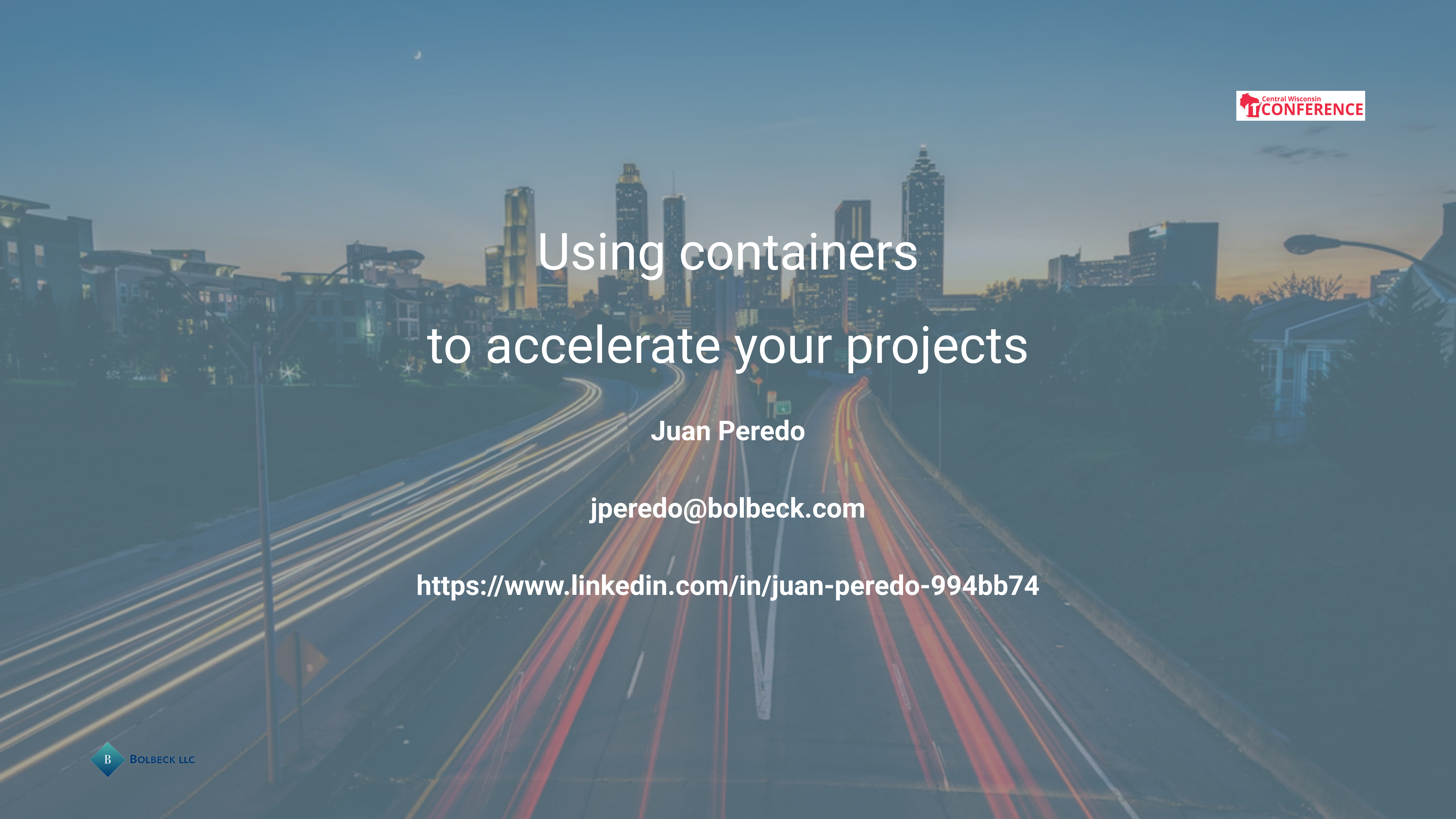

Central Wisconsin IT CONFERENCE

Using containers to accelerate your projects

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Problems? ... What development problems?

- Long and (boring) software installs 😴
- Incompatible libraries 😕
- Data mocking since backend servers not yet available 🙇
- Maintaining multiple versions of an app 😶

Problems? ... What deployment problems?

