devt\2022-SP2\single-tier>cd ..\two-tier
C:\devt\2022-SP2\two-tier>docker compose -p phonebook -f docker-compose-local.yml up
[+] Running 2/2
- Container phonebook-backend-1 Recreated 0.2s
- Container phonebook-frontend-1 Recreated 0.2s
Attaching to phonebook-backend-1, phonebook-frontend-1
phonebook-frontend-1 | https://www.dyalog.com
phonebook-backend-1 | https://www.dyalog.com
phonebook-backend-1 | Dyalog APL/S-64 Version 18.2.45405
phonebook-backend-1 | Serial number: UNREGISTERED - not for commercial use
phonebook-frontend-1 | Dyalog APL/S-64 Version 18.2.45405
phonebook-backend-1 | +----------+
phonebook-frontend-1 | Serial number: UNREGISTERED - not for commercial use
phonebook-backend-1 | | Dyalog is free for non-commercial use but is not free software. |


Command Prompt - docker compose -p phonebook -f docker-c
phonebook-backend-1 | | https://www
phonebook-frontend-1 | | For further
phonebook-backend-1 | +----------
phonebook-frontend-1 | | https://www
phonebook-backend-1 | Thu Oct 6 12
phonebook-frontend-1 | +----------
phonebook-frontend-1 | Thu Oct 6 12
phonebook-backend-1 | Link Warning:
phonebook-backend-1 | to 'ns'
phonebook-frontend-1 | Link Warning:
phonebook-frontend-1 | to 'ns'
phonebook-frontend-1 | Linked: # → /
phonebook-backend-1 | Linked: # → /
phonebook-frontend-1 | 2022/10/06 @
phonebook-frontend-1 | 2022/10/06 @
phonebook-frontend-1 | 2022/10/06 @
phonebook-frontend-1 | 2022/10/06 @
phonebook-frontend-1 | 2022/10/06 @
phonebook-frontend-1 | m "/app
phonebook-backend-1 | 2022/10/06 @
phonebook-backend-1 | 2022/10/06 @
phonebook-backend-1 | 2022/10/06 @
phonebook-backend-1 | 2022/10/06 @
phonebook-backend-1 | 2022/10/06 @
phonebook-backend-1 | m "/app
phonebook-frontend-1 |)si
phonebook-frontend-1 | · [#.Jarvis
phonebook-frontend-1 | · [#.[Jarvi
phonebook-frontend-1 | &2
CLEAR WS
localhost:8088
Apps
Link
APL
Flying & Sailing
Car
Dyalog
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Edit View Window Action Threads Help
Dyalog APL/S-64 Version 18.2.45405
Serial number: UNREGISTERED - not for commercial use
| Dyalog is free for non-commercial use but is not free software. |
| A basic licence can be used for experiments and proof of |
| concept until the point in time that it is of value. |
| For further information visit |
| https://www.dyalog.com/prices-and-licences.htm |
Thu Oct 6 12:21:56 2022
Link Warning: SE.Link.Create: .NET or .NetCore not available - watch defaults
to 'ns'
Linked: # → /opt/mdyalog/Jarvis/Source
2022/10/06 @ 12:21:57 - Starting Jarvis 1.11.2
2022/10/06 @ 12:21:57 - Conga copied from /opt/mdyalog/18.2/64/unicode/ws/conga
2022/10/06 @ 12:21:57 - Local Conga reference is #.Jarvis.[LIB]
2022/10/06 @ 12:21:57 - Jarvis starting in "JSON" mode on port 8080
2022/10/06 @ 12:21:57 - Serving code in #.CodeLocation (populated with code fro
m "/app/frontend")
2022/10/06 @ 12:21:57 - Click http://172.18.0.2:8080 to access web interface
)si
· [#.Jarvis.[LIB]] #.Jarvis.Conga.LIB.Wait[8]
· [#.[Jarvis]] #.Jarvis.Server[4]
&2
&: 2 DQ: 0 TRAP SI: 0 IO: 1 ML: 1 Pos: 24/25,6

Ctrl-C to stop

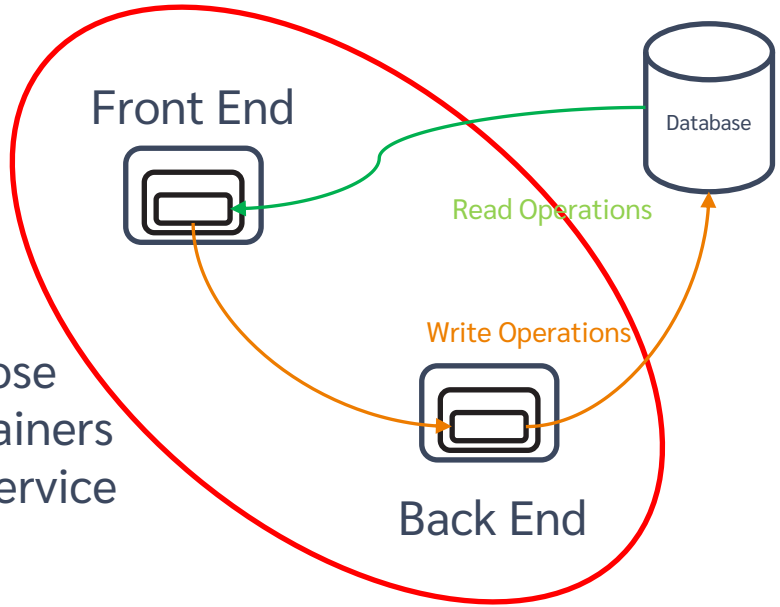
Command Prompt

```
phonebook-backend-1    | 2022/10/06 @ 12:21:57 - Local Conga reference is #.Jarvis.[LIB]
phonebook-backend-1    | 2022/10/06 @ 12:21:57 - Jarvis starting in "JSON" mode on port 8081
phonebook-backend-1    | 2022/10/06 @ 12:21:57 - Serving code in #.CodeLocation (populated with code fro
phonebook-backend-1    |       m "/app/backend")
phonebook-frontend-1   |       )si
phonebook-frontend-1   | .    [#.Jarvis.[LIB]] #.Jarvis.Conga.LIB.Wait[8]
phonebook-frontend-1   | .    [#.[Jarvis]] #.Jarvis.Server[4]
phonebook-frontend-1   | &2
Gracefully stopping... (press Ctrl+C again to force)
[+] Running 2/2
 - Container phonebook-frontend-1  Stopped                                          11.0s
 - Container phonebook-backend-1   Stopped                                          10.6s
canceled

C:\devt\2022-SP2\two-tier>
```

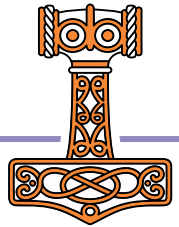


Split into Front and Back Ends

We'll call this "Two-Tier"

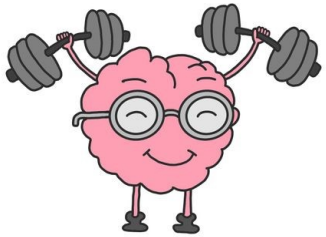


Docker Compose defines the containers that make up a service



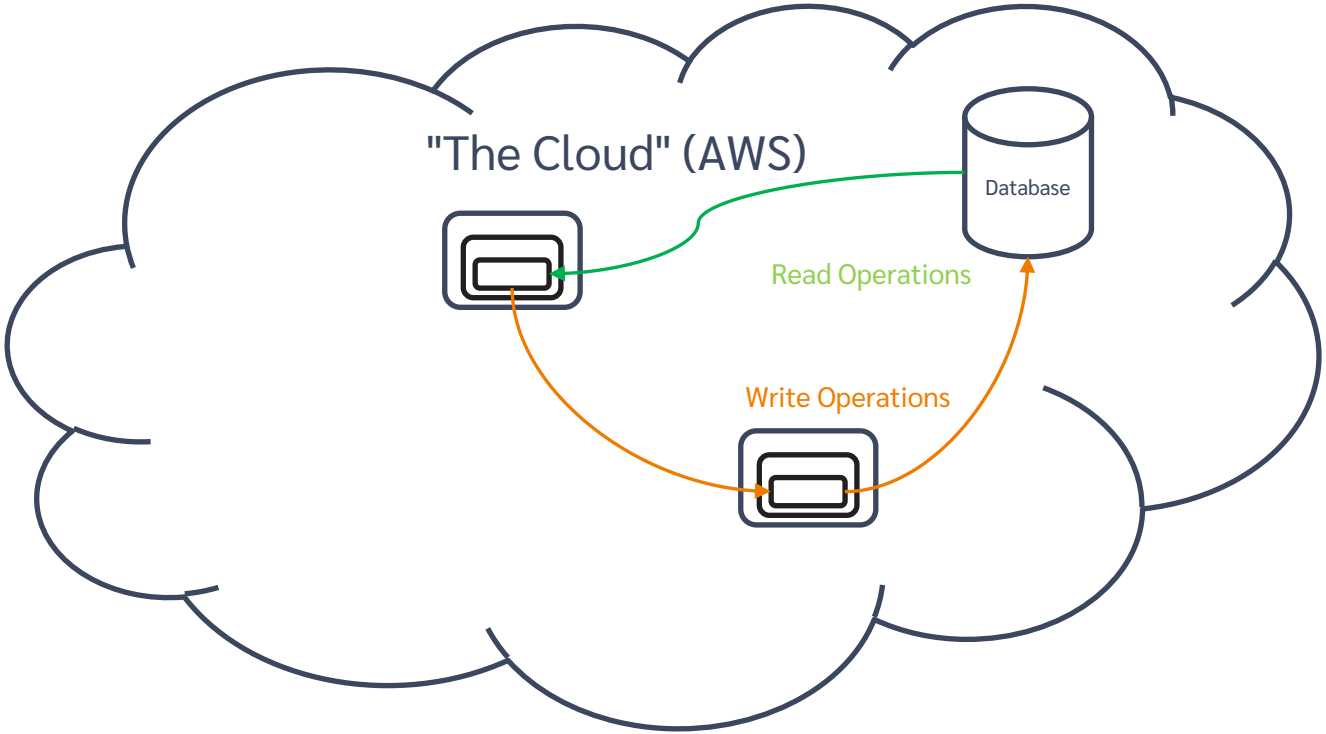
Exercise 3
Local Docker Compose

- Start docker desktop
- Do a "docker compose up" using
  -f docker-compose-local.yml
  To select the right docker-compose file
- Make a request
- Debug with RIDE
- Advanced: Check that you can make a request to backend:8081 from a RIDE session to the frontend, but NOT from the outside (port 8081)
- See what happens if you)OFF from RIDE



Head for the Clouds

Try it in the cloud



AWS Configuration

1) Create AWS user (you should have done this already)

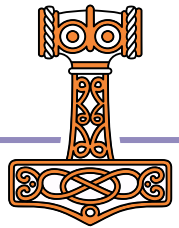
   NB: We recommend and have been testing with eu-west-3 (Paris) as the default region

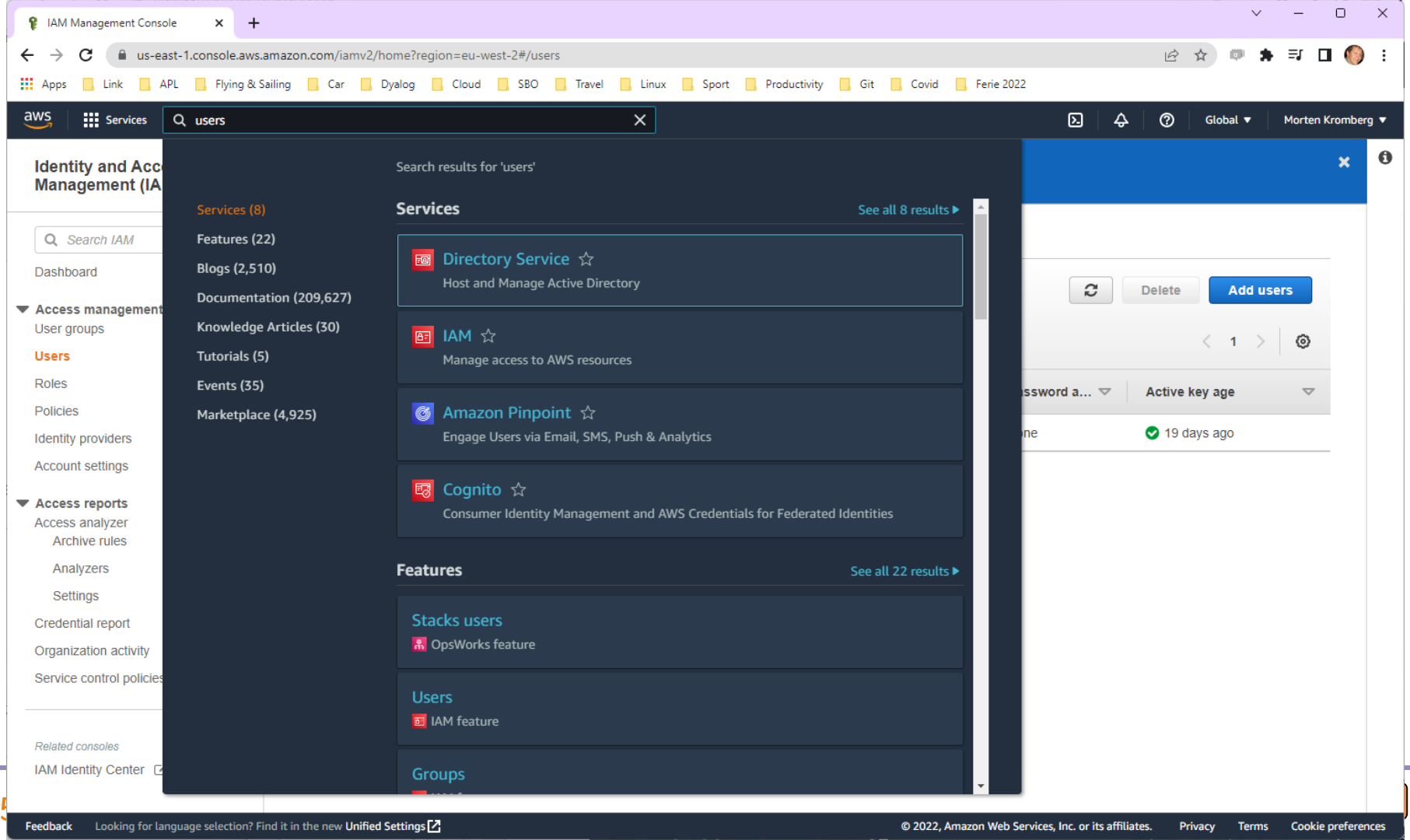
2) Create IAM user

3) Download credentials / tokens

4) Install AWS CLI & configure to use tokens

5) Push images to Amazon Container Registry




IAM Management Console
us-east-1.console.aws.amazon.com/iamv2/home?region=eu-west-2#/users
Apps
Link
APL
Flying & Sailing
Car
Dyalog
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Covid
Ferie 2022
aws
Services
users
Global
Morten Kromberg
Identity and Acc
Management (IA
Search IAM
Dashboard
Access management
User groups
Users
Roles
Policies
Identity providers
Account settings
Access reports
Access analyzer
Archive rules
Analyzers
Settings
Credential report
Organization activity
Service control policies
Related consoles
IAM Identity Center
Search results for 'users'
Services (8)
Features (22)
Blogs (2,510)
Documentation (209,627)
Knowledge Articles (30)
Tutorials (5)
Events (35)
Marketplace (4,925)
Services
See all 8 results
Directory Service
Host and Manage Active Directory
IAM
Manage access to AWS resources
Amazon Pinpoint
Engage Users via Email, SMS, Push & Analytics
Cognito
Consumer Identity Management and AWS Credentials for Federated Identities
Features
See all 22 results
Stacks users
OpsWorks feature
Users
IAM feature
Groups
Delete
Add users
1
Active key age
19 days ago
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Add user

1 2 3 4 5

Set user details

You can add multiple users at once with the same access type and permissions. Learn more

User name* sp2-user

Add another user

Select AWS access type

Select how these users will primarily access AWS. If you choose only programmatic access, it does NOT prevent users from accessing the console using an assumed role. Access keys and autogenerated passwords are provided in the last step. Learn more

Select AWS credential type*

- [x] **Access key - Programmatic access**
  Enables an **access key ID** and **secret access key** for the AWS API, CLI, SDK, and other development tools.
- [ ] **Password - AWS Management Console access**
  Enables a **password** that allows users to sign-in to the AWS Management Console.

* Required

Cancel Next: Permissions

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Add user

1 2 3 4 5

Set permissions

Add user to group | Copy permissions from existing user | Attach existing policies directly

Add user to an existing group or create a new one. Using groups is a best-practice way to manage user's permissions by job functions. Learn more

Add user to group

Create group | Refresh

Search — Showing 1 result

Group	Attached policies
Testers	AdministratorAccess

Set permissions boundary

Cancel | Previous | Next: Tags

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Add user

1 2 3 4 5

Set permissions

Add user to group | Copy permissions from existing user | Attach existing policies directly

Create policy

Filter policies | Search | Showing 771 results

Policy name	Type	Used as
AdministratorAccess	Job function	Permissions policy (1)
AdministratorAccess-Amplify	AWS managed	None
AdministratorAccess-AWSElasticBeanstalk	AWS managed	None
AlexaForBusinessDeviceSetup	AWS managed	None
AlexaForBusinessFullAccess	AWS managed	None
AlexaForBusinessGatewayExecution	AWS managed	None
AlexaForBusinessLifesizeDelegatedAccessPolicy	AWS managed	None
AlexaForBusinessPolyDelegatedAccessPolicy	AWS managed	None
AlexaForBusinessReadOnlyAccess	AWS managed	None
AmazonAPIGatewayAdministrator	AWS managed	None
AmazonAPIGatewayInvokeFullAccess	AWS managed	None
AmazonAPIGatewayPushToCloudWatchLogs	AWS managed	None

Cancel Previous Next: Tags

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Add user

1 2 3 4 5

Add tags (optional)

IAM tags are key-value pairs you can add to your user. Tags can include user information, such as an email address, or can be descriptive, such as a job title. You can use the tags to organize, track, or control access for this user. Learn more

Key	Value (optional)	Remove
Add new key		

You can add 50 more tags.

Cancel Previous Next: Review

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Add user

1 2 3 4 5

Review

Review your choices. After you create the user, you can view and download the autogenerated password and access key.

User details

User name	sp2-user
AWS access type	Programmatic access - with an access key
Permissions boundary	Permissions boundary is not set

Permissions summary

The following policies will be attached to the user shown above.

Type	Name
Managed policy	AdministratorAccess

Tags

No tags were added.

Cancel Previous **Create user**

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Add user

1 2 3 4 5

Success

You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Management Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.

Users with AWS Management Console access can sign-in at: https://352645159704.signin.aws.amazon.com/console

Download .csv

User	Access key ID	Secret access key
sp2-user	AKIAVEG2KDMMDGLTSUPK	5OFfJLDqXK92ueOcvHn4zugGWUCQxez7IL6xPZrN Hide

Close

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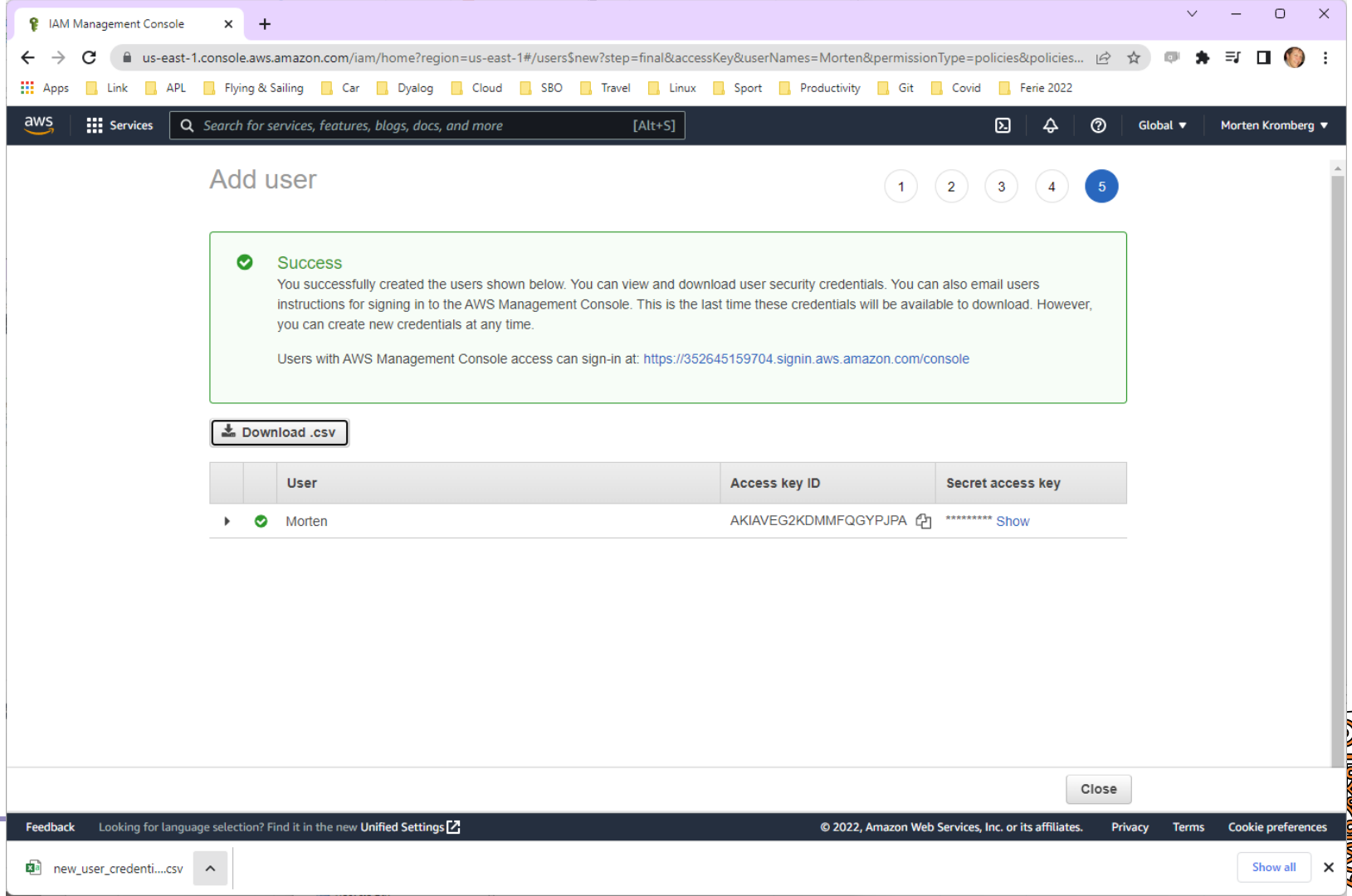
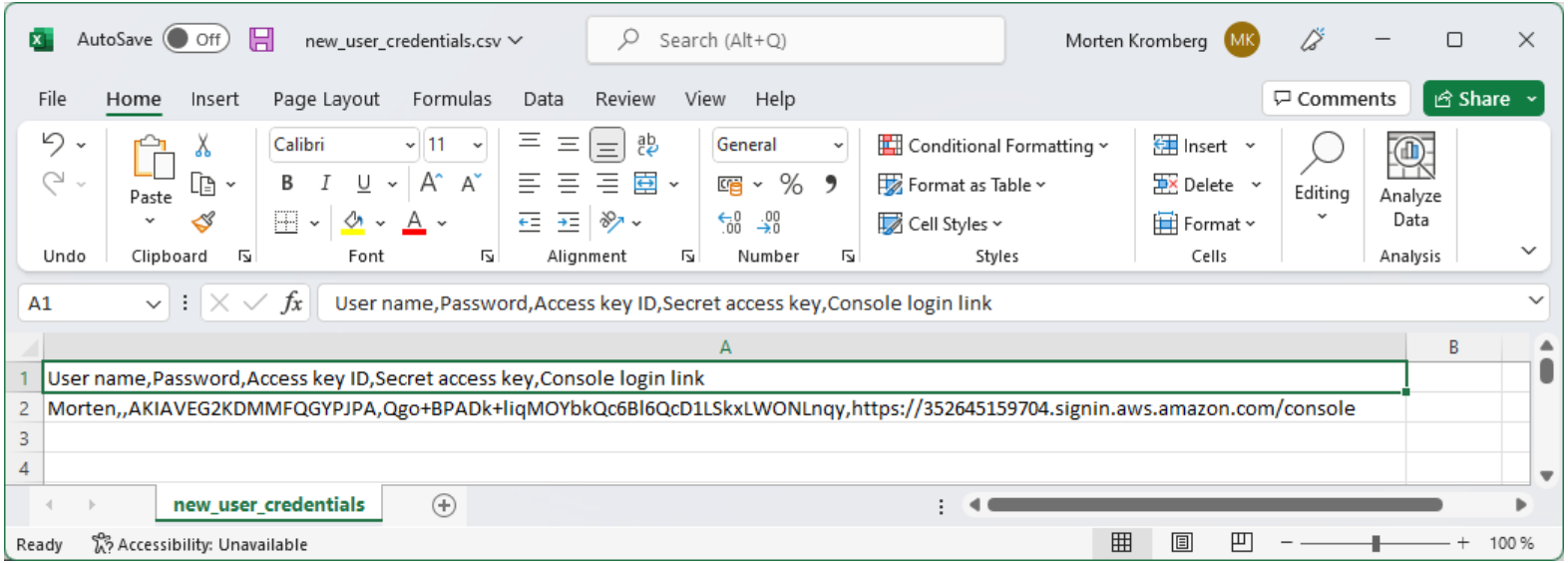
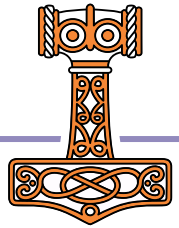

IAM Management Console
us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/users$new?step=final&accessKey&userNames=Morten&permissionType=policies&policies...
Apps
Link
APL
Flying & Sailing
Car
Dyalog
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Covid
Ferie 2022
aws
Services
Search for services, features, blogs, docs, and more
[Alt+S]
Global
Morten Kromberg
Add user
1
2
3
4
5
Success
You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Management Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.
Users with AWS Management Console access can sign-in at: https://352645159704.signin.aws.amazon.com/console
Download .csv
User
Access key ID
Secret access key
Morten
AKIAVEG2KDMMFQGYPJPA
******** Show
Close
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
new_user_credenti....csv
Show all



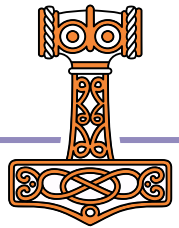
(these credentials are no longer valid ☺)



AWS CLI Setup

We need to:

- Install the Amazon Web Services Command Line Interface
- Configure it to use our new User Credentials



intall aws cli - Google Search

google.com/search?q=intall+aws+cli&rlz=1C1GCEU_enDK975DK976&oq=intall+aws+cli&aqs=chrome..69i57j0i10i512l9.5491j0j4&sourceid=chrome&ie=UTF-8

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Google

intall aws cli

All | Videos | Shopping | Images | News | More | Tools

About 62.600.000 results (0,45 seconds)

Showing results for ***install*** aws cli
Search instead for intall aws cli

https://docs.aws.amazon.com › cli › getting-started-install

Installing or updating the latest version of the AWS CLI

Install or update the **AWS CLI** · Unzip the installer. If your Linux distribution doesn't have a built-in unzip command, use an equivalent to unzip it. · Run the ...
Past releases · Configuring the · Quick setup · Prerequisites to use the AWS...

https://docs.aws.amazon.com › cli › latest › userguide

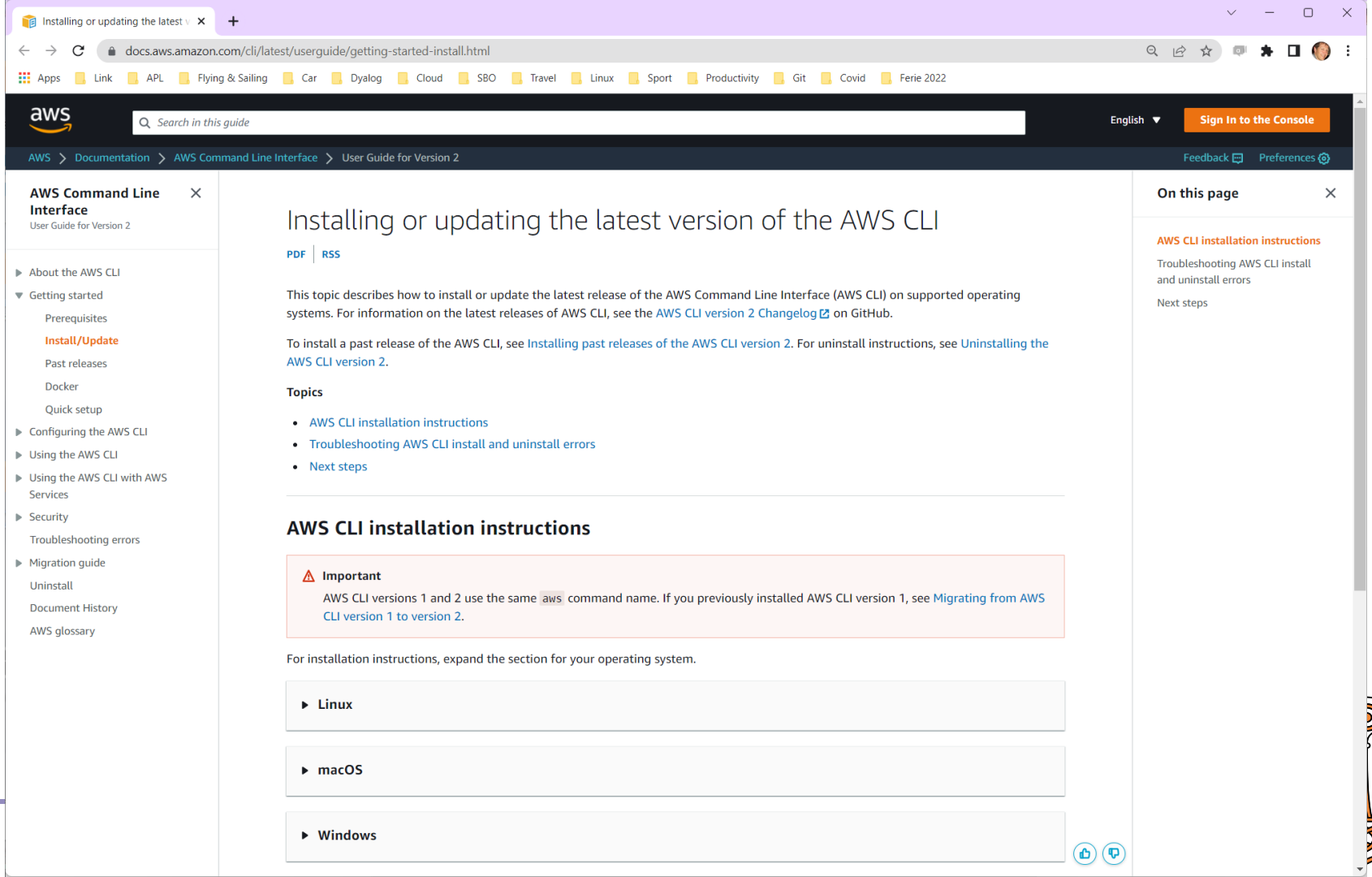
Getting started with the AWS CLI - AWS Command Line Interface

Install the **AWS Command Line** Interface (**AWS CLI**) on your system.

People also ask

- How install AWS CLI on Linux?
- How install AWS CLI in Shell?
- How install AWS CLI after installation?
- How install AWS CLI Arch Linux?

Feedback


Installing or updating the latest
docs.aws.amazon.com/cli/latest/userguide/getting-started-install.html
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AWS > Documentation > AWS Command Line Interface > User Guide for Version 2
Feedback
Preferences
AWS Command Line Interface
User Guide for Version 2
About the AWS CLI
Getting started
Prerequisites
Install/Update
Past releases
Docker
Quick setup
Configuring the AWS CLI
Using the AWS CLI
Using the AWS CLI with AWS Services
Security
Troubleshooting errors
Migration guide
Uninstall
Document History
AWS glossary
Installing or updating the latest version of the AWS CLI
PDF
RSS
This topic describes how to install or update the latest release of the AWS Command Line Interface (AWS CLI) on supported operating systems. For information on the latest releases of AWS CLI, see the AWS CLI version 2 Changelog on GitHub.
To install a past release of the AWS CLI, see Installing past releases of the AWS CLI version 2. For uninstall instructions, see Uninstalling the AWS CLI version 2.
Topics
AWS CLI installation instructions
Troubleshooting AWS CLI install and uninstall errors
Next steps
AWS CLI installation instructions
Important
AWS CLI versions 1 and 2 use the same aws command name. If you previously installed AWS CLI version 1, see Migrating from AWS CLI version 1 to version 2.
For installation instructions, expand the section for your operating system.
Linux
macOS
Windows
On this page
AWS CLI installation instructions
Troubleshooting AWS CLI install and uninstall errors
Next steps

▶ macOS

▼ Windows

Installation requirements

- We support the AWS CLI on Microsoft-supported versions of 64-bit Windows.
- Admin rights to install software

Install or update the AWS CLI

To update your current installation of AWS CLI on Windows, download a new installer each time you update to overwrite previous versions. AWS CLI is updated regularly. To see when the latest version was released, see the AWS CLI version 2 Changelog on *GitHub*.

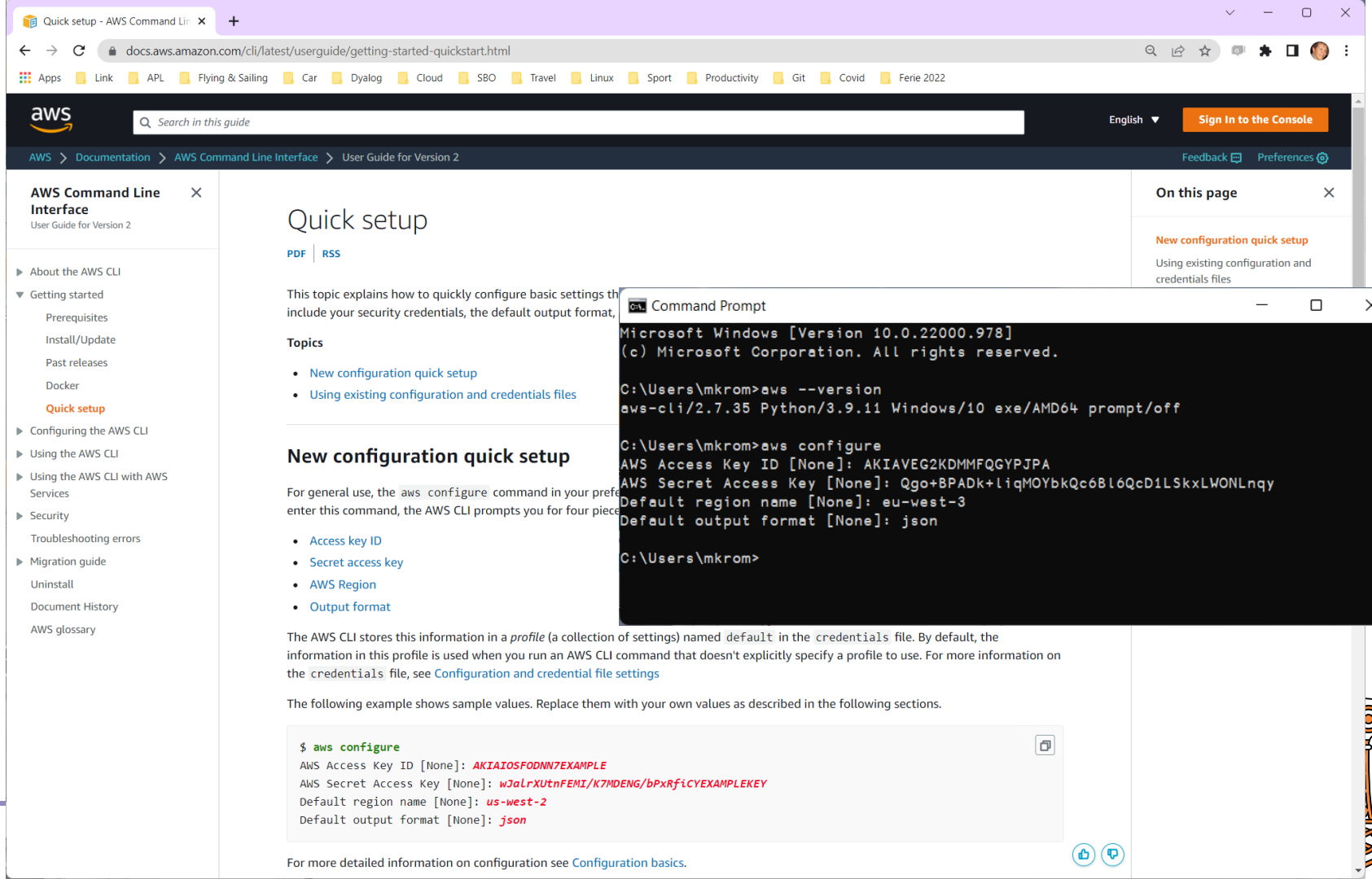
1. Download and run the AWS CLI MSI installer for Windows (64-bit):
   https://awscli.amazonaws.com/AWSCLIV2.msi
   Alternatively, you can run the `msiexec` command to run the MSI installer.

   ```
   C:\> msiexec.exe /i https://awscli.amazonaws.com/AWSCLIV2.msi
   ```

   For various parameters that can be used with `msiexec`, see msiexec on the *Microsoft Docs* website.
2. To confirm the installation, open the **Start** menu, search for `cmd` to open a command prompt window, and at the command prompt use the `aws --version` command.

   ```
   C:\> aws --version
   aws-cli/2.7.24 Python/3.8.8 Windows/10 exe/AMD64 prompt/off
   ```

   If Windows is unable to find the program, you might need to close and reopen the command prompt window to refresh the path, or follow the troubleshooting in Troubleshooting AWS CLI errors.


Quick setup - AWS Command Lin
docs.aws.amazon.com/cli/latest/userguide/getting-started-quickstart.html
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AWS Command Line Interface
User Guide for Version 2
About the AWS CLI
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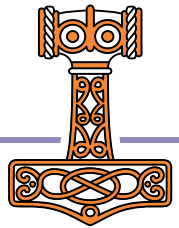
Quick setup
Configuring the AWS CLI
Using the AWS CLI
Using the AWS CLI with AWS Services
Security
Troubleshooting errors
Migration guide
Uninstall
Document History
AWS glossary
Quick setup
PDF
RSS
This topic explains how to quickly configure basic settings th
include your security credentials, the default output format,
Topics
New configuration quick setup
Using existing configuration and credentials files
New configuration quick setup
For general use, the aws configure command in your prefe
enter this command, the AWS CLI prompts you for four piece
Access key ID
Secret access key
AWS Region
Output format
The AWS CLI stores this information in a profile (a collection of settings) named default in the credentials file. By default, the information in this profile is used when you run an AWS CLI command that doesn't explicitly specify a profile to use. For more information on the credentials file, see Configuration and credential file settings
The following example shows sample values. Replace them with your own values as described in the following sections.
$ aws configure
AWS Access Key ID [None]: AKIAIOSFODNN7EXAMPLE
AWS Secret Access Key [None]: wJalrXUtnFEMI/K7MDENG/bPxRfiCYEXAMPLEKEY
Default region name [None]: us-west-2
Default output format [None]: json
For more detailed information on configuration see Configuration basics.
On this page
New configuration quick setup
Using existing configuration and credentials files
Command Prompt
Microsoft Windows [Version 10.0.22000.978]
(c) Microsoft Corporation. All rights reserved.
C:\Users\mkrom>aws --version
aws-cli/2.7.35 Python/3.9.11 Windows/10 exe/AMD64 prompt/off
C:\Users\mkrom>aws configure
AWS Access Key ID [None]: AKIAVEG2KDMMFQGYPJPA
AWS Secret Access Key [None]: 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
Default region name [None]: eu-west-3
Default output format [None]: json
C:\Users\mkrom>

Docker ECS integration

- Docker Compose can be connected to the Amazon Elastic Container Service
  - Integration also exists for Microsoft Azure and perhaps other providers
- We need to create a "docker context"
- When we select the ECS context, commands like "docker compose ... up" will use ECS to run our containers



Create AWS context

Run the `docker context create ecs myecscontext` command to create an Amazon ECS Docker context named `myecscontext`. If you have already installed and configured the AWS CLI, the setup command lets you select an existing AWS profile to connect to Amazon. Otherwise, you can create a new profile by passing an AWS access key ID and a secret access key. Finally, you can configure your ECS context to retrieve AWS credentials by `AWS_*` environment variables, which is a common way to integrate with third-party tools and single-sign-on providers.

```
? Create a Docker context using:  [Use arrows to move, type to filter]
  An existing AWS profile
  AWS secret and token credentials
> AWS environment variables
```

After you have created an AWS context, you can list your Docker contexts by running the `docker context ls` command:

```
NAME                TYPE                DESCRIPTION                               DOCKER ENDPOINT               KUBERNETES ENDPOINT
myecscontext        ecs                 credentials read from environment
default *           moby                Current DOCKER_HOST based configuration   unix:///var/run/docker.sock
```

Run a Compose application

You can deploy and manage multi-container applications defined in Compose files to Amazon ECS using the `docker compose` command. To do this:

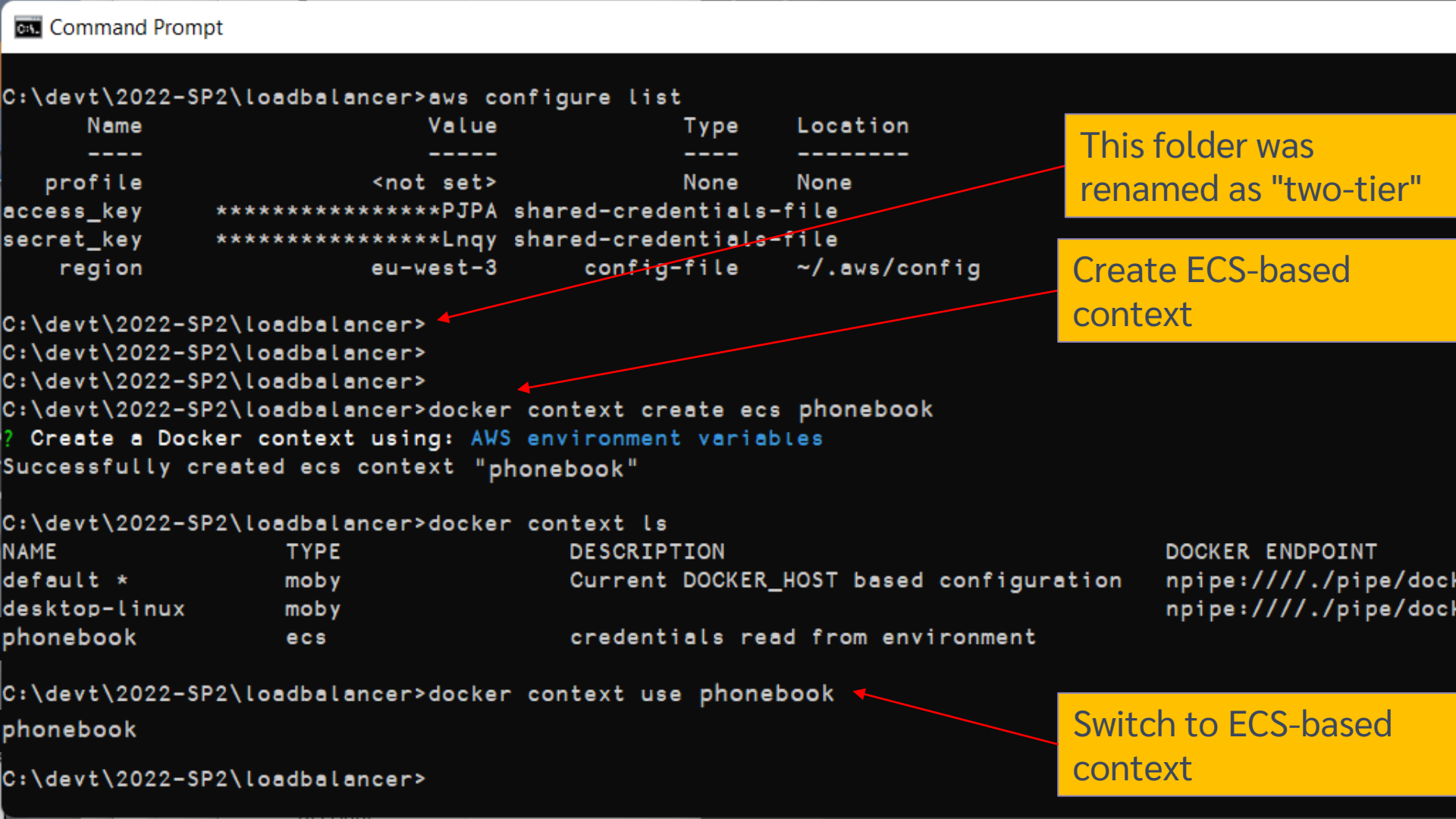
- Ensure you are using your ECS context. You can do this either by specifying the `--context myecscontext` flag with your command, or by setting the current context using the command `docker context use myecscontext`.
- Run `docker compose up` and `docker compose down` to start and then stop a full Compose application.

  By default, `docker compose up` uses the `compose.yaml` or `docker-compose.yaml` file in the current folder. You can specify the working directory using the --workdir flag or specify the Compose file directly using `docker compose --file mycomposefile.yaml up`.

  You can also specify a name for the Compose application using the `--project-name` flag during deployment. If no name is specified, a name will be derived from the working directory.

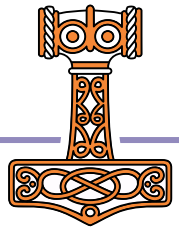
Docker ECS integration converts the Compose application model into a set of AWS resources, described as a CloudFormation template. The actual mapping is described in technical documentation. You can review the generated template using `docker compose convert` command, and follow CloudFormation applying this model within AWS web console when you run `docker compose up`, in addition to CloudFormation events being displayed in your terminal.