- Inconsistent environments among dev/test/prod machines 😢
- Different code in test vs what is deployed in prod 😫
- Deploying and rolling back apps 😲
- Performance and scaling apps 💪
-

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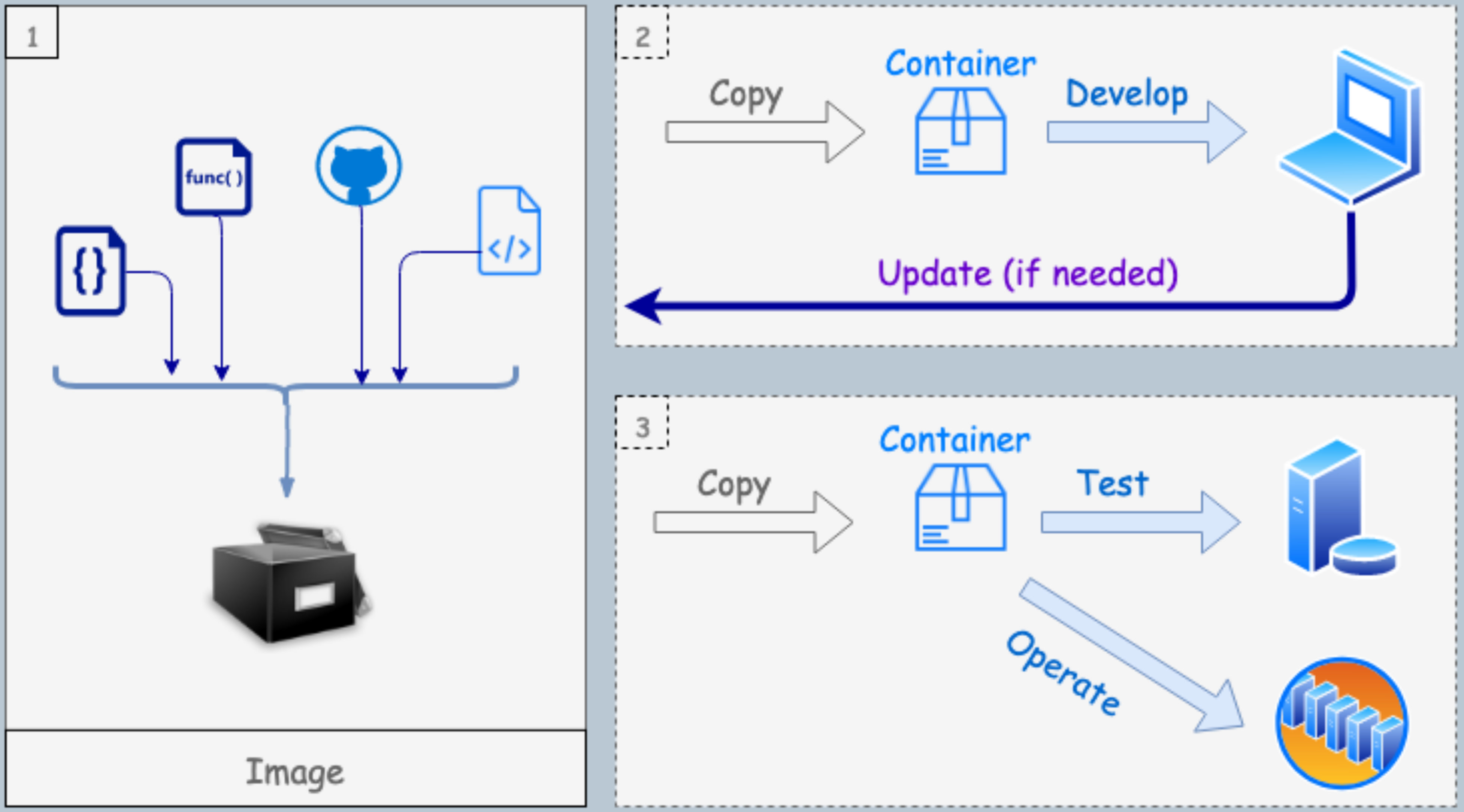
What is a container ?