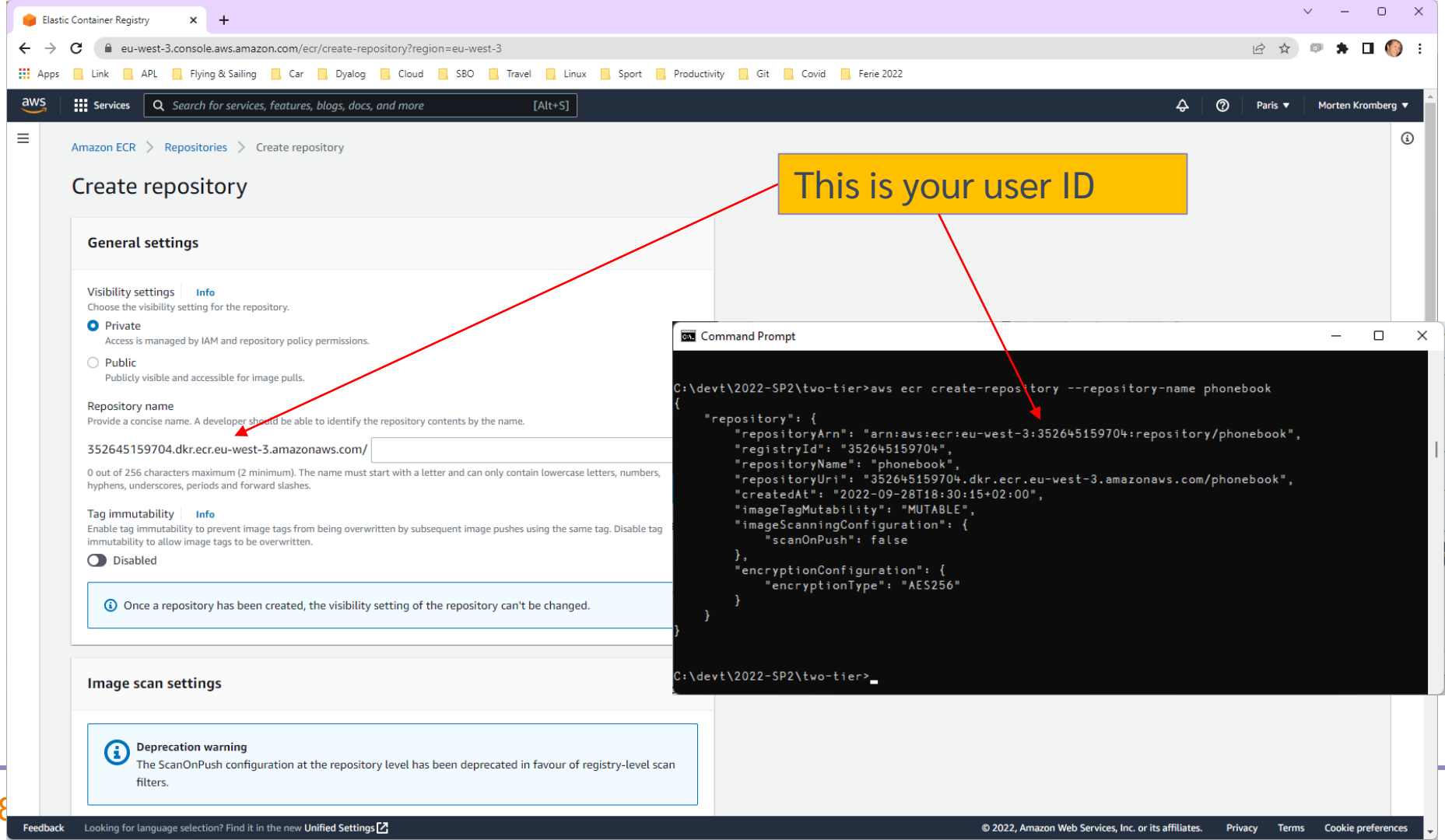
Edit this page
Request changes


Command Prompt
C:\devt\2022-SP2\loadbalancer>aws configure list
Name Value Type Location
profile <not set> None None
access_key **********PJPA shared-credentials-file
secret_key **********Lnqy shared-credentials-file
region eu-west-3 config-file ~/.aws/config
C:\devt\2022-SP2\loadbalancer>
C:\devt\2022-SP2\loadbalancer>
C:\devt\2022-SP2\loadbalancer>
C:\devt\2022-SP2\loadbalancer>docker context create ecs phonebook
? Create a Docker context using: AWS environment variables
Successfully created ecs context "phonebook"
C:\devt\2022-SP2\loadbalancer>docker context ls
NAME TYPE DESCRIPTION DOCKER ENDPOINT
default * moby Current DOCKER_HOST based configuration npipe:////./pipe/dock
desktop-linux moby npipe:////./pipe/dock
phonebook ecs credentials read from environment
C:\devt\2022-SP2\loadbalancer>docker context use phonebook
phonebook
C:\devt\2022-SP2\loadbalancer>
This folder was renamed as "two-tier"
Create ECS-based context
Switch to ECS-based context

Upload Image

- In order to use our container from AWS we need to store it either in DockerHub or the Amazon Elastic Container Registry
  - Other registries exist but we have not tested them
- We will use ECR since we already have a user id on AWS

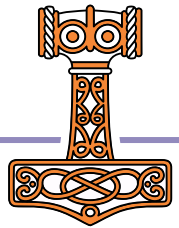



Elastic Container Registry
eu-west-3.console.aws.amazon.com/ecr/create-repository?region=eu-west-3
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
aws Services Search for services, features, blogs, docs, and more [Alt+S] Paris Morten Kromberg
Amazon ECR > Repositories > Create repository
Create repository
This is your user ID
General settings
Visibility settings Info
Choose the visibility setting for the repository.
Private
Access is managed by IAM and repository policy permissions.
Public
Publicly visible and accessible for image pulls.
Repository name
Provide a concise name. A developer should be able to identify the repository contents by the name.
352645159704.dkr.ecr.eu-west-3.amazonaws.com/
0 out of 256 characters maximum (2 minimum). The name must start with a letter and can only contain lowercase letters, numbers, hyphens, underscores, periods and forward slashes.
Tag immutability Info
Enable tag immutability to prevent image tags from being overwritten by subsequent image pushes using the same tag. Disable tag immutability to allow image tags to be overwritten.
Disabled
Once a repository has been created, the visibility setting of the repository can't be changed.
Image scan settings
Deprecation warning
The ScanOnPush configuration at the repository level has been deprecated in favour of registry-level scan filters.
Command Prompt
C:\devt\2022-SP2\two-tier>aws ecr create-repository --repository-name phonebook
{
"repository": {
"repositoryArn": "arn:aws:ecr:eu-west-3:352645159704:repository/phonebook",
"registryId": "352645159704",
"repositoryName": "phonebook",
"repositoryUri": "352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook",
"createdAt": "2022-09-28T18:30:15+02:00",
"imageTagMutability": "MUTABLE",
"imageScanningConfiguration": {
"scanOnPush": false
},
"encryptionConfiguration": {
"encryptionType": "AES256"
}
}
}
C:\devt\2022-SP2\two-tier>
Feedback Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Your user ID goes here

```
C:\devt\2022-SP2\two-tier>aws ecr get-login-password | docker login --username AWS --password-stdin
352645159704.dkr.ecr.eu-west-3.amazonaws.com
Login Succeeded

C:\devt\2022-SP2\two-tier>docker context use default

C:\devt\2022-SP2\two-tier>docker build -t phonebook .

C:\devt\2022-SP2\two-tier>docker tag phonebook 352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook

C:\devt\2022-SP2\two-tier>docker push 352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook
Using default tag: latest
The push refers to repository [352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook]
5f70bf18a086: Pushed
56547f2ee3b0: Pushed
…blablabla…
eb0d9da5f23f: Pushed
09ebdb357ed5: Pushed
latest: digest: sha256:8e98fe2b7827ce2f1be123f567ca7be2d62985587228ddb4a390c5dfb02609e5 size: 3236

C:\devt\2022-SP2\two-tier>
```

(You can edit & run `push.bat` instead of typing the last command above)



Amazon Elastic Container Registry

Private registry
Public registry
Repositories

Getting started
Documentation
Public gallery

Amazon ECR > Repositories

Private | Public

Private repositories (1)

View push commands | Delete | Actions | Create repository

Find repositories

1

Repository name	URI	Created at	Tag immutability	Scan frequency	Encryption type	Pull-through cache
phonebook	352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook	28 September 2022, 18:30:15 (UTC+02)	Disabled	Manual	AES-256	Inactive

Amazon Elastic Container Registry

Private registry
Public registry
Repositories
- Summary
- Images
- Permissions
- Lifecycle Policy
- Repository tags

Getting started
Documentation
Public gallery

Amazon ECR > Repositories > phonebook

phonebook

View push commands | Edit

Images (3)

Delete | Scan

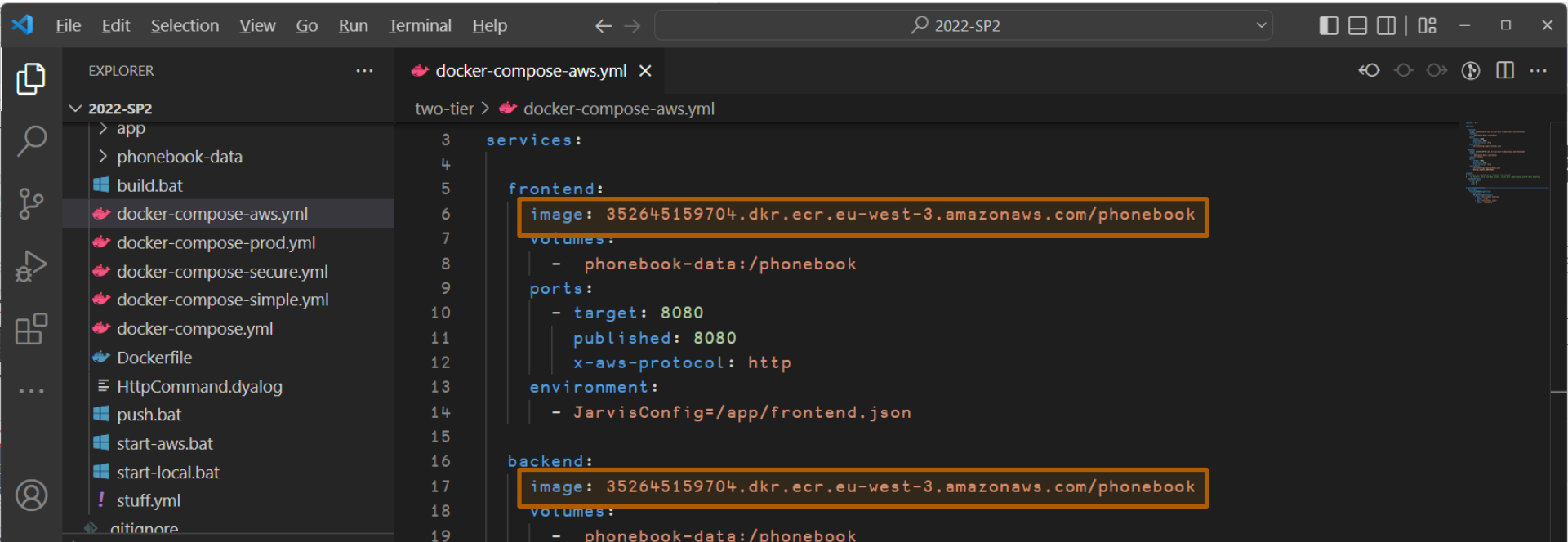
Find images

1

Image tag	Artifact type	Pushed at	Size (MB)	Image URI	Digest	Scan status	Vulnerabilities
latest	Image	01 October 2022, 08:42:27 (UTC+02)	78.42	Copy URI	sha256:027c297e50e714...	-	-
<untagged>	Image	30 September 2022, 21:33:58 (UTC+02)	78.44	Copy URI	sha256:cfa74c2bb646f30...	-	-
<untagged>	Image	28 September 2022, 18:31:00 (UTC+02)	78.25	Copy URI	sha256:7f884e0a2f5a757...	-	-

Ready for take-off?

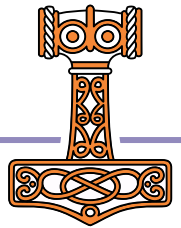
- Edit docker-compose-aws.yml
  - Edit image names to refer to YOUR image



```
C:> docker context use phonebook
C:> docker compose -p phonebook -f docker-compose-aws.yml up
```

Command Prompt

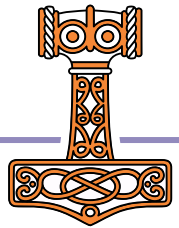
```
C:\devt\2022-SP2\two-tier>docker compose -p phonebook -f docker-compose-aws.yml up
level=warning msg="services.scale: unsupported attribute"
level=warning msg="services.restart: unsupported attribute"
level=warning msg="services.scale: unsupported attribute"
[+] Running 24/24
 - phonebook                                  CreateComplete                199.1s
 - BackendTaskExecutionRole                   CreateComplete                 22.1s
 - Cluster                                    CreateComplete                  6.0s
 - DefaultNetwork                             CreateComplete                  5.0s
 - FrontendTaskExecutionRole                  CreateComplete                 22.1s
 - PhonebookdataAccessPoint                   CreateComplete                  6.0s
 - Frontend8080TargetGroup                    CreateComplete                  2.0s
 - LogGroup                                   CreateComplete                  2.0s
 - CloudMap                                   CreateComplete                 47.1s
 - PhonebookdataNFSMountTargetOnSubnetcb6fe286  CreateC...                   82.0s
 - PhonebookdataNFSMountTargetOnSubnetedfb8396  CreateC...                   97.0s
 - DefaultNetworkIngress                      CreateComplete                  1.0s
 - PhonebookdataNFSMountTargetOnSubnetcccceda5  CreateC...                   82.0s
 - Default8080Ingress                         CreateComplete                  1.0s
 - FrontendTaskRole                           CreateComplete                 23.0s
 - LoadBalancer                               CreateComplete                 92.0s
 - BackendTaskRole                            CreateComplete                 23.0s
 - FrontendTaskDefinition                     CreateComplete                  2.0s
 - BackendTaskDefinition                      CreateComplete                  3.0s
 - FrontendServiceDiscoveryEntry              CreateComplete                  2.0s
 - BackendServiceDiscoveryEntry               CreateComplete                  2.0s
 - Frontend8080Listener                       CreateComplete                  1.9s
 - FrontendService                            CreateComplete                 75.9s
 - BackendService                             CreateComplete                 85.9s

C:\devt\2022-SP2\two-tier>
```

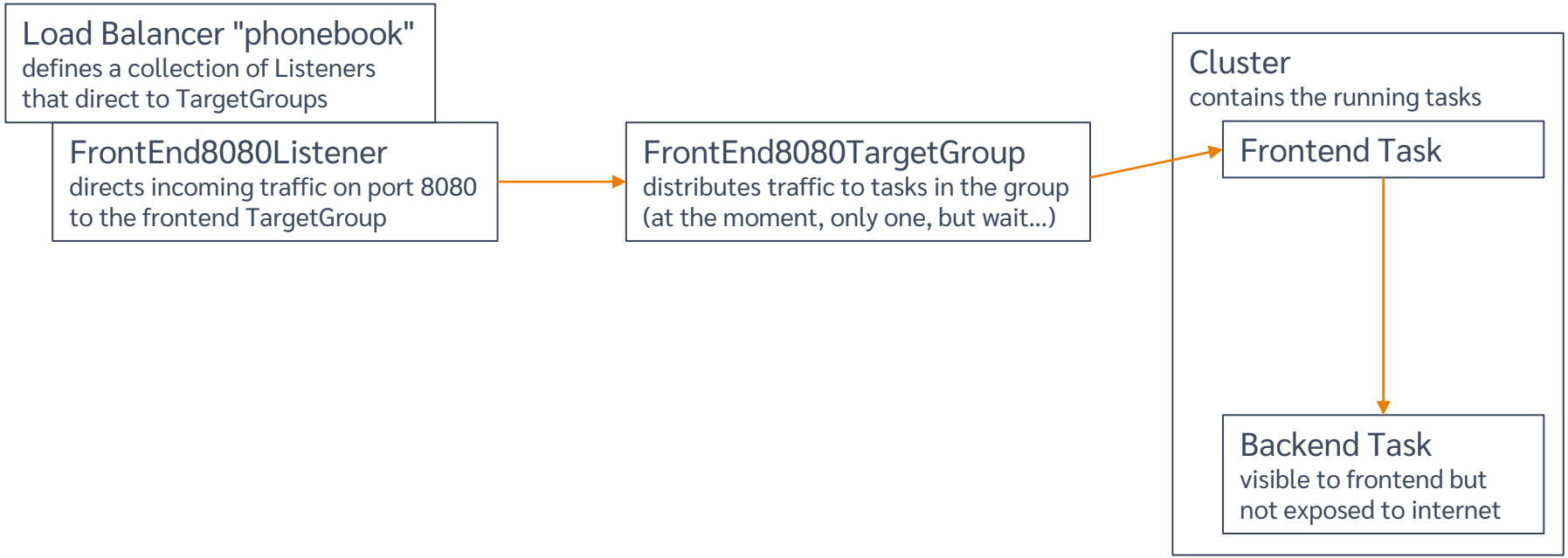



So what just happened??!!

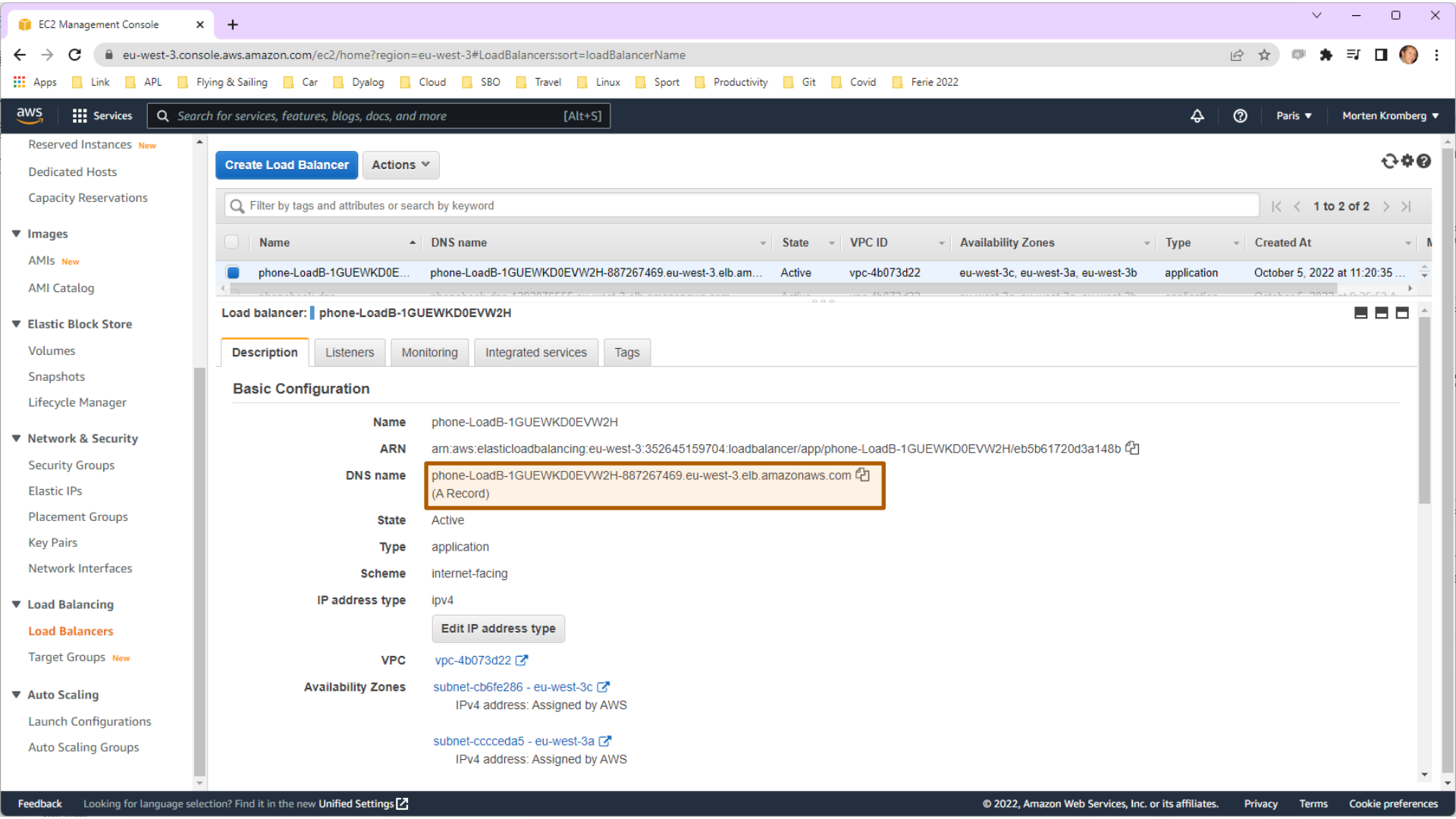
A "CloudFormation Stack" was created...

It contains "Elastic" components that reproduce the networking and process management that docker compose was doing locally





Plus: CloudMap, DefaultNetwork, LogGroup, Roles, "Ingresses" for each Listener,
"ServiceDiscoveryEntry" and "TaskExecutionRoles" for each TargetGroup,
"NFSMountTargets" on each subnet in the region


EC2 Management Console
eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#LoadBalancers:sort=loadBalancerName
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
aws Services Search for services, features, blogs, docs, and more [Alt+S] Paris Morten Kromberg
Reserved Instances New
Dedicated Hosts
Capacity Reservations
Images
AMIs New
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Lifecycle Manager
Network & Security
Security Groups
Elastic IPs
Placement Groups
Key Pairs
Network Interfaces
Load Balancing
Load Balancers
Target Groups New
Auto Scaling
Launch Configurations
Auto Scaling Groups
Create Load Balancer
Actions
Filter by tags and attributes or search by keyword
1 to 2 of 2
Name
DNS name
State
VPC ID
Availability Zones
Type
Created At
phone-LoadB-1GUEWKD0E...
phone-LoadB-1GUEWKD0EVW2H-887267469.eu-west-3.elb.am...
Active
vpc-4b073d22
eu-west-3c, eu-west-3a, eu-west-3b
application
October 5, 2022 at 11:20:35 ...
Load balancer: phone-LoadB-1GUEWKD0EVW2H
Description
Listeners
Monitoring
Integrated services
Tags
Basic Configuration
Name
phone-LoadB-1GUEWKD0EVW2H
ARN
arn:aws:elasticloadbalancing:eu-west-3:352645159704:loadbalancer/app/phone-LoadB-1GUEWKD0EVW2H/eb5b61720d3a148b
DNS name
phone-LoadB-1GUEWKD0EVW2H-887267469.eu-west-3.elb.amazonaws.com
(A Record)
State
Active
Type
application
Scheme
internet-facing
IP address type
ipv4
Edit IP address type
VPC
vpc-4b073d22
Availability Zones
subnet-cb6fe286 - eu-west-3c
IPv4 address: Assigned by AWS
subnet-cccceda5 - eu-west-3a
IPv4 address: Assigned by AWS
Feedback
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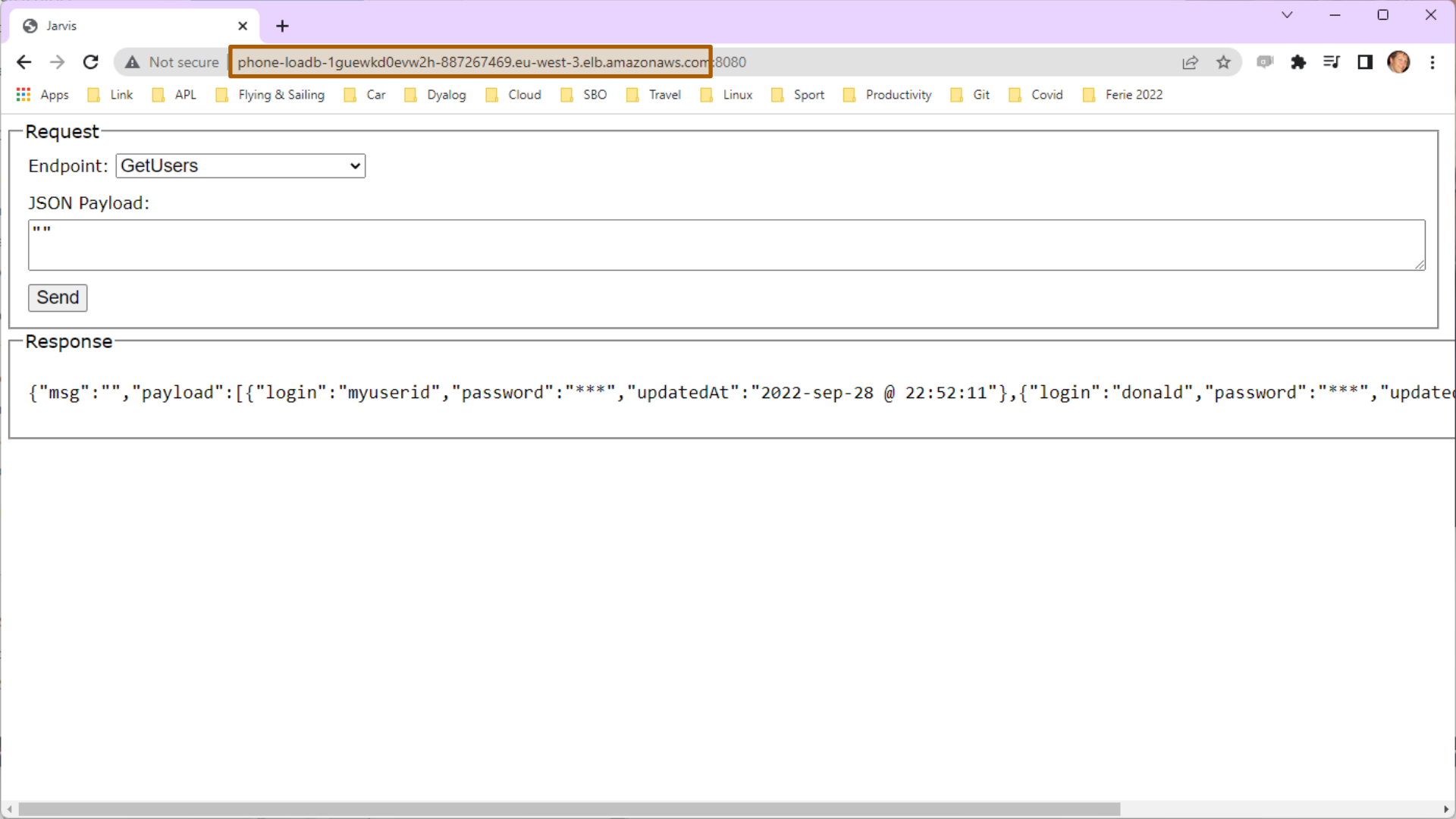
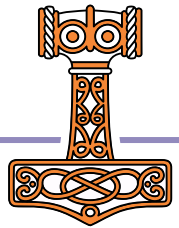
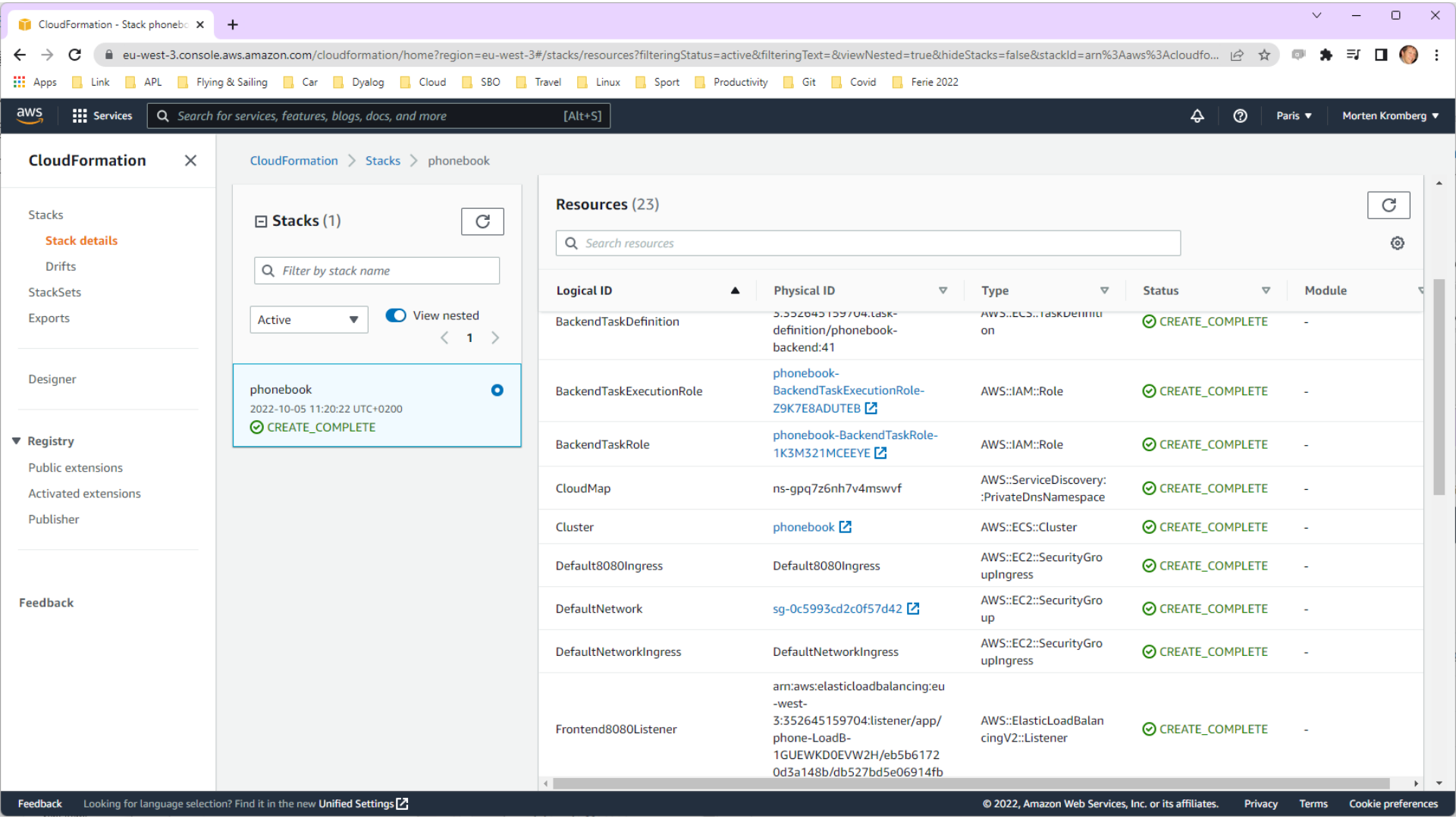

Jarvis
Not secure
phone-loadb-1guewkd0evw2h-887267469.eu-west-3.elb.amazonaws.com:8080
Apps
Link
APL
Flying & Sailing
Car
Dyalog
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Covid
Ferie 2022
Request
Endpoint:
GetUsers
JSON Payload:
""
Send
Response
{"msg":"","payload":[{"login":"myuserid","password":"***","updatedAt":"2022-sep-28 @ 22:52:11"},{"login":"donald","password":"***","update

Let's take a look

- (screen shots of selected artefacts)




CloudFormation - Stack phonebo
eu-west-3.console.aws.amazon.com/cloudformation/home?region=eu-west-3#/stacks/resources?filteringStatus=active&filteringText=&viewNested=true&hideStacks=false&stackId=arn%3Aaws%3Acloudfo...
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
aws Services Search for services, features, blogs, docs, and more [Alt+S] Paris Morten Kromberg
CloudFormation
Stacks
Stack details
Drifts
StackSets
Exports
Designer
Registry
Public extensions
Activated extensions
Publisher
Feedback
CloudFormation > Stacks > phonebook
Stacks (1)
Filter by stack name
Active
View nested
1
phonebook
2022-10-05 11:20:22 UTC+0200
CREATE_COMPLETE
Resources (23)
Search resources
Logical ID
Physical ID
Type
Status
Module
BackendTaskDefinition
3:352645159704:task-definition/phonebook-backend:41
AWS::ECS::TaskDefinition
CREATE_COMPLETE
-
BackendTaskExecutionRole
phonebook-BackendTaskExecutionRole-Z9K7E8ADUTEB
AWS::IAM::Role
CREATE_COMPLETE
-
BackendTaskRole
phonebook-BackendTaskRole-1K3M321MCEEYE
AWS::IAM::Role
CREATE_COMPLETE
-
CloudMap
ns-gpq7z6nh7v4mswvf
AWS::ServiceDiscovery::PrivateDnsNamespace
CREATE_COMPLETE
-
Cluster
phonebook
AWS::ECS::Cluster
CREATE_COMPLETE
-
Default8080Ingress
Default8080Ingress
AWS::EC2::SecurityGroupIngress
CREATE_COMPLETE
-
DefaultNetwork
sg-0c5993cd2c0f57d42
AWS::EC2::SecurityGroup
CREATE_COMPLETE
-
DefaultNetworkIngress
DefaultNetworkIngress
AWS::EC2::SecurityGroupIngress
CREATE_COMPLETE
-
Frontend8080Listener
arn:aws:elasticloadbalancing:eu-west-3:352645159704:listener/app/phone-LoadB-1GUEWKD0EVW2H/eb5b61720d3a148b/db527bd5e06914fb
AWS::ElasticLoadBalancingV2::Listener
CREATE_COMPLETE
-
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CloudFormation

Stacks
Stack details
Drifts
StackSets
Exports

Designer

Registry
Public extensions
Activated extensions
Publisher

Feedback

Stacks (1)

Filter by stack name

Active View nested

1

phonebook
2022-10-05 11:20:22 UTC+0200
CREATE_COMPLETE

phonebook

Delete Update Stack actions Create stack

Stack info | Events | Resources | Outputs | Parameters | Template | Change sets

Template

View in Designer

```
AWSTemplateFormatVersion: 2010-09-09
Resources:
  BackendService:
    DependsOn:
      - PhonebookdataNFSMountTargetOnSubnetcccceda5
      - PhonebookdataNFSMountTargetOnSubnetcb6fe286
      - PhonebookdataNFSMountTargetOnSubnetedfb8396
    Properties:
      Cluster:
        Fn::GetAtt:
          - Cluster
          - Arn
      DeploymentConfiguration:
        MaximumPercent: 200
        MinimumHealthyPercent: 100
      DeploymentController:
        Type: ECS
      DesiredCount: 1
      LaunchType: FARGATE
      NetworkConfiguration:
        AwsvpcConfiguration:
          AssignPublicIp: ENABLED
          SecurityGroups:
            - Ref: DefaultNetwork
          Subnets:
            - subnet-cccceda5
            - subnet-cb6fe286
            - subnet-edfb8396
      PlatformVersion: 1.4.0
      PropagateTags: SERVICE
```


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New ECS Experience
Tell us what you think
Amazon ECS
Clusters
Task Definitions
Account Settings
Amazon ECR
Repositories
AWS Marketplace
Discover software
Subscriptions

Cluster : phonebook

Update Cluster | Delete Cluster

Get a detailed view of the resources on your cluster.

Cluster ARN	arn:aws:ecs:eu-west-3:352645159704:cluster/phonebook
Status	ACTIVE
Registered container instances	0
Pending tasks count	0 Fargate, 0 EC2, 0 External
Running tasks count	2 Fargate, 0 EC2, 0 External
Active service count	2 Fargate, 0 EC2, 0 External
Draining service count	0 Fargate, 0 EC2, 0 External

Services | Tasks | ECS Instances | Metrics | Scheduled Tasks | Tags | Capacity Providers

Create | Update | Delete | Actions

Last updated on October 5, 2022 11:35:38 AM (0m ago)

Filter in this page | Launch type ALL | Service type ALL | 1-2

Service Name	Status	Service type	Task Definition ...	Desired tasks	Running tasks	Launch type	Platform versio...
phonebook-FrontendService-O6bWlyHagzpV	ACTIVE	REPLICA	phonebook-front...	1	1	FARGATE	1.4.0
phonebook-BackendService-t6KVNQJFIUS3	ACTIVE	REPLICA	phonebook-back...	1	1	FARGATE	1.4.0

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Target groups | EC2 Management

eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#TargetGroups:

Apps | Link | APL | Flying & Sailing | Car | Dyalog | Cloud | SBO | Travel | Linux | Sport | Productivity | Git | Covid | Ferie 2022

aws | Services | Search for services, features, blogs, docs, and more [Alt+S] | Paris | Morten Kromberg

- Reserved Instances New
- Dedicated Hosts
- Capacity Reservations
- **Images**
  - AMIs New
  - AMI Catalog
- **Elastic Block Store**
  - Volumes
  - Snapshots
  - Lifecycle Manager
- **Network & Security**
  - Security Groups
  - Elastic IPs
  - Placement Groups
  - Key Pairs
  - Network Interfaces
- **Load Balancing**
  - Load Balancers
  - Target Groups New
- **Auto Scaling**
  - Launch Configurations
  - Auto Scaling Groups

EC2 > Target groups

Target groups (1) Info

Actions | Create target group

Search or filter target groups

1

Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
phone-Front-2MX0AB0RSGDR	arn:aws:elasticl...	8080	HTTP	IP	phone-LoadB-1GUEWKD0EVW2H	vpc-4b073d22

0 target groups selected

Select a target group above.

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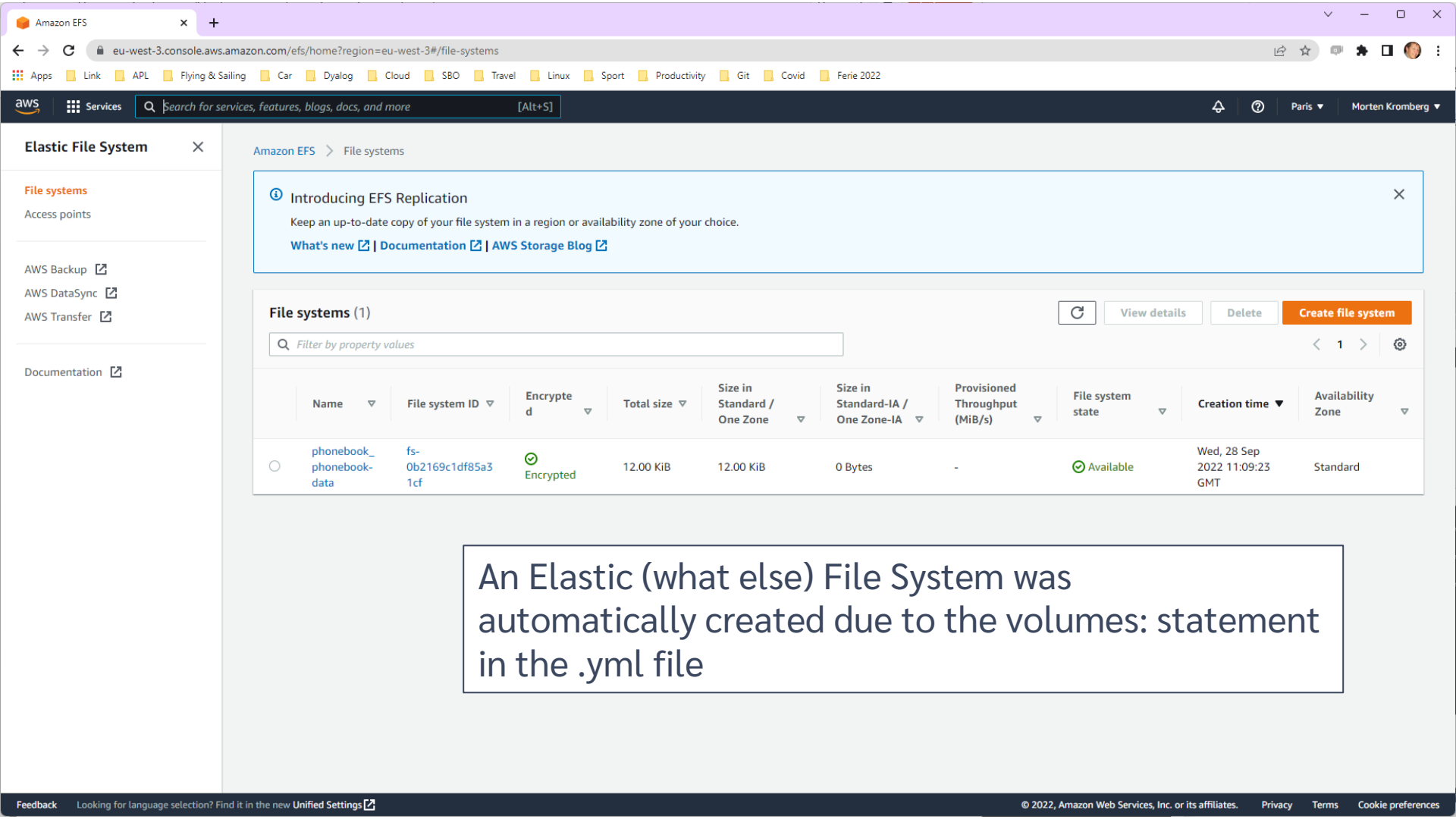
Amazon EFS
eu-west-3.console.aws.amazon.com/efs/home?region=eu-west-3#/file-systems
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid Ferie 2022
aws Services Search for services, features, blogs, docs, and more [Alt+S] Paris Morten Kromberg
Elastic File System
File systems
Access points
AWS Backup
AWS DataSync
AWS Transfer
Documentation
Amazon EFS > File systems
Introducing EFS Replication
Keep an up-to-date copy of your file system in a region or availability zone of your choice.
What's new | Documentation | AWS Storage Blog
File systems (1)
View details Delete Create file system
Filter by property values
1
Name File system ID Encrypted Total size Size in Standard / One Zone Size in Standard-IA / One Zone-IA Provisioned Throughput (MiB/s) File system state Creation time Availability Zone
phonebook_phonebook-data fs-0b2169c1df85a31cf Encrypted 12.00 KiB 12.00 KiB 0 Bytes - Available Wed, 28 Sep 2022 11:09:23 GMT Standard
An Elastic (what else) File System was automatically created due to the volumes: statement in the .yml file
Feedback Looking for language selection? Find it in the new Unified Settings
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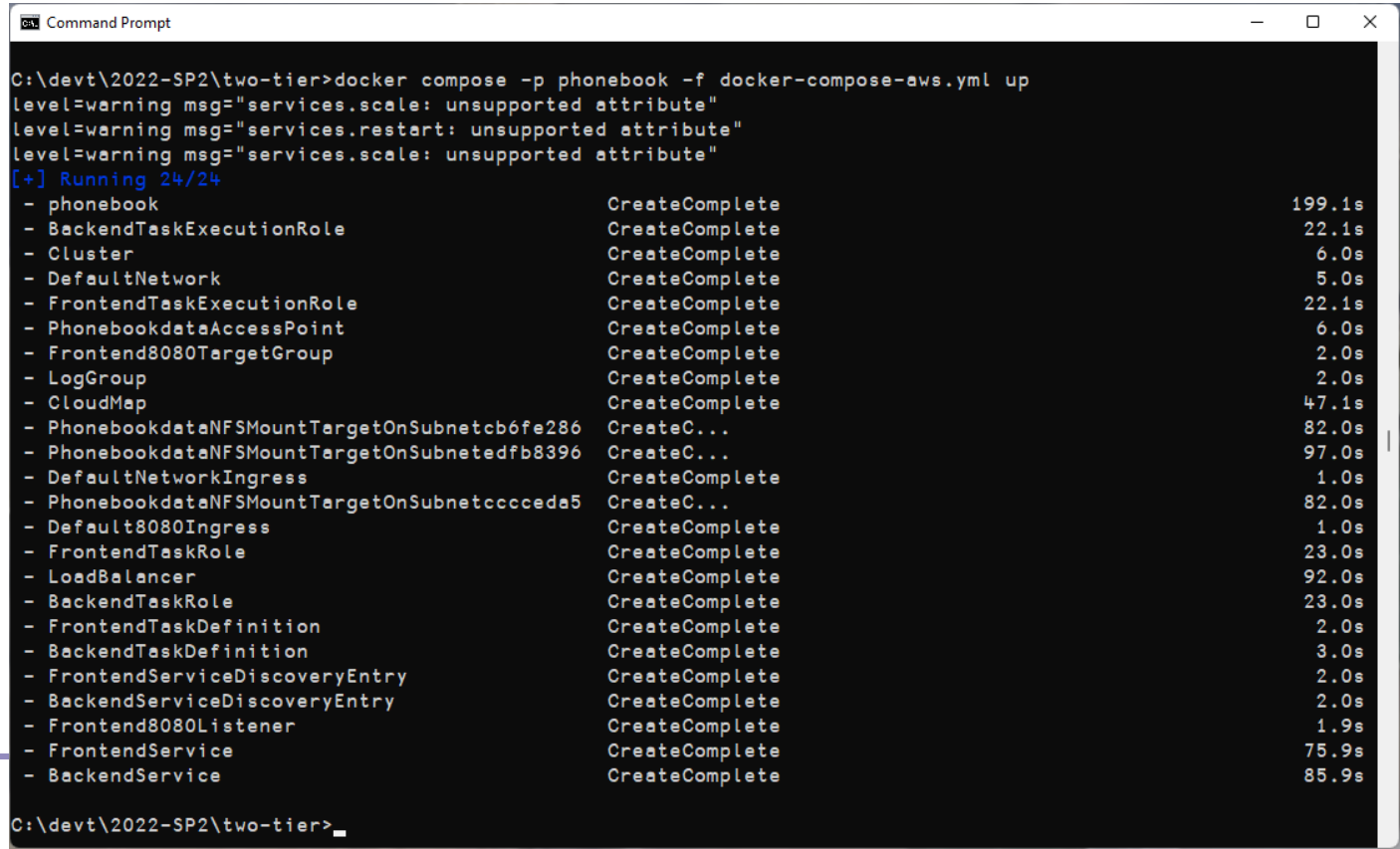
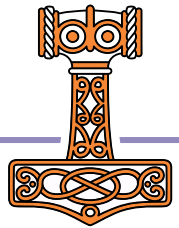
We can see them all here...

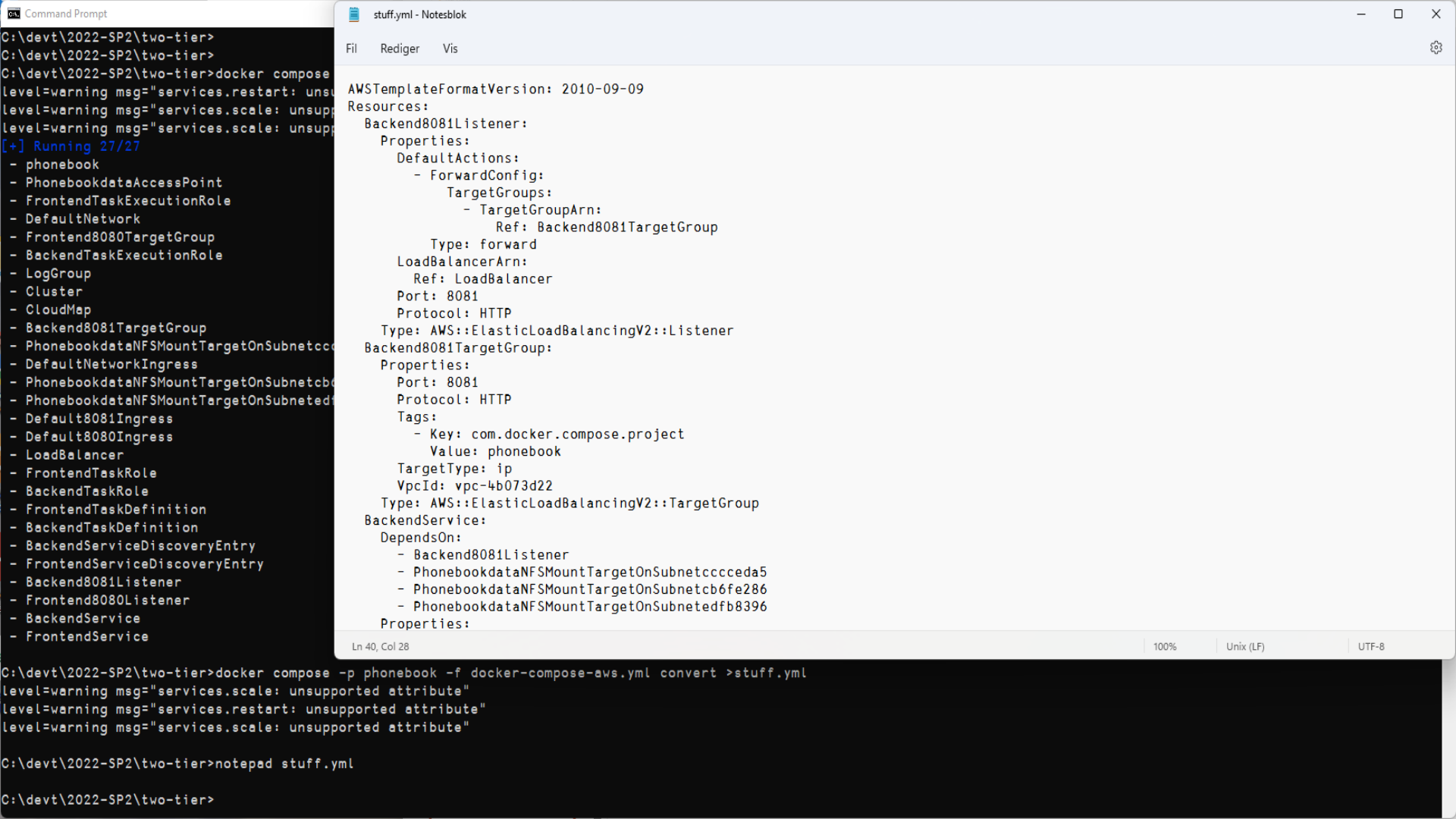


docker compose … convert

```
docker compose … convert >file.yml
```

… will create the CloudFormation YML for you to view
(and edit, once you do another week of reading)




Command Prompt
C:\devt\2022-SP2\two-tier>
C:\devt\2022-SP2\two-tier>
C:\devt\2022-SP2\two-tier>docker compose
level=warning msg="services.restart: unsu
level=warning msg="services.scale: unsupp
level=warning msg="services.scale: unsupp
[+] Running 27/27
- phonebook
- PhonebookdataAccessPoint
- FrontendTaskExecutionRole
- DefaultNetwork
- Frontend8080TargetGroup
- BackendTaskExecutionRole
- LogGroup
- Cluster
- CloudMap
- Backend8081TargetGroup
- PhonebookdataNFSMountTargetOnSubnetcc
- DefaultNetworkIngress
- PhonebookdataNFSMountTargetOnSubnetcb
- PhonebookdataNFSMountTargetOnSubnetedf
- Default8081Ingress
- Default8080Ingress
- LoadBalancer
- FrontendTaskRole
- BackendTaskRole
- FrontendTaskDefinition
- BackendTaskDefinition
- BackendServiceDiscoveryEntry
- FrontendServiceDiscoveryEntry
- Backend8081Listener
- Frontend8080Listener
- BackendService
- FrontendService
stuff.yml - Notesblok
Fil
Rediger
Vis
AWSTemplateFormatVersion: 2010-09-09
Resources:
Backend8081Listener:
Properties:
DefaultActions:
- ForwardConfig:
TargetGroups:
- TargetGroupArn:
Ref: Backend8081TargetGroup
Type: forward
LoadBalancerArn:
Ref: LoadBalancer
Port: 8081
Protocol: HTTP
Type: AWS::ElasticLoadBalancingV2::Listener
Backend8081TargetGroup:
Properties:
Port: 8081
Protocol: HTTP
Tags:
- Key: com.docker.compose.project
Value: phonebook
TargetType: ip
VpcId: vpc-4b073d22
Type: AWS::ElasticLoadBalancingV2::TargetGroup
BackendService:
DependsOn:
- Backend8081Listener
- PhonebookdataNFSMountTargetOnSubnetcccceda5
- PhonebookdataNFSMountTargetOnSubnetcb6fe286
- PhonebookdataNFSMountTargetOnSubnetedfb8396
Properties:
Ln 40, Col 28
100%
Unix (LF)
UTF-8
C:\devt\2022-SP2\two-tier>docker compose -p phonebook -f docker-compose-aws.yml convert >stuff.yml
level=warning msg="services.scale: unsupported attribute"
level=warning msg="services.restart: unsupported attribute"
level=warning msg="services.scale: unsupported attribute"
C:\devt\2022-SP2\two-tier>notepad stuff.yml
C:\devt\2022-SP2\two-tier>