- "A standardized unit of software" -- Docker
- ?
- "Package Software into Standardized Units for Development, Shipment and Deployment" -- Docker
- ? ? 😕

Image and Containers



- An image encapsulates all code and libraries required to run application independently of the OS
- Containers are stand alone copies of the image
- Changes to the container do not affect the image
- Code changes must be added to the image by rebuilding the image

```
        t.appeared = false;
        return;
    }

    //is the element inside the visible window?
    var a = w.scrollLeft();
    var b = w.scrollTop();
    var o = t.offset();
    var x = o.left;
    var y = o.top;

    var ax = settings.accX;
    var ay = settings.accY;
    var th = t.height();
    var wh = w.height();
    var tw = t.width();
    var ww = w.width();

    if (y + th + ay >= b &&
        y <= b + wh + ay &&
        x + tw + ax >= a &&
        x <= a + ww + ax) {

            //trigger the custom event
            if (!t.appeared) t.trigger('appear', settings.data);

        } else {

            //it scrolled out of view
            t.appeared = false;
        }
    };

    //create a modified fn with some additional logic
    var modifiedFn = function() {

        //mark the element as visible
        t.appeared = true;

        //is this supposed to happen only once?
        if (settings.one) {

            //remove the check
            w.unbind('scroll', check);
            var i = $.inArray(check, $.fn.appear.checks);
            if (i >= 0) $.fn.appear.checks.splice(i, 1);
```

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Demo Time

We will walk thru:

- Downloading and using an image
- Creating a new image
- Multi-container application
- Distributing an image

Using multiple containers

- Node app to pull SQL Server data and display JSON browser
  - Locally built node container and official MySQL image

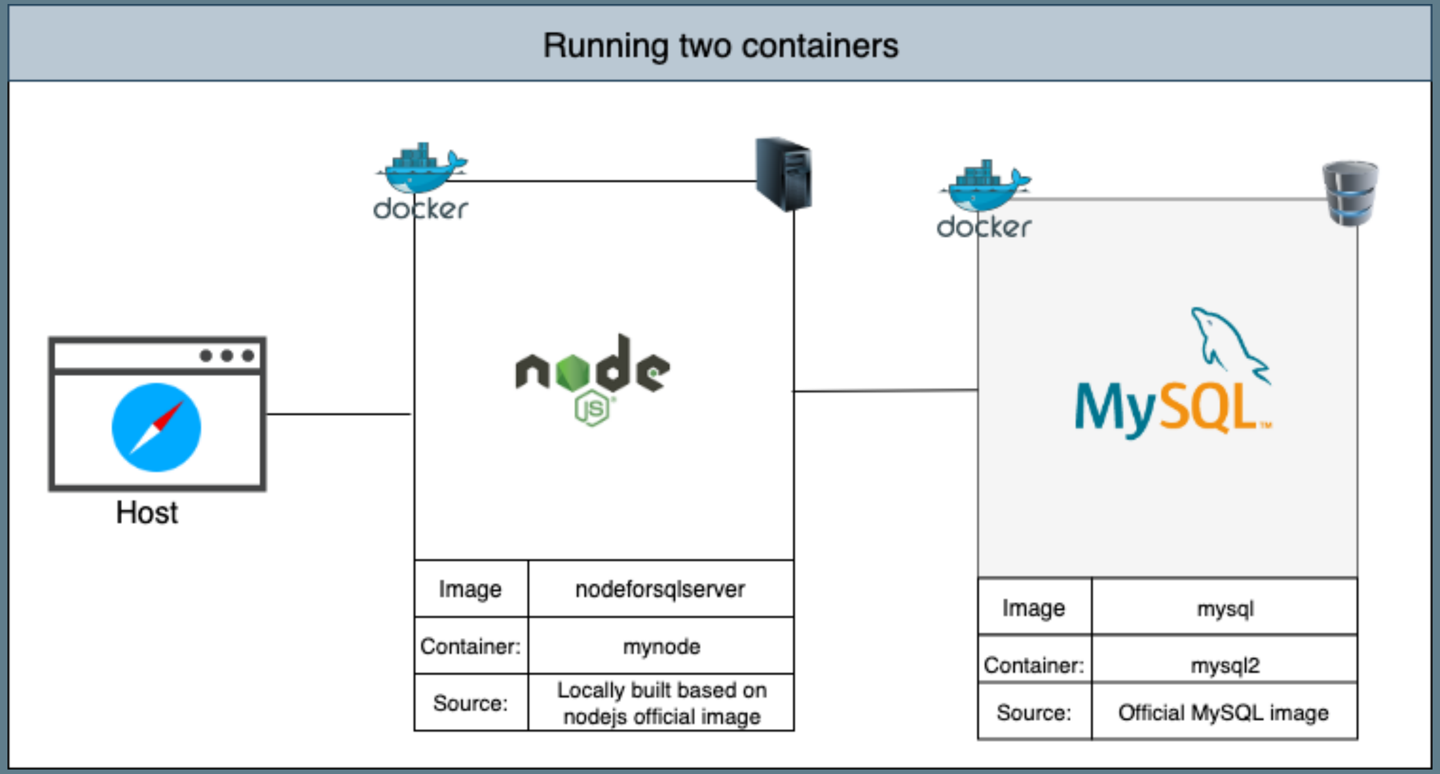

Image	nodeforsqlserver
Container:	mynode
Source:	Locally built based on nodejs official image

Image	mysql
Container:	mysql2
Source:	Official MySQL image

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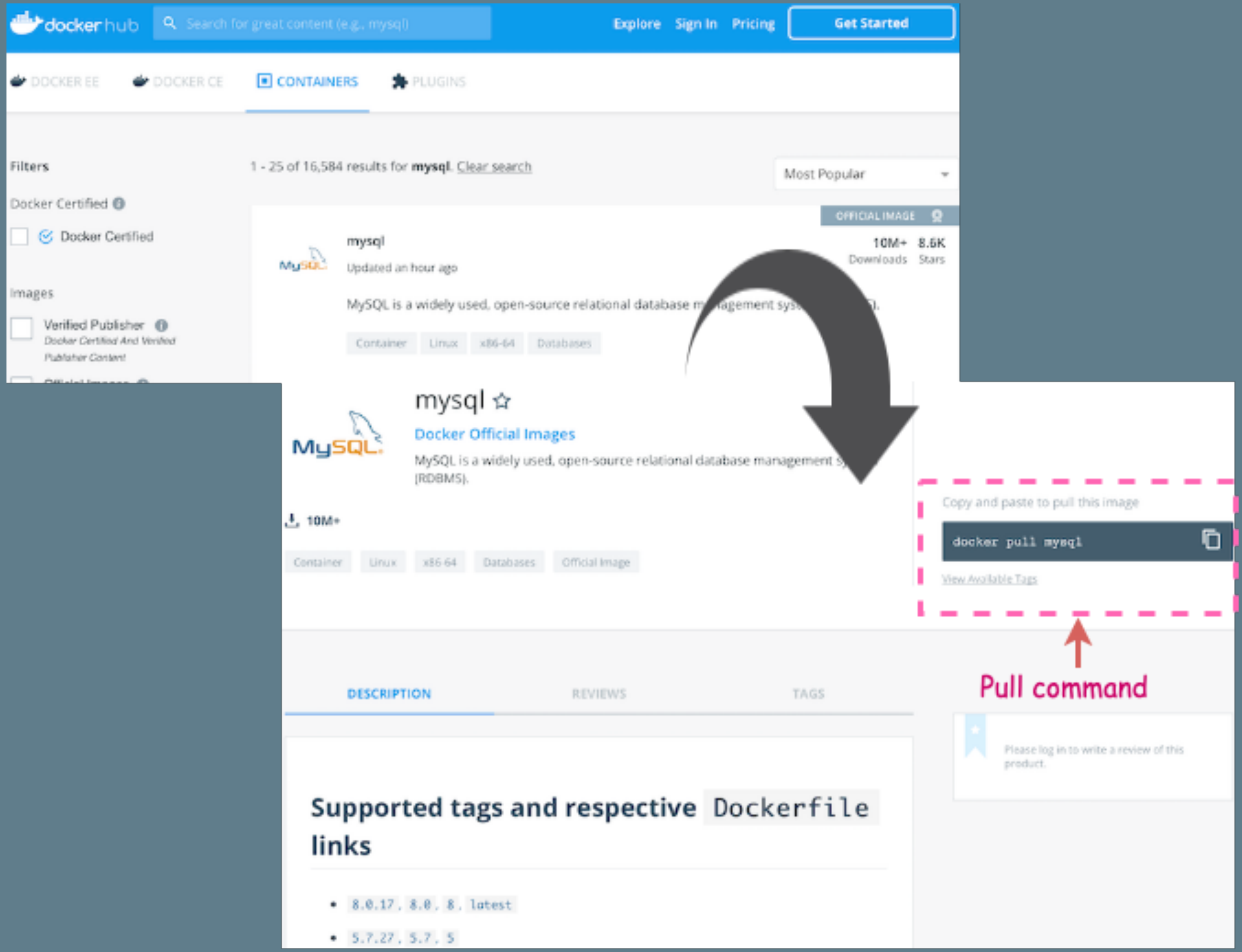
Downloading an image



1 - 25 of 16,584 results for **mysql**. Clear search

MySQL is a widely used, open-source relational database management system (RDBMS).

```
docker pull mysql
```