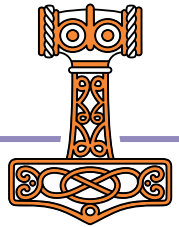
Tidying up a bit

- So far, we have been using two YML files
  - docker-compose-local.yml
  - docker-compose-aws.yml

```yaml
services:
  frontend:
    image: phonebook
    volumes:
      - ./phonebook-data:/phonebook
```

```yaml
services:

  frontend:
    image: 352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook
    volumes:
      - phonebook-data:/phonebook      You, 4 days ago • More cle
```

- It would be easier to maintain a single YML file



One .YML File → two .BAT files

start-local.bat - Notesblok

Fil Rediger Vis

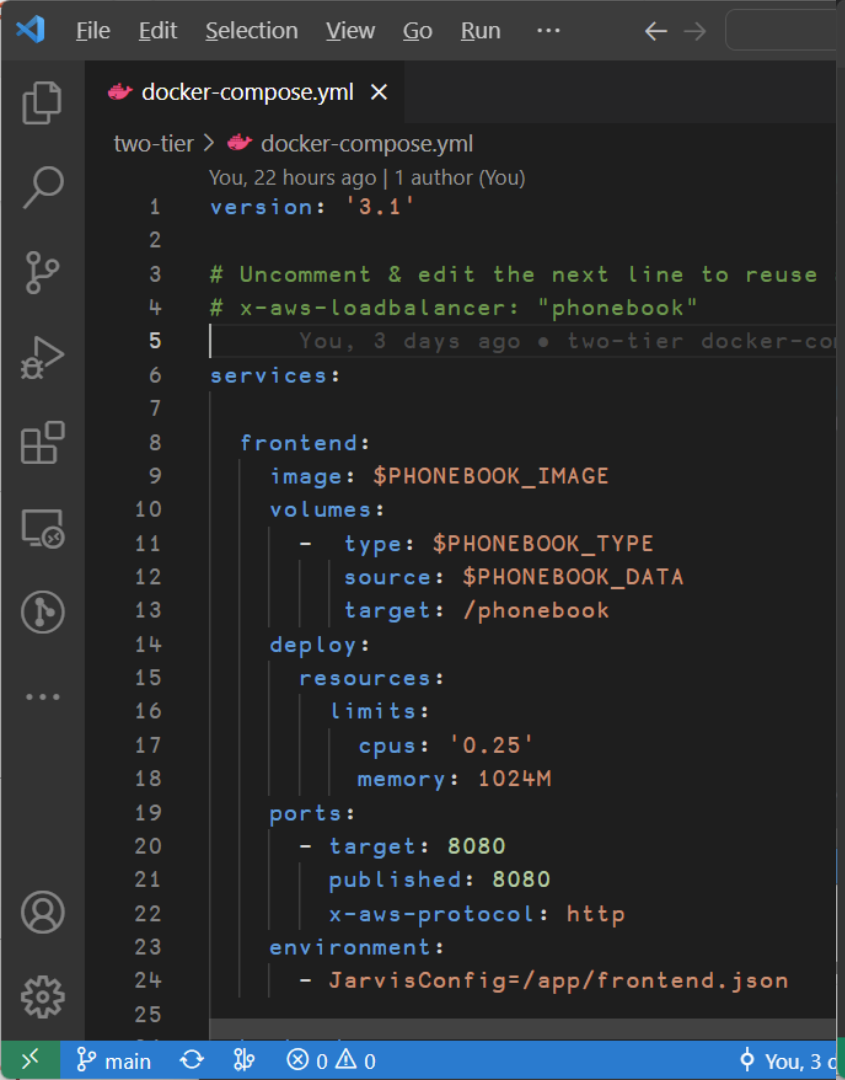
```
SET PHONEBOOK_IMAGE=phonebook
SET PHONEBOOK_TYPE=bind
SET PHONEBOOK_DATA=./phonebook-data
docker context use default
docker compose -p phonebook up
```

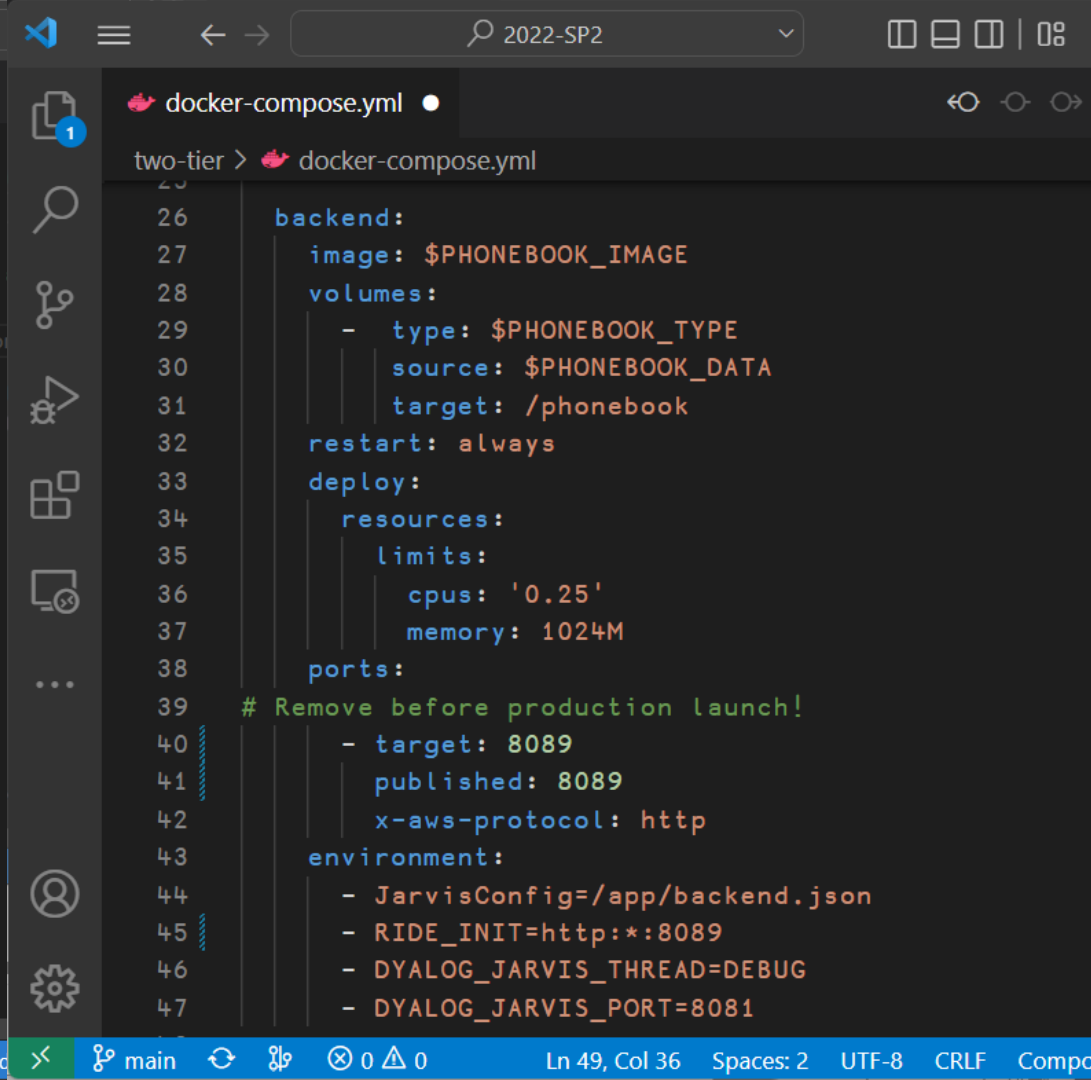
start-aws.bat - Notesblok

Fil Rediger Vis

```
SET PHONEBOOK_IMAGE=352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook
SET PHONEBOOK_TYPE=volume
SET PHONEBOOK_DATA=phonebook-data
SET AWS_ID=352645159704.dkr.ecr.eu-west-3.amazonaws.com

aws ecr get-login-password --region eu-west-3 | docker login --username AWS --password-stdin %AWS_ID%
docker context use phonebook
docker compose -p phonebook up --scale frontend=2
```

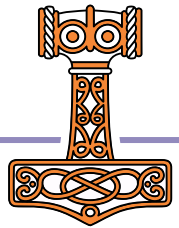
Ln 1, Col 1 100% Windows (CRLF) UTF-8


File Edit Selection View Go Run ···
docker-compose.yml
two-tier > docker-compose.yml
You, 22 hours ago | 1 author (You)
version: '3.1'
Uncomment & edit the next line to reuse
x-aws-loadbalancer: "phonebook"
You, 3 days ago • two-tier docker-co
services:
frontend:
image: $PHONEBOOK_IMAGE
volumes:
- type: $PHONEBOOK_TYPE
source: $PHONEBOOK_DATA
target: /phonebook
deploy:
resources:
limits:
cpus: '0.25'
memory: 1024M
ports:
- target: 8080
published: 8080
x-aws-protocol: http
environment:
- JarvisConfig=/app/frontend.json
main
0 0
You, 3 d


2022-SP2
docker-compose.yml
two-tier > docker-compose.yml
backend:
image: $PHONEBOOK_IMAGE
volumes:
- type: $PHONEBOOK_TYPE
source: $PHONEBOOK_DATA
target: /phonebook
restart: always
deploy:
resources:
limits:
cpus: '0.25'
memory: 1024M
ports:
Remove before production launch!
- target: 8089
published: 8089
x-aws-protocol: http
environment:
- JarvisConfig=/app/backend.json
- RIDE_INIT=http:*:8089
- DYALOG_JARVIS_THREAD=DEBUG
- DYALOG_JARVIS_PORT=8081
main
0 0
Ln 49, Col 36
Spaces: 2
UTF-8
CRLF
Compo

CloudFormation "Overlays"

- AWS ECS has features that docker-compose does not support directly
- We can add "overlays" that will modify the CloudFormation before it is uploaded



docker-compose.yml ●

two-tier > docker-compose.yml

```
57  volumes:
58  # This will be created as an "Elastic File System"
59  #    by default, only root has access, so we will impersonate user 0 when mounting
60    phonebook-data:
61      driver_opts:
62        uid: 0
63        gid: 0
64
65  x-aws-cloudformation:
66    Resources:
67      Frontend8080TargetGroup:
68        Properties:
69          TargetGroupAttributes:
70            - Key: "stickiness.enabled"
71              Value: "true"
72            - Key: "stickiness.type"
73              Value: "lb_cookie"
74      Backend8089TargetGroup:        You, 1 second ago • Uncommitted changes
75      # Redirect health checks to Jarvis and reduce frequency to minimum
76        Properties:
77          HealthCheckPort: 8081
78          HealthCheckIntervalSeconds: 300
79          HealthyThresholdCount: 10
80
```

This is not an overlay, but needed because volumes are created with root as user. This section states that we will access the file system as if we were user 0 (root).

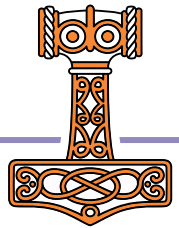
Make load balancing "sticky": direct all requests from same client to the same server process.

(Uses cookies, allows some server-side state)

The interpreter does not respond to "Health Checks" on the RIDE port, so the backend will be recucled after (3×30=90) seconds unless we add this

Using your own Domain Name

- At the moment, everything is re-created on each "docker compose ... up"
- The DNS address is different each time
- To resolve this, we must use the same "Load Balancer" each time
- If we create a load balancer, we can instruct docker compose to use it...



Creating a Permanent Load Balancer

C:\devt\2022-SP2\two-tier\MakeLoadBalancer.aplf

File Edit View Help

```
[0]     MakeLoadBalancer;folder;sg;file;r;ig;z;range;perm;subnets;cmd;gid;dns;name;getstderr;SH;PutJSON
[1]   ⍝ Create a "Permanent" Load Balancer and Security Group suitable for fixed IP Phonebook
[2]
[3]     folder←'C:\devt\2022-SP2\two-tier\cli-cmds\'
[4]     getstderr←' 2>&1 || echo "PROBLEM:$?"'
[5]
[6]     SH←{z←⎕CMD ⍵,getstderr
[7]       s←(⍷z) ⎕SIGNAL ('"PROBLEM:'≡9↑⊃⌽z)/11
[8]       ⍷z}
[9]     PutJSON←{(⎕JSON⍠'Compact' 0⊢⍺) ⎕NPUT ⍵ 1} ⍝ Pretty-printed, overwrite if file exists
[10]
[11]    ⍝ --- Create a Security Group ---
[12]    sg←⎕NS''
[13]    sg.(Description GroupName)←'Phonebook Access' 'Phonebook-dns'
[14]    sg PutJSON file←folder,'sg-spec.json'
[15]    r←SH'aws ec2 create-security-group --output json --cli-input-yaml file://',file,getstderr
[16]    gid←(⎕JSON ⍷r).GroupId ⍝ Our new group id
[17]    ⎕NDELETE file
[18]    ⎕←'Created Security group "',gid,'"'
[19]
[20]    ⍝ --- Add an "Ingress" for ports 8080-8088 to the security Group ---
[21]    (range←⎕NS '').(CidrIp Description)←'0.0.0.0/0' 'Allow Jarvis Traffic'
[22]    (perm←⎕NS '').(FromPort ToPort IpProtocol IpRanges)←8080 8088 'tcp' (,range)
[23]    ig←⎕NS''
[24]    ig.GroupId←gid ⍝ The one we just created
[25]    ig.IpPermissions←,perm
[26]    ig PutJSON file←folder,'ig-spec.json'
[27]    r←SH'aws ec2 authorize-security-group-ingress --output json --cli-input-yaml file://',file
[28]    ⎕NDELETE file
[29]
[30]    ⍝ --- Add an "Ingress" for port 443 (HTTPS) ---
[31]    perm.(FromPort ToPort)←443 443
[32]    ig PutJSON file←folder,'ig-spec.json'
[33]    r←SH'aws ec2 authorize-security-group-ingress --output json --cli-input-yaml file://',file
[34]    ⎕NDELETE file
[35]
[36]    ⍝ --- Finally, create a load balancer ---
[37]    subnets←(⎕JSON ⍷⎕CMD 'aws ec2 describe-subnets --no-paginate').Subnets.SubnetId
[38]
[39]    cmd←'aws elbv2 create-load-balancer --name phonebook-dns '
[40]    cmd,←' --scheme internet-facing --type application'
[41]    cmd,←' --security-groups ',gid
[42]    cmd,←' --subnets',⍕subnets
[43]
[44]    r←SH cmd
[45]    (name dns)←(⎕JSON ⍷r).(⊃LoadBalancers).(LoadBalancerName DNSName)
[46]    ⎕←'Created load balancer ',name
[47]    ⎕←'    DNSName is ',dns
```

Function | Last saved by: | Pos: 0/48,1

CLEAR WS - Dyalog APL/W-64

File Edit View Window Session Log Action Options Tools Threads Help

Language Bar

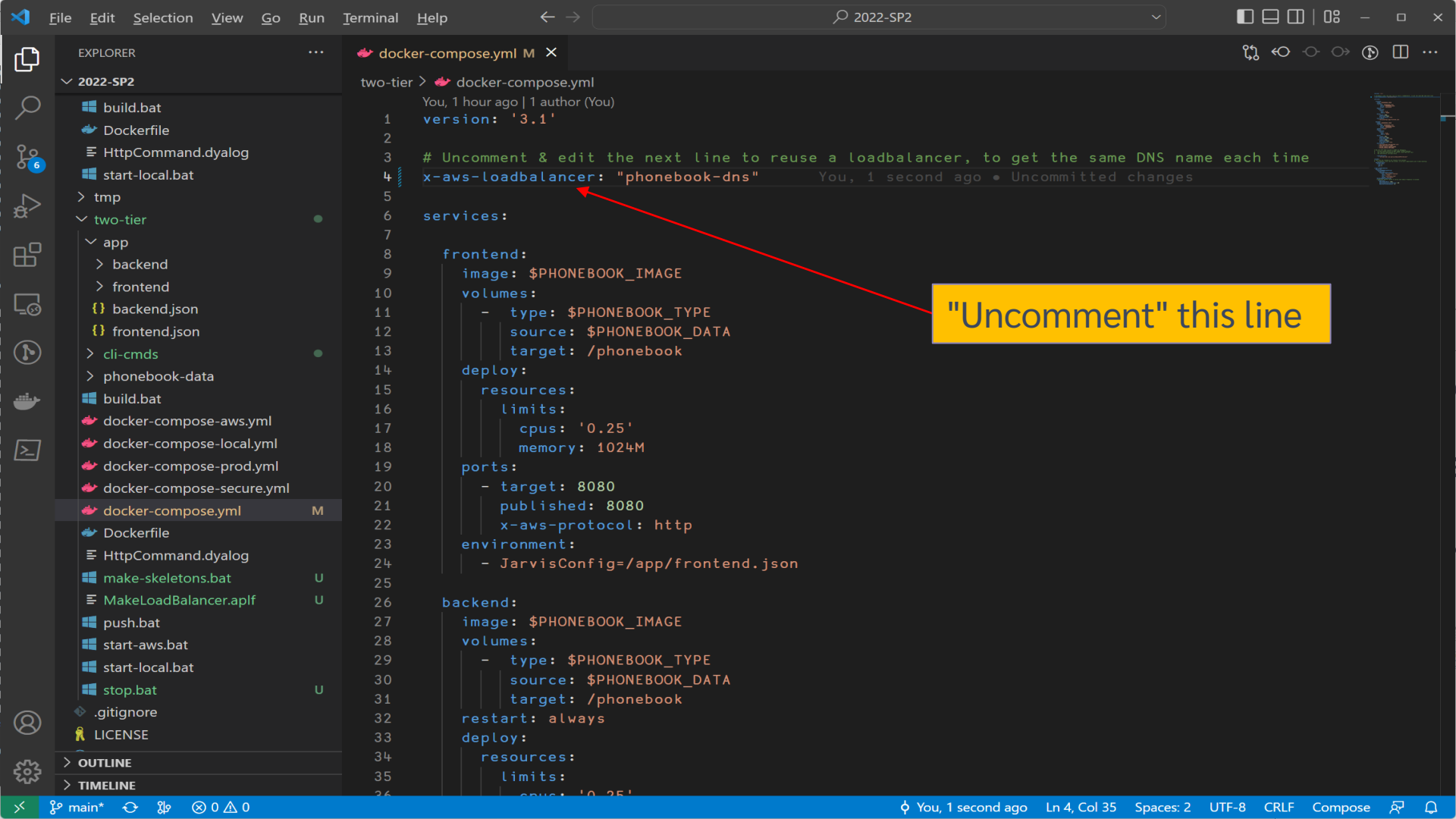
```
      MakeLoadBalancer
Created Security group "sg-0e51aa1d61ff783b6"
Created load balancer phonebook-dns
   DNSName is phonebook-dns-509436610.eu-west-3.elb.amazonaws.com
```

Debugger

Ready... Ins

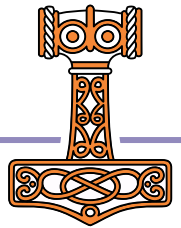
CurObj: c (Undefined) | &:1 | ⎕DQ:0 | ⎕TRAP | ⎕SI:0

Dep


File Edit Selection View Go Run Terminal Help
2022-SP2
EXPLORER
2022-SP2
build.bat
Dockerfile
HttpCommand.dyalog
start-local.bat
tmp
two-tier
app
backend
frontend
backend.json
frontend.json
cli-cmds
phonebook-data
build.bat
docker-compose-aws.yml
docker-compose-local.yml
docker-compose-prod.yml
docker-compose-secure.yml
docker-compose.yml M
Dockerfile
HttpCommand.dyalog
make-skeletons.bat U
MakeLoadBalancer.aplf U
push.bat
start-aws.bat
start-local.bat
stop.bat U
.gitignore
LICENSE
OUTLINE
TIMELINE
docker-compose.yml M
two-tier > docker-compose.yml
You, 1 hour ago | 1 author (You)
version: '3.1'
Uncomment & edit the next line to reuse a loadbalancer, to get the same DNS name each time
x-aws-loadbalancer: "phonebook-dns" You, 1 second ago • Uncommitted changes
services:
frontend:
image: $PHONEBOOK_IMAGE
volumes:
- type: $PHONEBOOK_TYPE
source: $PHONEBOOK_DATA
target: /phonebook
deploy:
resources:
limits:
cpus: '0.25'
memory: 1024M
ports:
- target: 8080
published: 8080
x-aws-protocol: http
environment:
- JarvisConfig=/app/frontend.json
backend:
image: $PHONEBOOK_IMAGE
volumes:
- type: $PHONEBOOK_TYPE
source: $PHONEBOOK_DATA
target: /phonebook
restart: always
deploy:
resources:
limits:
"Uncomment" this line
main*
0 0
You, 1 second ago
Ln 4, Col 35
Spaces: 2
UTF-8
CRLF
Compose

Command Prompt

```
C:\devt\2022-SP2\two-tier>start-aws

C:\devt\2022-SP2\two-tier>SET PHONEBOOK_IMAGE=352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook

C:\devt\2022-SP2\two-tier>SET PHONEBOOK_TYPE=volume

C:\devt\2022-SP2\two-tier>SET PHONEBOOK_DATA=phonebook-data

C:\devt\2022-SP2\two-tier>SET AWS_ID=352645159704.dkr.ecr.eu-west-3.amazonaws.com

C:\devt\2022-SP2\two-tier>aws ecr get-login-password --region eu-west-3   | docker login --username AWS --pass
word-stdin 352645159704.dkr.ecr.eu-west-3.amazonaws.com
Login Succeeded

C:\devt\2022-SP2\two-tier>docker context use phonebook
phonebook

C:\devt\2022-SP2\two-tier>docker compose -p phonebook up --scale frontend=2
level=warning msg="services.scale: unsupported attribute"
level=warning msg="services.restart: unsupported attribute"
level=warning msg="services.scale: unsupported attribute"
[+] Running 26/26
 - phonebook                                  CreateComplete                                197.1s
 - Backend8088TargetGroup                     CreateComplete                                  1.0s
 - FrontendTaskExecutionRole                  CreateComplete                                 22.1s
 - CloudMap                                   CreateComplete                                 47.1s
 - BackendTaskExecutionRole                   CreateComplete                                 22.1s
 - Frontend8080TargetGroup                    CreateComplete                                  2.0s
 - Cluster                                    CreateComplete                                  6.0s
 - LogGroup                                   CreateComplete                                  2.0s
 - DefaultNetwork                             CreateComplete                                  6.0s
 - PhonebookdataAccessPoint                   CreateComplete                                 21.0s
 - Backend8088Listener                        CreateComplete                                  2.0s
 - Frontend8080Listener                       CreateComplete                                  3.0s
 - PhonebookdataNFSMountTargetOnSubnetcb6fe286  CreateC...                                   95.0s
 - PhonebookdataNFSMountTargetOnSubnetedfb8396  CreateC...                                   96.1s
 - Default8088Ingress                         CreateComplete                                  1.0s
 - Default8080Ingress                         CreateComplete                                  1.0s
 - PhonebookdataNFSMountTargetOnSubnetcccceda5  CreateC...                                   82.0s
 - DefaultNetworkIngress                      CreateComplete                                  1.0s
 - FrontendTaskRole                           CreateComplete                                 22.0s
 - BackendTaskRole                            CreateComplete                                 23.0s
 - FrontendTaskDefinition                     CreateComplete                                  4.0s
 - BackendServiceDiscoveryEntry               CreateComplete                                  2.0s
 - BackendTaskDefinition                      CreateComplete                                  3.0s
 - FrontendServiceDiscoveryEntry              CreateComplete                                  2.0s
 - BackendService                             CreateComplete                                 85.8s
 - FrontendService                            CreateComplete                                 85.8s

C:\devt\2022-SP2\two-tier>
```