Supported tags and respective `Dockerfile` links

- `8.0.17`, `8.0`, `8`, `latest`
- `5.7.27`, `5.7`, `5`

- Go to hub.docker.com and serach for MySQL
- Open the detail , find and copy the pull command
- Pull MySQL image from a terminal

```
docker pull mysql
docker image ls
```

Using multiple containers

Nodejs Dockerfile

```
FROM node
WORKDIR /code
COPY package.json /code
RUN npm install mysql
RUN npm install express
RUN npm install && npm ls
COPY . /code
EXPOSE 3000
CMD ["npm","start"]
```

Using multiple containers - Run Containers

- Build Nodejs image. Also, Nodejs and MySQL container.

```
docker build -t nodemysql .
docker run -p 3000:3000 --name nodemysqlcont nodemysql
docker run --name mysql2 -v mydatadir:/var/lib/mysql -p 3306:3306
            -e MYSQL_ROOT_PASSWORD=mySecretPwd -d  mysql
```

- Or, if containers already exist, start them

```
docker start nodemysqlcont
docker start mysql2
```

- Access the app by at `localhost:3000/mysql` 😟

Using multiple containers - Trouble in paradise

- The nodejs app is unresponsive. It cannot connect to MySQL.
- Containers are isolated and not running in the same network.
- Create network and attach both our containers

```
docker network create mynodenetwork
docker network ls
docker network connect mynodenetwork nodemysql
docker network connect mynodenetwork mysql2
```

- Access the nodejs app at `localhost:3000/mysql` 👍

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Using multiple containers - Cleanup

- Containers must be disconnected before deleting network

```
docker network disconnect mynodenetwork nodemysql
docker network disconnect mynodenetwork mysql2
docker network rm mynodenetwork
```

```
docker stop nodemysql
docker stop mysql2
docker rm nodemysql
docker rm mysql2
```

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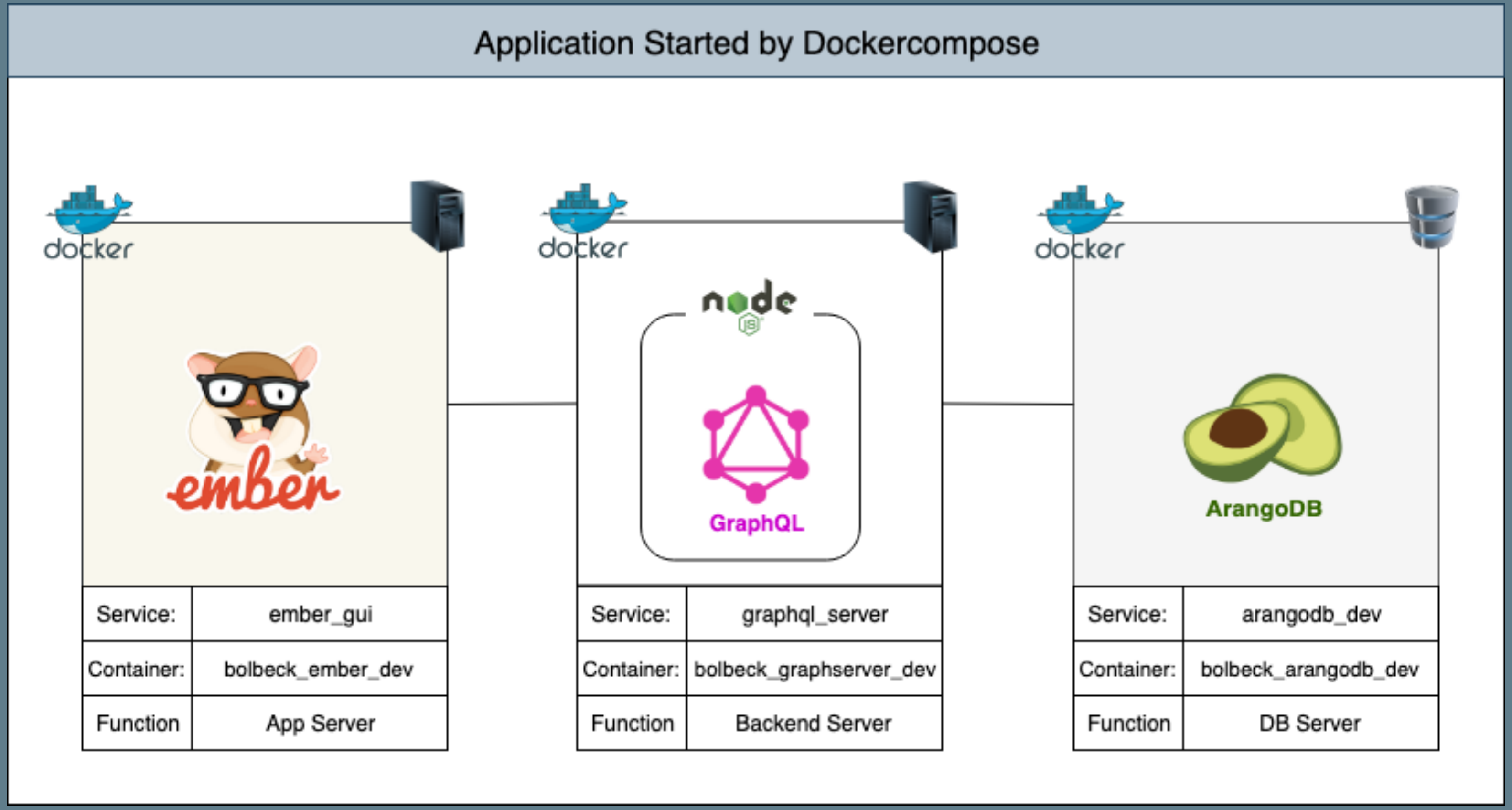
Multiple containers with dockercompose