Scaling the Frontend

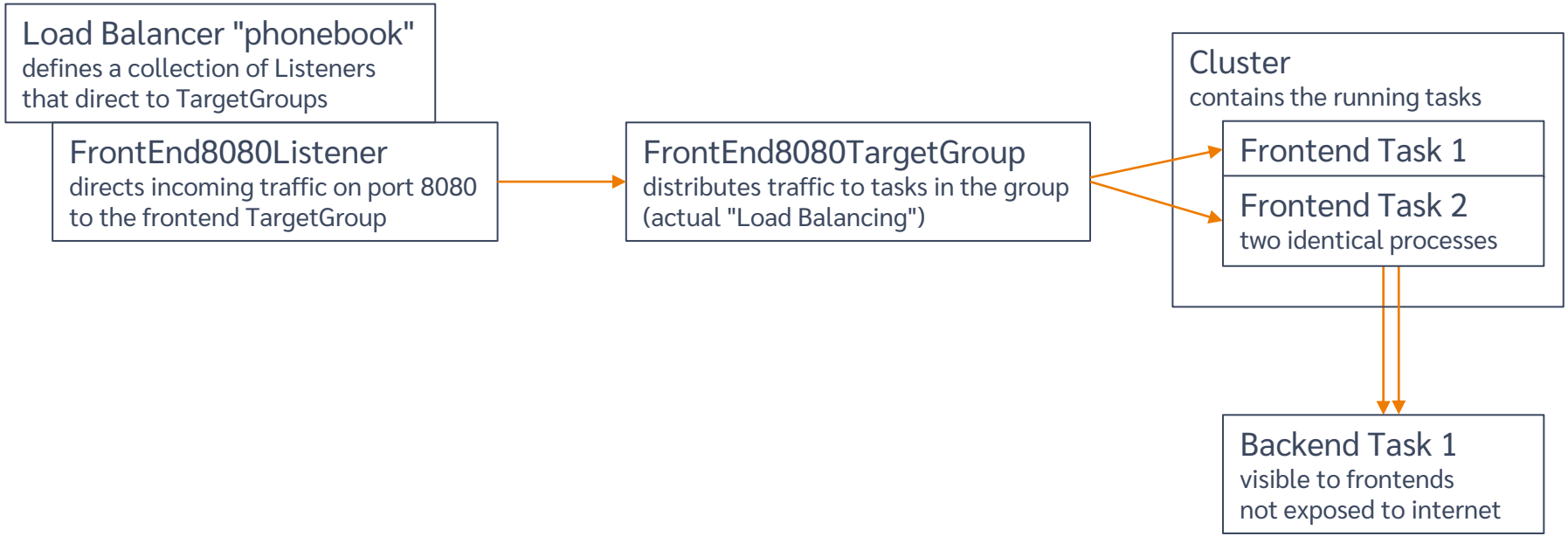
- The --scale switch instructs docker compose to run a specific number of copies of a service
- The docker compose command can be repeated to change the scale **while the system is running**

start-aws.bat - Notesblok

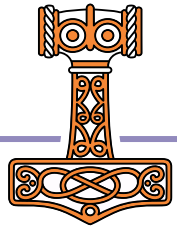
Fil Rediger Vis

```
SET PHONEBOOK_IMAGE=352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook
SET PHONEBOOK_TYPE=volume
SET PHONEBOOK_DATA=phonebook-data
SET AWS_ID=352645159704.dkr.ecr.eu-west-3.amazonaws.com

aws ecr get-login-password --region eu-west-3 | docker login --username AWS --password-stdin %AWS_ID%
docker context use phonebook
docker compose -p phonebook up --scale frontend=2
```

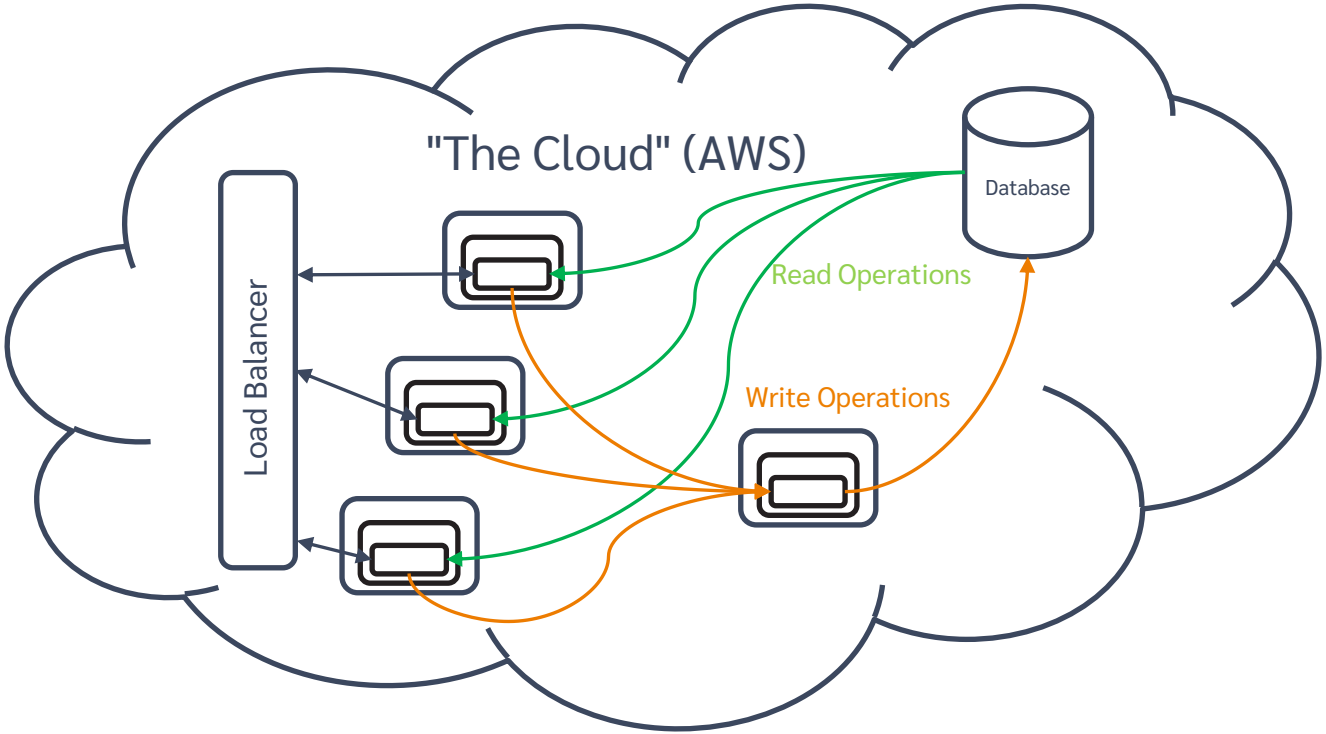
Ln 1, Col 1 100% Windows (CRLF) UTF-8

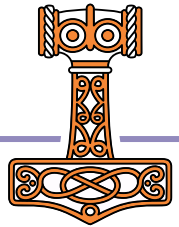


Plus: CloudMap, DefaultNetwork, LogGroup, Roles, "Ingresses" for each Listener,
"ServiceDiscoveryEntry" and "TaskExecutionRoles" for each TargetGroup,
"NFSMountTargets" on each subnet in the region



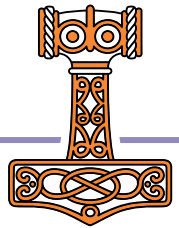
Load balance it





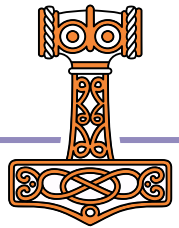
Sticky Sessions

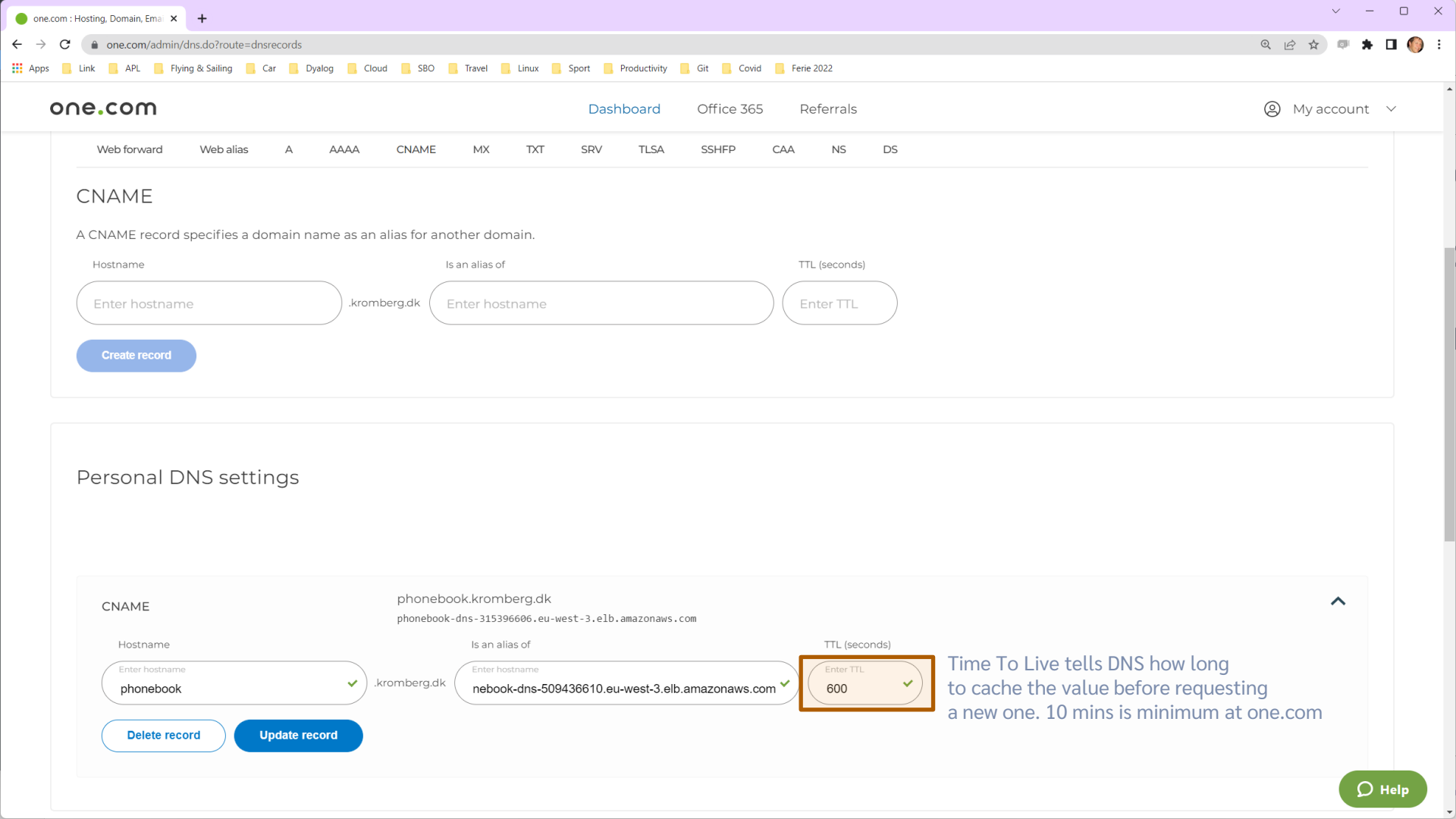
- Remember that, thanks to the sticky session overlay, each client will always be directed to the same frontend process



Set up Domain Redirection

- So, now our address is the same each time, but
  http://phone-loadb-1guewkd0evw2h-887267469.eu-west-3.elb.amazonaws.com
  ...is a bit of a mouthful
- How about phonebook.myco.com?
- This requires you to register your own domain, and have an ISP that allows you to do redirection
- Morten is using one.com




one.com : Hosting, Domain, Ema
one.com/admin/dns.do?route=dnsrecords
Apps
Link
APL
Flying & Sailing
Car
Dyalog
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Covid
Ferie 2022
one.com
Dashboard
Office 365
Referrals
My account
Web forward
Web alias
A
AAAA
CNAME
MX
TXT
SRV
TLSA
SSHFP
CAA
NS
DS
CNAME
A CNAME record specifies a domain name as an alias for another domain.
Hostname
Is an alias of
TTL (seconds)
Enter hostname
.kromberg.dk
Enter hostname
Enter TTL
Create record
Personal DNS settings
CNAME
phonebook.kromberg.dk
phonebook-dns-315396606.eu-west-3.elb.amazonaws.com
Hostname
Is an alias of
TTL (seconds)
Enter hostname
phonebook
.kromberg.dk
Enter hostname
nebook-dns-509436610.eu-west-3.elb.amazonaws.com
Enter TTL
600
Time To Live tells DNS how long
to cache the value before requesting
a new one. 10 mins is minimum at one.com
Delete record
Update record
Help

What is DNS TTL + Best Practices
varonis.com/blog/dns-ttl#:~:text=DNS%20TTL%20(time%20to%20live,to%20collect%20new%2C%20updated%20details.
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We're Varonis.

We've been keeping the world's most valuable data out of enemy hands since 2005 with our market-leading data security platform.

How it works →

What are typical TTL times for DNS records?

TTL times are always represented in seconds; for example, 300 seconds equals 5 minutes to live. The following TTL times will give you a rough estimate of what typically is set in DNS configuration:

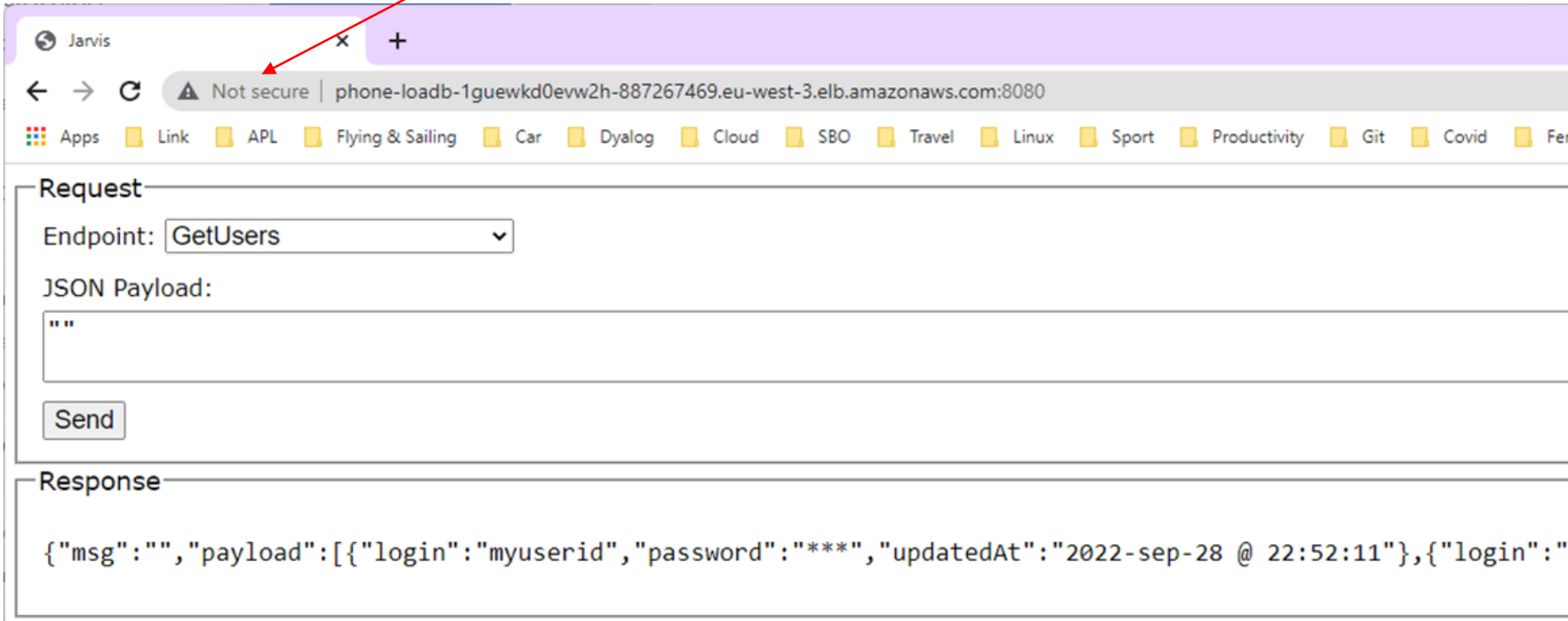
300 seconds = 5 minutes = "Very Short" – Websites within this timeframe use a low TTL focus to make fast changes but still can utilize some level of caching to help reduce resource consumption.

3600 seconds = 1 hour = "Short" – Websites within this timeframe use a low TTL focus to make fast changes but still can utilize some level of caching to help reduce resource consumption.

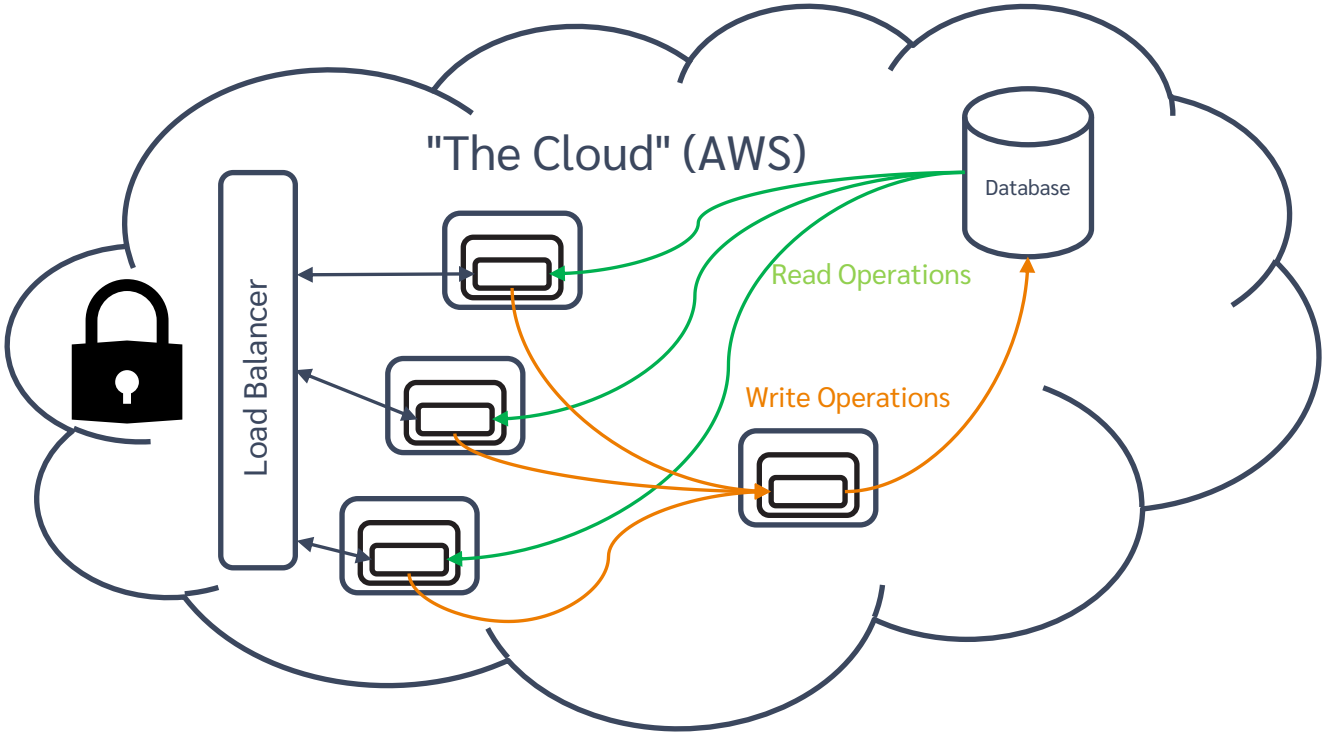
86400 seconds = 24 hours = "Long" – The opposite applies for websites using a 24 hour TTL as the focus shifts more towards a daily cache utilization.

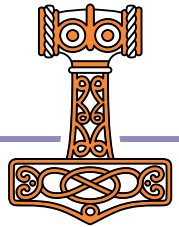
604800 seconds = 7 days = "Very long" – Weekly TTLs are not as common, but may be used for sites that contain publish or reputable information that does not change all that often (ex. Library resources, reference sites, etc.)

One Final Challenge



Secure it

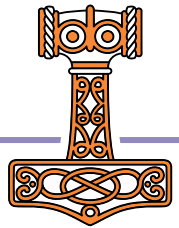

"The Cloud" (AWS)
Load Balancer
Database
Read Operations
Write Operations

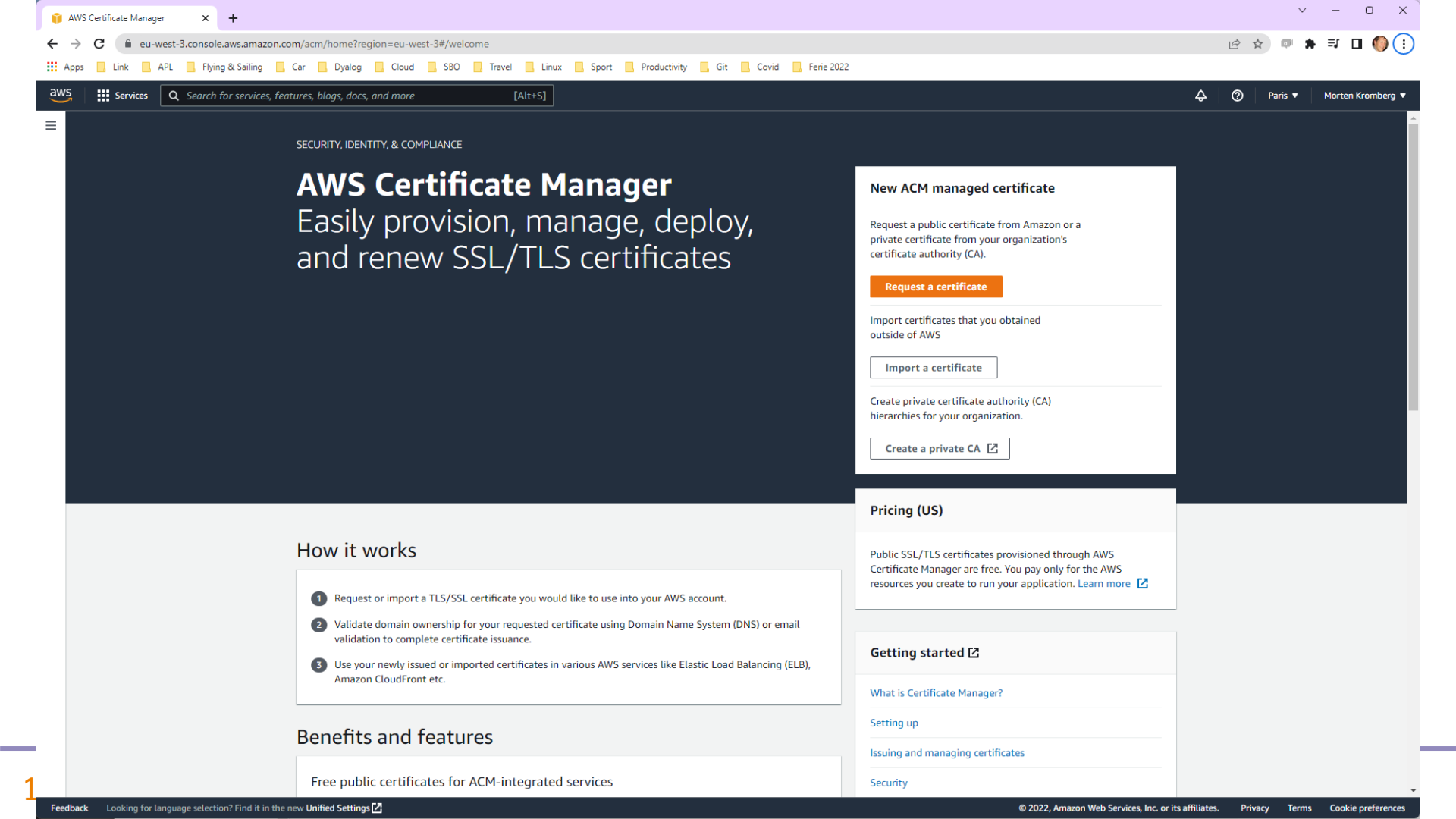


Securing the Service

Steps:

- Get hold of a certificate
  - We will get one from the AWS Certificate Manager
- ACM will ask us to add another CNAME redirection and test it to verify that we are in control of the domain
- Finally, we must add a listener on port 443 which redirects to 8080 (the frontend)




AWS Certificate Manager
eu-west-3.console.aws.amazon.com/acm/home?region=eu-west-3#/welcome
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SECURITY, IDENTITY, & COMPLIANCE
AWS Certificate Manager
Easily provision, manage, deploy, and renew SSL/TLS certificates
New ACM managed certificate
Request a public certificate from Amazon or a private certificate from your organization's certificate authority (CA).
Request a certificate
Import certificates that you obtained outside of AWS
Import a certificate
Create private certificate authority (CA) hierarchies for your organization.
Create a private CA
Pricing (US)
Public SSL/TLS certificates provisioned through AWS Certificate Manager are free. You pay only for the AWS resources you create to run your application. Learn more
How it works
1 Request or import a TLS/SSL certificate you would like to use into your AWS account.
2 Validate domain ownership for your requested certificate using Domain Name System (DNS) or email validation to complete certificate issuance.
3 Use your newly issued or imported certificates in various AWS services like Elastic Load Balancing (ELB), Amazon CloudFront etc.
Getting started
What is Certificate Manager?
Setting up
Issuing and managing certificates
Security
Benefits and features
Free public certificates for ACM-integrated services
Feedback Looking for language selection? Find it in the new Unified Settings
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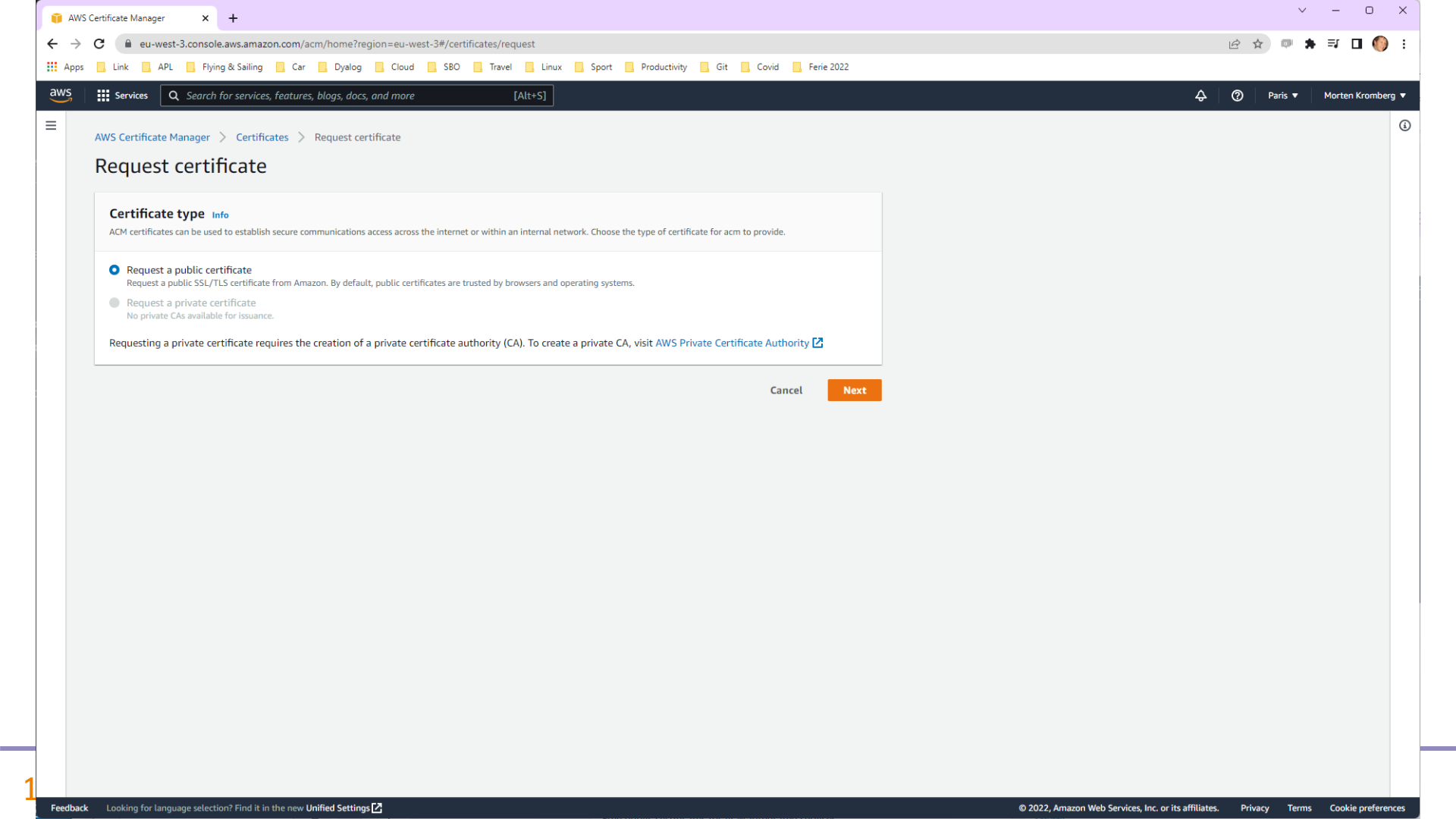
AWS Certificate Manager
eu-west-3.console.aws.amazon.com/acm/home?region=eu-west-3#/certificates/request
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Paris
Morten Kromberg
AWS Certificate Manager > Certificates > Request certificate
Request certificate
Certificate type Info
ACM certificates can be used to establish secure communications access across the internet or within an internal network. Choose the type of certificate for acm to provide.
Request a public certificate
Request a public SSL/TLS certificate from Amazon. By default, public certificates are trusted by browsers and operating systems.
Request a private certificate
No private CAs available for issuance.
Requesting a private certificate requires the creation of a private certificate authority (CA). To create a private CA, visit AWS Private Certificate Authority
Cancel
Next
Feedback
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AWS Certificate Manager

eu-west-3.console.aws.amazon.com/acm/home?region=eu-west-3#/certificates/request/public

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aws | Services | Search for services, features, blogs, docs, and more [Alt+S] | Paris | Morten Kromberg

AWS Certificate Manager > Certificates > Request certificate > Request public certificate

Request public certificate

Domain names

Fully qualified domain name Info

phonebook.kromberg.dk

Add another name to this certificate

You can add additional names to this certificate. For example, if you're requesting a certificate for "www.example.com", you might want to add the name "example.com" so that customers can reach your site by either name.

Select validation method Info

Select a method for validating domain ownership

- (•) DNS validation - recommended
  Choose this option if you are authorized to modify the DNS configuration for the domains in your certificate request.
- ( ) Email validation
  Choose this option if you do not have permission or cannot obtain permission to modify the DNS configuration for the domains in your certificate request.

Tags Info

To help you manage your certificates you can optionally assign your own metadata to each resource in the form of tags.

Tag key | Tag value - *optional*

Enter key | Enter value | Remove tag

Add tag

You can add 49 more tag(s).

Cancel | Previous | Request

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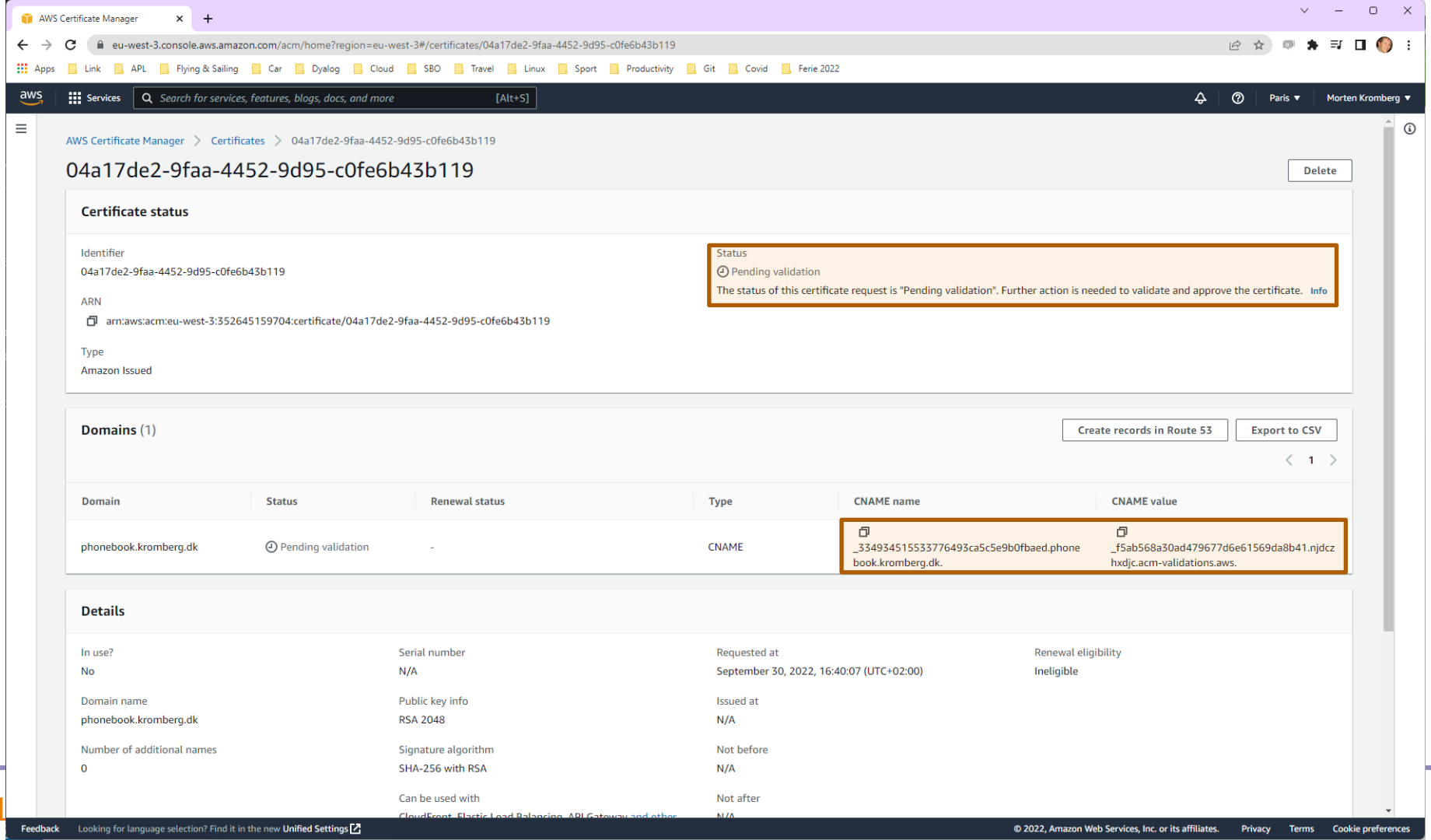
AWS Certificate Manager
eu-west-3.console.aws.amazon.com/acm/home?region=eu-west-3#/certificates/04a17de2-9faa-4452-9d95-c0fe6b43b119
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AWS Certificate Manager > Certificates > 04a17de2-9faa-4452-9d95-c0fe6b43b119
04a17de2-9faa-4452-9d95-c0fe6b43b119
Delete
Certificate status
Identifier
04a17de2-9faa-4452-9d95-c0fe6b43b119
ARN
arn:aws:acm:eu-west-3:352645159704:certificate/04a17de2-9faa-4452-9d95-c0fe6b43b119
Type
Amazon Issued
Status
Pending validation
The status of this certificate request is "Pending validation". Further action is needed to validate and approve the certificate. Info
Domains (1)
Create records in Route 53
Export to CSV
1
Domain
Status
Renewal status
Type
CNAME name
CNAME value
phonebook.kromberg.dk
Pending validation
-
CNAME
_33493451553377649 3ca5c5e9b0fbaed.phonebook.kromberg.dk.
_f5ab568a30ad479677d6e61569da8b41.njdczhxdjc.acm-validations.aws.
Details
In use?
No
Serial number
N/A
Requested at
September 30, 2022, 16:40:07 (UTC+02:00)
Renewal eligibility
Ineligible
Domain name
phonebook.kromberg.dk
Public key info
RSA 2048
Issued at
N/A
Number of additional names
0
Signature algorithm
SHA-256 with RSA
Not before
N/A
Can be used with
Not after
N/A
Feedback
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CNAME

A CNAME record specifies a domain name as an alias for another domain.

Hostname		Is an alias of	TTL (seconds)
Enter hostname: _33493451553377649 3ca5c5e9b0fbaed.	.kromberg.dk	Enter hostname: _f5ab568a30ad479677d6e61569da8b41.njdczhxdjc.acı	Enter TTL: 600

Create record

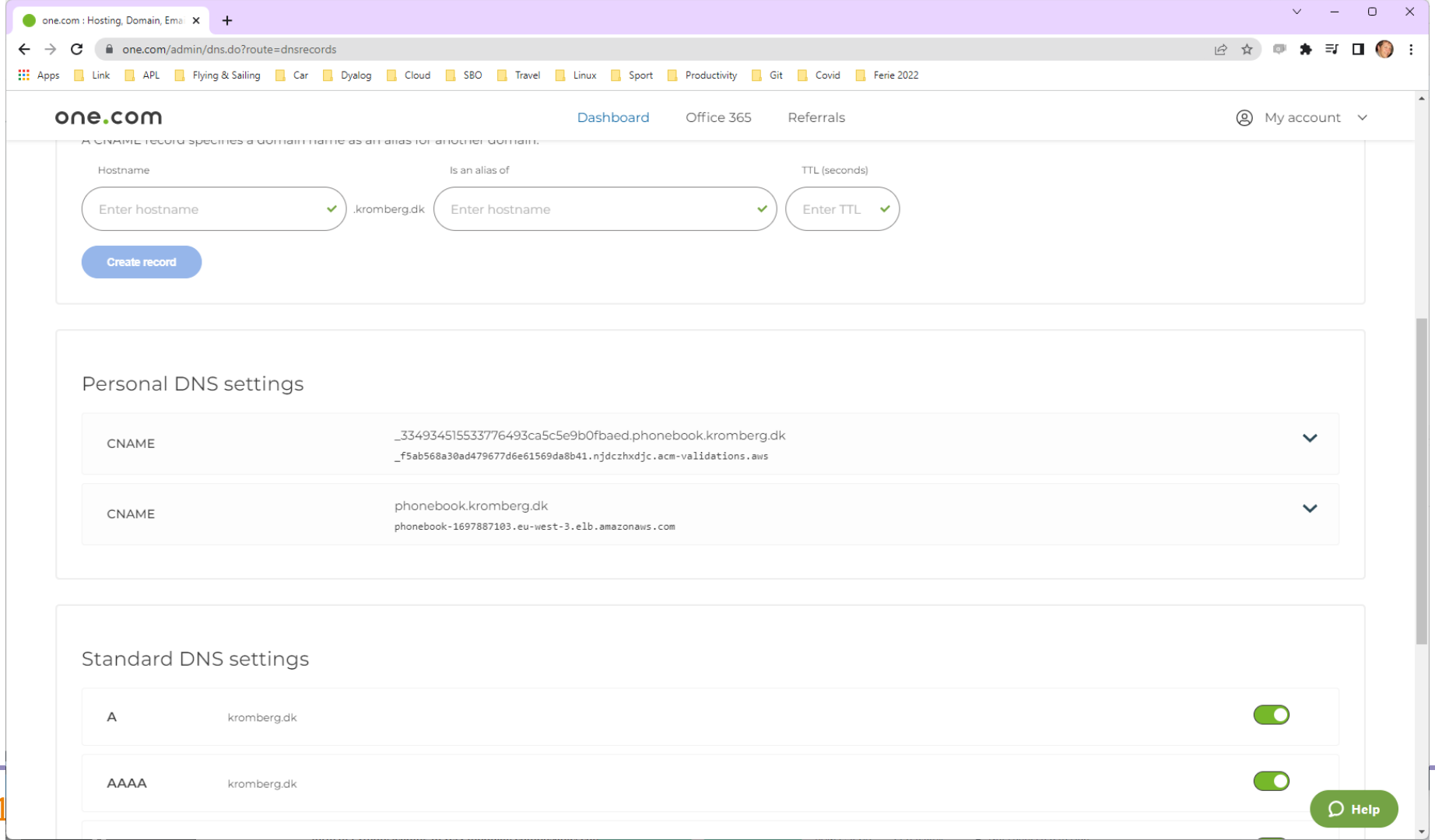
Personal DNS settings

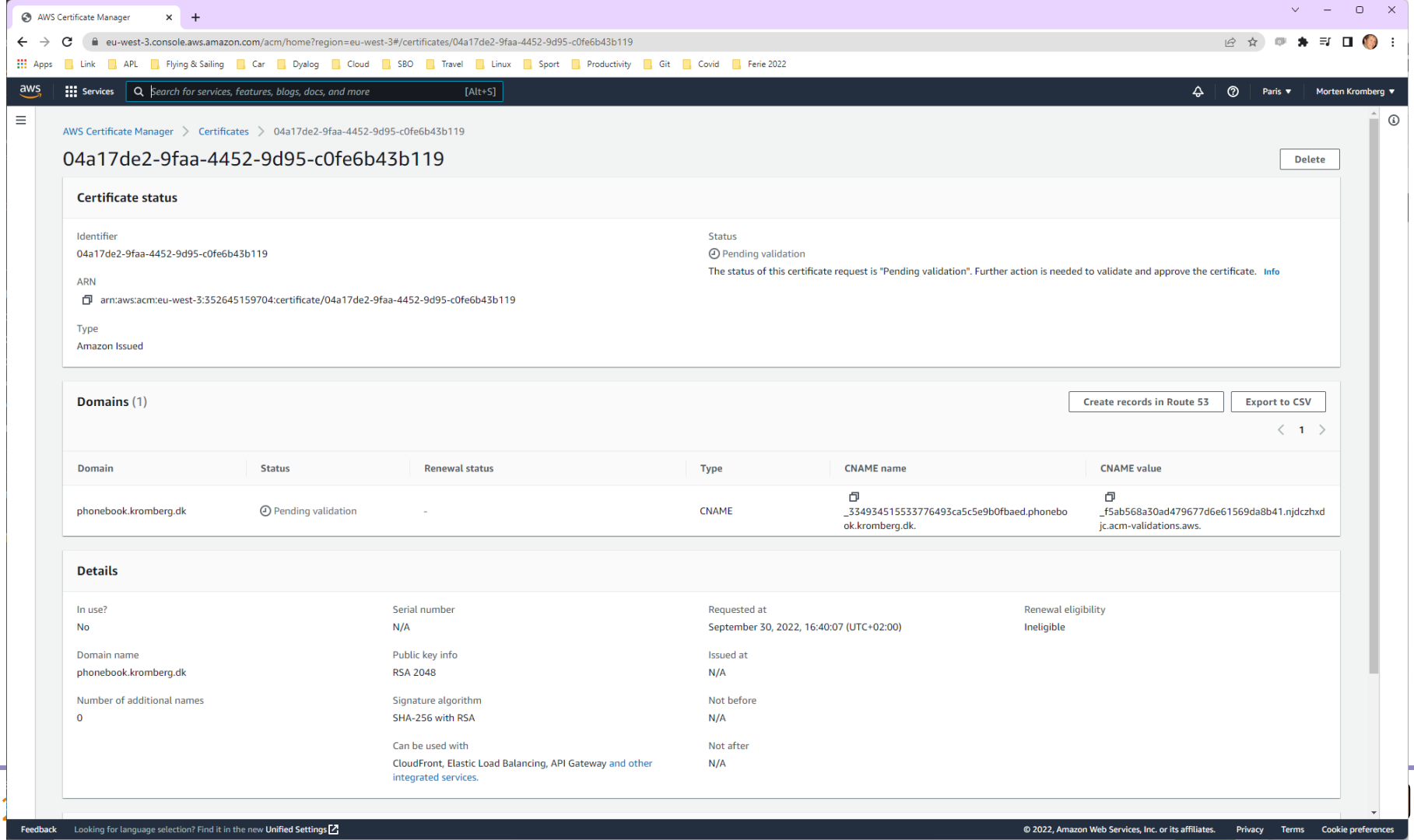
CNAME	phonebook.kromberg.dk phonebook-1697887103.eu-west-3.elb.amazonaws.com

Standard DNS settings

A	kromberg.dk

Help


one.com : Hosting, Domain, Ema
one.com/admin/dns.do?route=dnsrecords
Apps
Link
APL
Flying & Sailing
Car
Dyalog
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Covid
Ferie 2022
one.com
Dashboard
Office 365
Referrals
My account
Hostname
Is an alias of
TTL (seconds)
Enter hostname
.kromberg.dk
Enter hostname
Enter TTL
Create record
Personal DNS settings
CNAME
_33493451553377649 3ca5c5e9b0fbaed.phonebook.kromberg.dk
_f5ab568a30ad479677d6e61569da8b41.njdczhxdjc.acm-validations.aws
CNAME
phonebook.kromberg.dk
phonebook-1697887103.eu-west-3.elb.amazonaws.com
Standard DNS settings
A
kromberg.dk
AAAA
kromberg.dk
Help


AWS Certificate Manager
eu-west-3.console.aws.amazon.com/acm/home?region=eu-west-3#/certificates/04a17de2-9faa-4452-9d95-c0fe6b43b119
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AWS Certificate Manager > Certificates > 04a17de2-9faa-4452-9d95-c0fe6b43b119
04a17de2-9faa-4452-9d95-c0fe6b43b119
Delete
Certificate status
Identifier
04a17de2-9faa-4452-9d95-c0fe6b43b119
ARN
arn:aws:acm:eu-west-3:352645159704:certificate/04a17de2-9faa-4452-9d95-c0fe6b43b119
Type
Amazon Issued
Status
Pending validation
The status of this certificate request is "Pending validation". Further action is needed to validate and approve the certificate. Info
Domains (1)
Create records in Route 53
Export to CSV
1
Domain
Status
Renewal status
Type
CNAME name
CNAME value
phonebook.kromberg.dk
Pending validation
-
CNAME
_33493451553377649 3ca5c5e9b0fbaed.phonebook.kromberg.dk.
_f5ab568a30ad479677d6e61569da8b41.njdczhxdjc.acm-validations.aws.
Details
In use?
No
Domain name
phonebook.kromberg.dk
Number of additional names
0
Serial number
N/A
Public key info
RSA 2048
Signature algorithm
SHA-256 with RSA
Can be used with
CloudFront, Elastic Load Balancing, API Gateway and other integrated services.
Requested at
September 30, 2022, 16:40:07 (UTC+02:00)
Issued at
N/A
Not before
N/A
Not after
N/A
Renewal eligibility
Ineligible
Feedback
Looking for language selection? Find it in the new Unified Settings
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Cookie preferences

AWS Certificate Manager

eu-west-3.console.aws.amazon.com/acm/home?region=eu-west-3#/certificates/04a17de2-9faa-4452-9d95-c0fe6b43b119

Apps | Link | APL | Flying & Sailing | Car | Dyalog | Cloud | SBO | Travel | Linux | Sport | Productivity | Git | Covid | Ferie 2022

aws | Services | Search for services, features, blogs, docs, and more [Alt+S] | Paris | Morten Kromberg

AWS Certificate Manager > Certificates > 04a17de2-9faa-4452-9d95-c0fe6b43b119

04a17de2-9faa-4452-9d95-c0fe6b43b119

Delete

Certificate status

Identifier
04a17de2-9faa-4452-9d95-c0fe6b43b119

ARN
arn:aws:acm:eu-west-3:352645159704:certificate/04a17de2-9faa-4452-9d95-c0fe6b43b119

Type
Amazon Issued

Status
Issued
The certificate was issued at September 30, 2022, 16:57:29 (UTC+02:00).

Domains (1)

Create records in Route 53 | Export to CSV

1

Domain	Status	Renewal status	Type	CNAME name	CNAME value
phonebook.kromberg.dk	Success	-	CNAME	_33493451553377649 3ca5c5e9b0fbaed.phonebook.kromberg.dk.	_f5ab568a30ad479677d6e61569da8b41.njdczhxdjc.acm-validations.aws.

Details

In use?
No

Domain name
phonebook.kromberg.dk

Number of additional names
0

Serial number
08:bd:5e:22:da:8d:7c:64:75:9b:03:10:09:2f:ed:ea

Public key info
RSA 2048

Signature algorithm
SHA-256 with RSA

Can be used with
CloudFront, Elastic Load Balancing, API Gateway and other integrated services.

Requested at
September 30, 2022, 16:40:07 (UTC+02:00)

Issued at
September 30, 2022, 16:57:29 (UTC+02:00)

Not before
September 30, 2022, 02:00:00 (UTC+02:00)

Not after
October 30, 2023, 00:59:59 (UTC+01:00)

Renewal eligibility
Ineligible

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EC2 Management Console

eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#LoadBalancers:sort=loadBalancerName

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New EC2 Experience
Tell us what you think

- EC2 Dashboard
- EC2 Global View
- Events
- Tags
- Limits

Instances
- Instances New
- Instance Types
- Launch Templates
- Spot Requests
- Savings Plans
- Reserved Instances New
- Dedicated Hosts
- Capacity Reservations

Images
- AMIs New
- AMI Catalog

Elastic Block Store
- Volumes New
- Snapshots New
- Lifecycle Manager New

Network & Security
- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs

Create Load Balancer | Actions

Filter by tags and attributes or search by keyword | 1 to 1 of 1

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
phonebook-dns	phonebook-dns-509436610.eu-west-3.elb.amazonaws.com	Active	vpc-4b073d22	eu-west-3c, eu-west-3a...	application	October 4, 2022 at 1:39:1

Load balancer: phonebook-dns

Description | Listeners | Monitoring | Integrated services | Tags

Listeners listen for connection requests using their protocol and port. You can add, remove, or update listeners and listener rules.

To view and edit listener attributes, select the listener and choose Edit.

Add listener | Edit | Delete

Listener ID	Security policy	SSL Certificate	Rules
HTTP : 8080 arn...db0a984120855c02	N/A	N/A	Default: forwarding to phone-Front-SK5LBQ1C4REL View/edit rules
HTTP : 8081 arn...ad164977d9ff61b1	N/A	N/A	Default: forwarding to phone-Backe-10O8FX2FO53WB View/edit rules
HTTP : 8088 arn...b7c6d0ea04a1e64e	N/A	N/A	Default: forwarding to phone-Backe-JRA0Y1N9F5G View/edit rules

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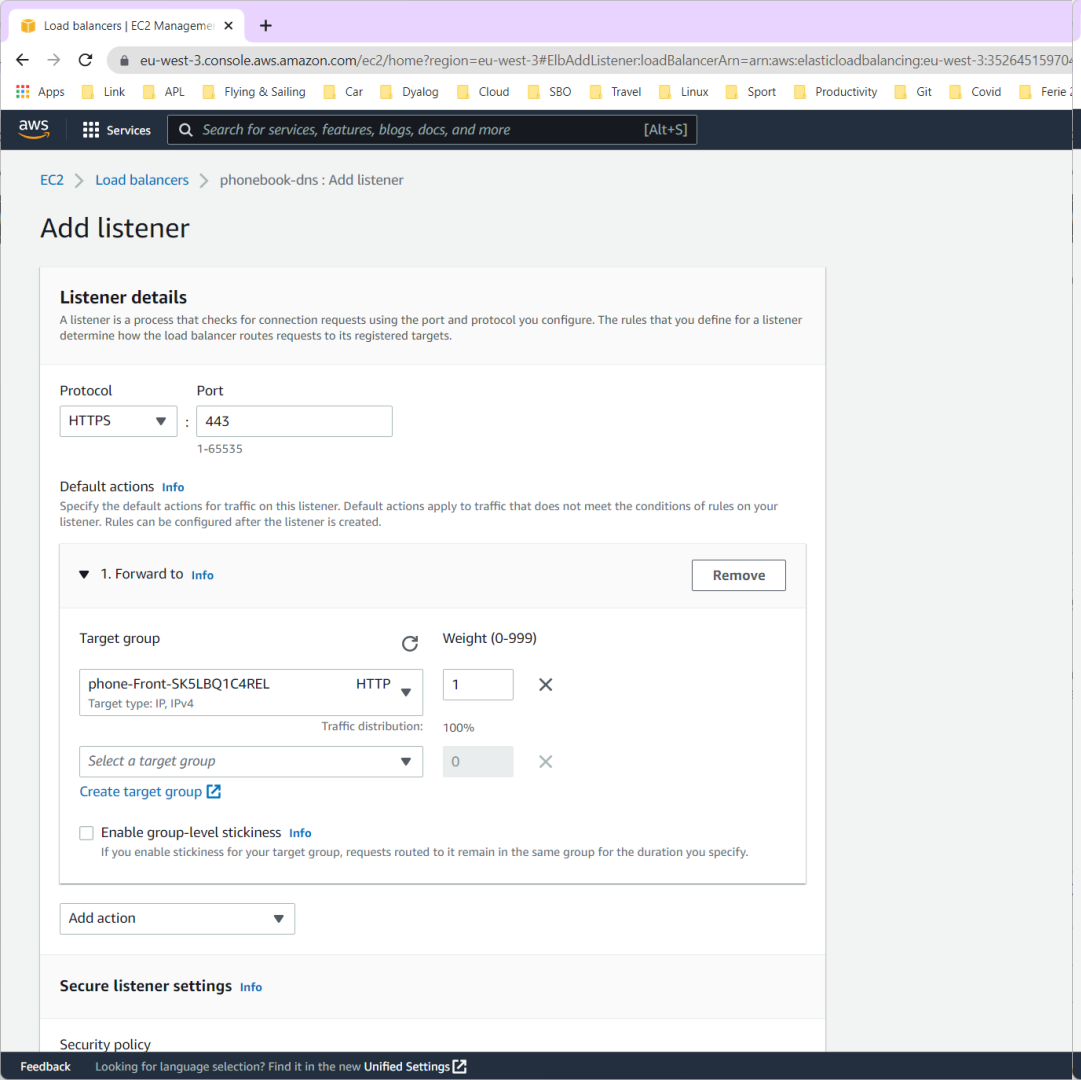
Load balancers | EC2 Manageme
eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#ElbAddListener:loadBalancerArn=arn:aws:elasticloadbalancing:eu-west-3:352645159704
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity Git Covid
aws Services Search for services, features, blogs, docs, and more [Alt+S]
EC2 > Load balancers > phonebook-dns : Add listener
Add listener
Listener details
A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.
Protocol
HTTPS
Port
443
1-65535
Default actions Info
Specify the default actions for traffic on this listener. Default actions apply to traffic that does not meet the conditions of rules on your listener. Rules can be configured after the listener is created.
1. Forward to Info
Remove
Target group
Weight (0-999)
phone-Front-SK5LBQ1C4REL
HTTP
Target type: IP, IPv4
1
Traffic distribution:
100%
Select a target group
0
Create target group
Enable group-level stickiness Info
If you enable stickiness for your target group, requests routed to it remain in the same group for the duration you specify.
Add action
Secure listener settings Info
Security policy
Feedback
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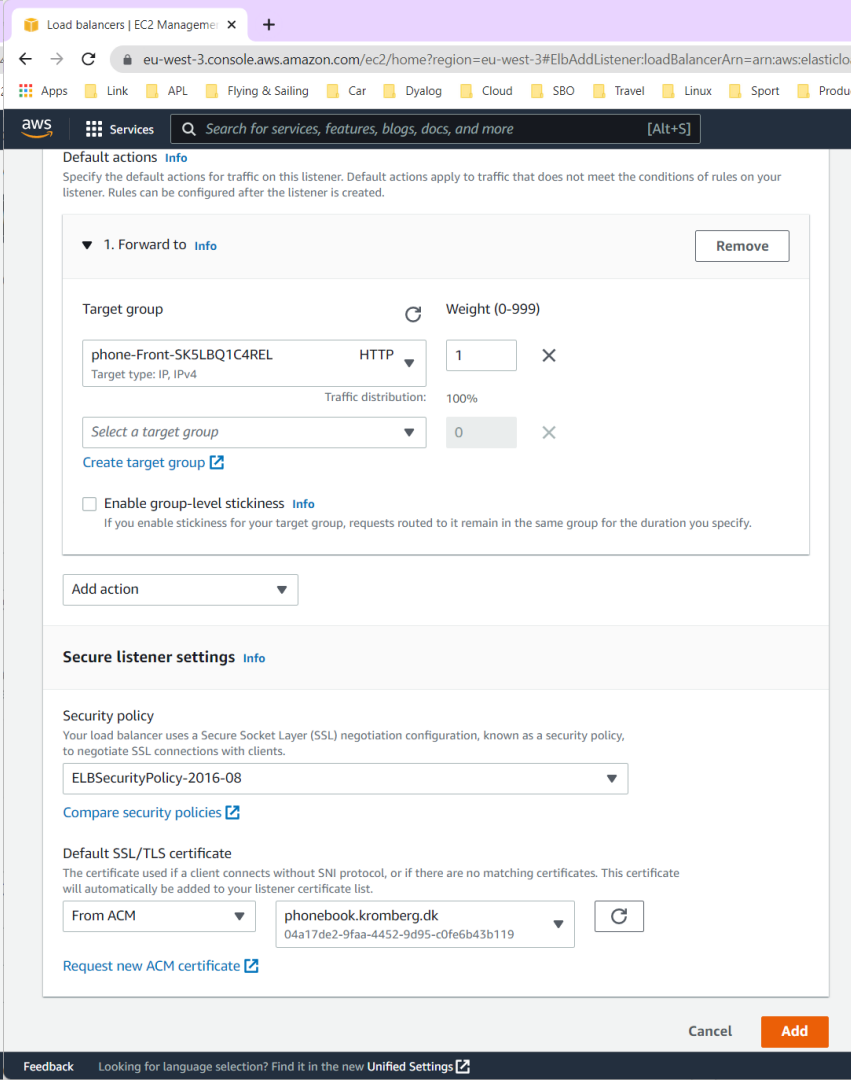
Load balancers | EC2 Manageme
eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#ElbAddListener:loadBalancerArn=arn:aws:elasticlo
Apps Link APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Produ
aws Services Search for services, features, blogs, docs, and more [Alt+S]
Default actions Info
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Target group
Weight (0-999)
phone-Front-SK5LBQ1C4REL
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Target type: IP, IPv4
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Select a target group
0
Create target group
Enable group-level stickiness Info
If you enable stickiness for your target group, requests routed to it remain in the same group for the duration you specify.
Add action
Secure listener settings Info
Security policy
Your load balancer uses a Secure Socket Layer (SSL) negotiation configuration, known as a security policy, to negotiate SSL connections with clients.
ELBSecurityPolicy-2016-08
Compare security policies
Default SSL/TLS certificate
The certificate used if a client connects without SNI protocol, or if there are no matching certificates. This certificate will automatically be added to your listener certificate list.
From ACM
phonebook.kromberg.dk
04a17de2-9faa-4452-9d95-c0fe6b43b119
Request new ACM certificate
Cancel
Add
Feedback
Looking for language selection? Find it in the new Unified Settings

EC2 Management Console

eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#LoadBalancers:search=phonebook-dns;sort=loadBalancerName

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Images
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Elastic Block Store
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- Snapshots New
- Lifecycle Manager New

Network & Security
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- Placement Groups
- Key Pairs

Create Load Balancer | Actions

search : phonebook-dns | Add filter | 1 to 1 of 1

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
phonebook-dns	phonebook-dns-509436610.eu-west-3.elb.amazonaws.com	Active	vpc-4b073d22	eu-west-3c, eu-west-3a...	application	October 4, 2022 at 1:39:1

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Add listener | Edit | Delete

Listener ID	Security policy	SSL Certificate	Rules
HTTPS : 443 arn...c343cd811e259799	ELBSecurityPolicy-2016-08	Default: 04a17de2-9faa-4452-9d95-c0fe6b43b119 (ACM) View/edit certificates	Default: forwarding to phone-Front-SK5LBQ1C4REL View/edit rules
HTTP : 8080 arn...db0a984120855c02	N/A	N/A	Default: forwarding to phone-Front-SK5LBQ1C4REL View/edit rules
HTTP : 8081 arn...ad164977d9ff61b1	N/A	N/A	Default: forwarding to phone-Backe-10O8FX2FO53WB View/edit rules
HTTP : 8088 arn...b7c6d0ea04a1e64e	N/A	N/A	Default: forwarding to phone-Backe-JRA0Y1N9F5G View/edit rules

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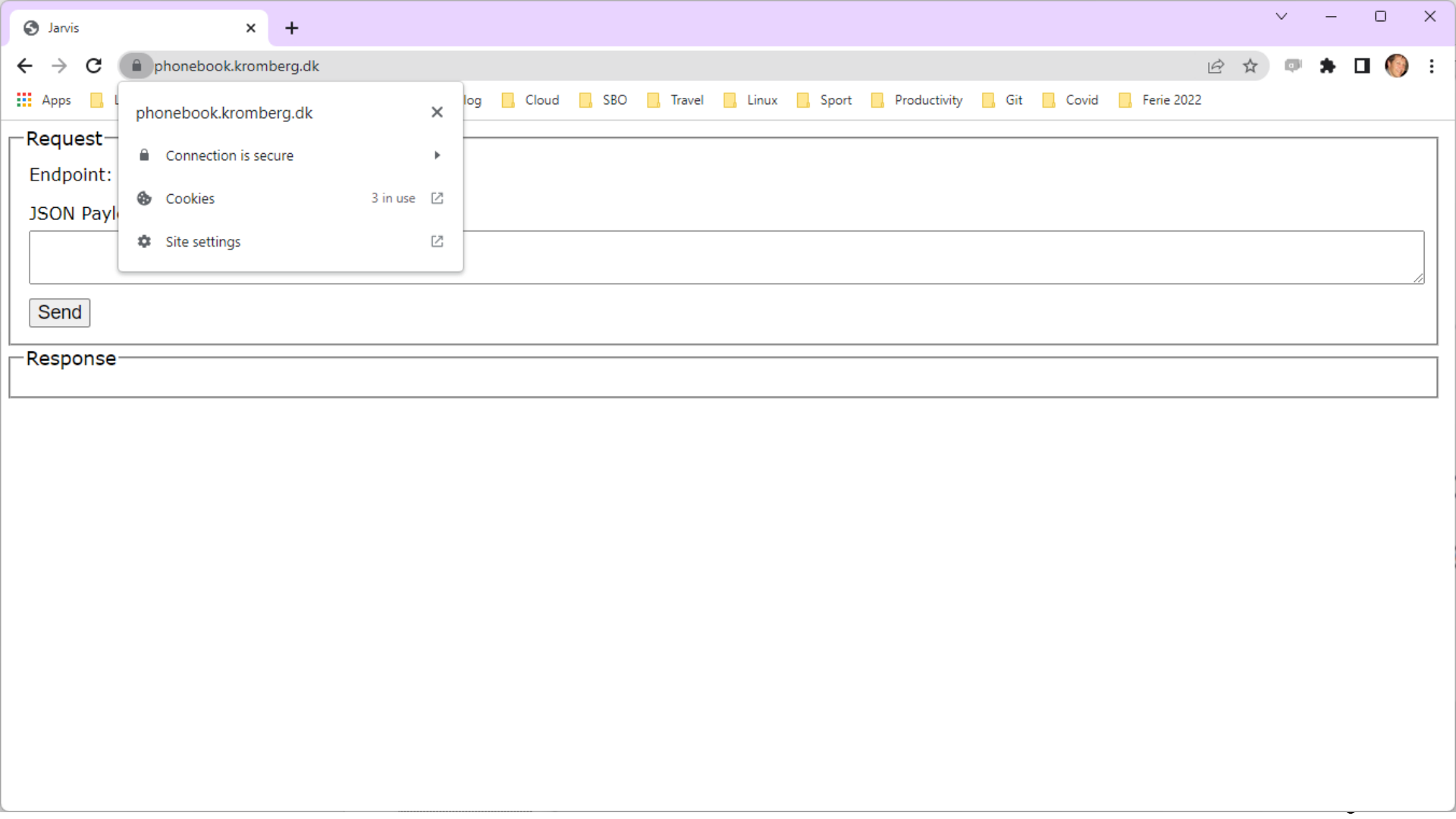
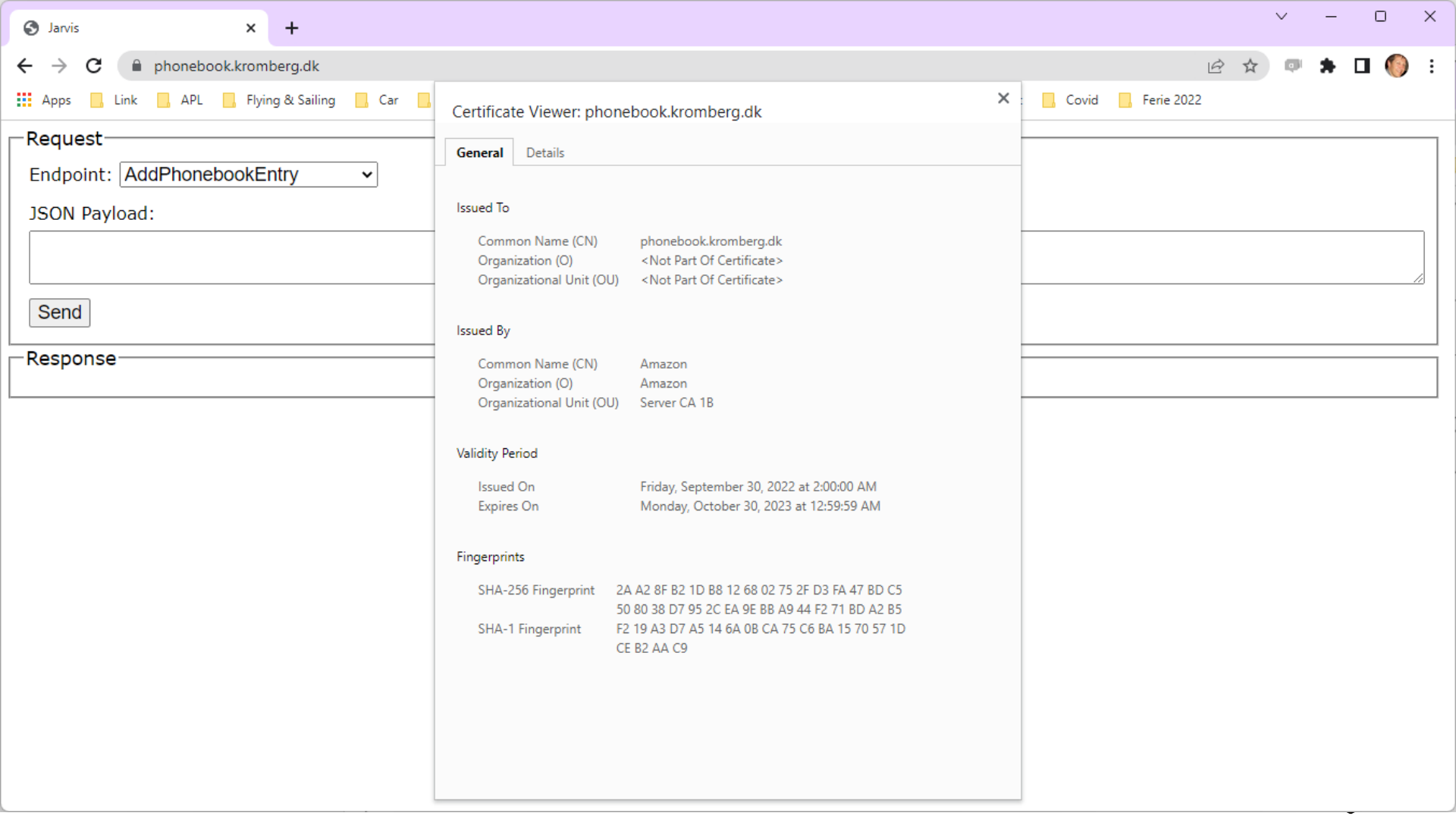
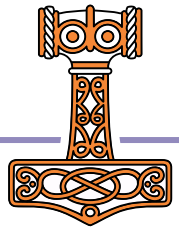

Jarvis
phonebook.kromberg.dk
phonebook.kromberg.dk
Connection is secure
Cookies
3 in use
Site settings
Apps
Cloud
SBO
Travel
Linux
Sport
Productivity
Git
Covid
Ferie 2022
Request
Endpoint:
JSON Payl
Send
Response


Jarvis
phonebook.kromberg.dk
Apps
Link
APL
Flying & Sailing
Car
Covid
Ferie 2022
Request
Endpoint: AddPhonebookEntry
JSON Payload:
Send
Response
Certificate Viewer: phonebook.kromberg.dk
General
Details
Issued To
Common Name (CN) phonebook.kromberg.dk
Organization (O) <Not Part Of Certificate>
Organizational Unit (OU) <Not Part Of Certificate>
Issued By
Common Name (CN) Amazon
Organization (O) Amazon
Organizational Unit (OU) Server CA 1B
Validity Period
Issued On Friday, September 30, 2022 at 2:00:00 AM
Expires On Monday, October 30, 2023 at 12:59:59 AM
Fingerprints
SHA-256 Fingerprint 2A A2 8F B2 1D B8 12 68 02 75 2F D3 FA 47 BD C5 50 80 38 D7 95 2C EA 9E BB A9 44 F2 71 BD A2 B5
SHA-1 Fingerprint F2 19 A3 D7 A5 14 6A 0B CA 75 C6 BA 15 70 57 1D CE B2 AA C9

Loose Ends

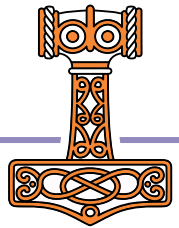
Secure Service Setup:

- Did not complete automation of startup of secure service – manual steps required
  - We will figure out how to do it and post updates (there will be a pod cast series)
- Note that the manual setup requires manual teardown



Issues

- Did not complete automation of secure setup.
- Manual setup requires manual teardown
- Not 100% stable



Issue

- Did
  setu
- Man
- Not

Command Prompt

```
 - DefaultNetwork                                DeleteComplete                                 2.1s
Target group 'arn:aws:elasticloadbalancing:eu-west-3:352645159704:targetgroup/phone-Front-TMKI1JC6VVMW/0f
d2fe962a81730d' is currently in use by a listener or a rule (Service: AmazonElasticLoadBalancing; Status
Code: 400; Error Code: ResourceInUse; Request ID: 0c2ab834-b1fd-41a9-af7a-0ef5b83fcfb7; Proxy: null)

C:\devt\2022-SP2\two-tier>
C:\devt\2022-SP2\two-tier>
C:\devt\2022-SP2\two-tier>
C:\devt\2022-SP2\two-tier>start-aws

C:\devt\2022-SP2\two-tier>SET PHONEBOOK_IMAGE=352645159704.dkr.ecr.eu-west-3.amazonaws.com/phonebook

C:\devt\2022-SP2\two-tier>SET PHONEBOOK_TYPE=volume

C:\devt\2022-SP2\two-tier>SET PHONEBOOK_DATA=phonebook-data

C:\devt\2022-SP2\two-tier>SET AWS_ID=352645159704.dkr.ecr.eu-west-3.amazonaws.com

C:\devt\2022-SP2\two-tier>aws ecr get-login-password --region eu-west-3    | docker login --username AWS -
-password-stdin 352645159704.dkr.ecr.eu-west-3.amazonaws.com
Login Succeeded

C:\devt\2022-SP2\two-tier>docker context use phonebook
phonebook

C:\devt\2022-SP2\two-tier>docker compose -p phonebook up --scale frontend=2
level=warning msg="services.restart: unsupported attribute"
level=warning msg="services.scale: unsupported attribute"
level=warning msg="services.scale: unsupported attribute"
ValidationError: Stack:arn:aws:cloudformation:eu-west-3:352645159704:stack/phonebook/38bd8ba0-43d3-11ed-9
b14-0a901ed97212 is in DELETE_FAILED state and can not be updated.
        status code: 400, request id: 6f4e3bc3-1af1-4a94-9230-c82f5fd85273
```

Goals

Give a quick introduction to:

- Jarvis – Dyalog's Web Service Framework – to expose APL functions as services
- Docker: to create lightweight Virtual Machines known as "Containers"
- Docker Compose: to launch and manage multiple inter-connected containers
- Amazon Web Services "Elastic Container Service": to allow Docker Compose to launch containers directly to the cloud (so-called "serverless" deployment)
- How to scale the system by running multiple copies of selected services
- How to assign your own domain name and a certificate to your service