Three tier app running in 3 containers hosted in 3 services created by a dockercompose YAML file



Service:	ember_gui
Container:	bolbeck_ember_dev
Function	App Server

Service:	graphql_server
Container:	bolbeck_graphserver_dev
Function	Backend Server

Service:	arangodb_dev
Container:	bolbeck_arangodb_dev
Function	DB Server

Multiple containers with dockercompose - YAML file

```
version: "3"
services:
  arangodb_dev:
    image: arangodb
    container_name: bolbeck_arangodb_dev
      env_file: docker-compose.env
    ports:
      - "8529:8529"
    volumes:
        - ./Arango/db:/var/lib/arangodb3
        - ./Arango/apps_db_system:/var/lib/arangodb3-apps/_db/
  graphql_server:
    build: ./GraphQLServer
    depends_on:
      - arangodb_dev
    container_name: bolbeck_graphserver_dev
    command: nodemon -L --inspect=0.0.0.0:5858
    volumes:
      - ./GraphQLServer:/Bolbeck/code
    ports:
      - "8000:8000"
      - "5858:5858"
      - "4000:4000"
  ember_gui:
    image: danlynn/ember-cli
    container_name: bolbeck_ember_dev
    depends_on:
      - graphql_server
    volumes:
      - ./Ember:/myapp
    command: ember server
    ports:
      - "4200:4200"
      - "7020:7020"
      - "7357:7357"
```

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Let me get my glasses....

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Multiple containers with dockercompose - Database service

```
version: "3"

services:
  arangodb_dev:
    image: arangodb
    container_name: bolbeck_arangodb_dev
        env_file: docker-compose.env
    ports:
      - "8529:8529"
    volumes:
        - ./Arango/db:/var/lib/arangodb3
        - ./Arango/apps_db_system:/var/lib/arangodb3-apps/_db/
```

Multiple containers with dockercompose - GraphQL service

```
graphql_server:
  build: ./GraphQLServer
  depends_on:
    - arangodb_dev
  container_name: bolbeck_graphserver_dev
  command: nodemon -L --inspect=0.0.0.0:5858
  volumes:
    - ./GraphQLServer:/Bolbeck/code
  ports:
    - "8000:8000"
    - "5858:5858"
    - "4000:4000"
```

Multiple containers with dockercompose - Gui service

```
ember_gui:
  image: danlynn/ember-cli
  container_name: bolbeck_ember_dev
  depends_on:
    - graphql_server
  volumes:
    - ./Ember:/myapp
  command: ember server
  ports:
    - "4200:4200"
    - "7020:7020"
    - "7357:7357"
```

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Multiple containers with dockercompose - Running app

- Pull image, build image, create containers, volumes and network:

```
docker-compose up
```

- See the application running in localhost:4200
- Bring it all down, remove containers and delete the network

```
docker-compose down
```

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Multiple containers with docker compose - Development

- All files in the folders associated with the volumes are shared between host and container
- All code changes take are reflected immediately
- All data changes are also saved in the host
- We can create and destroy the containers at will and not loose any work

Pushing an image to dockerhub

- Login from the console to docker hub (account needed):

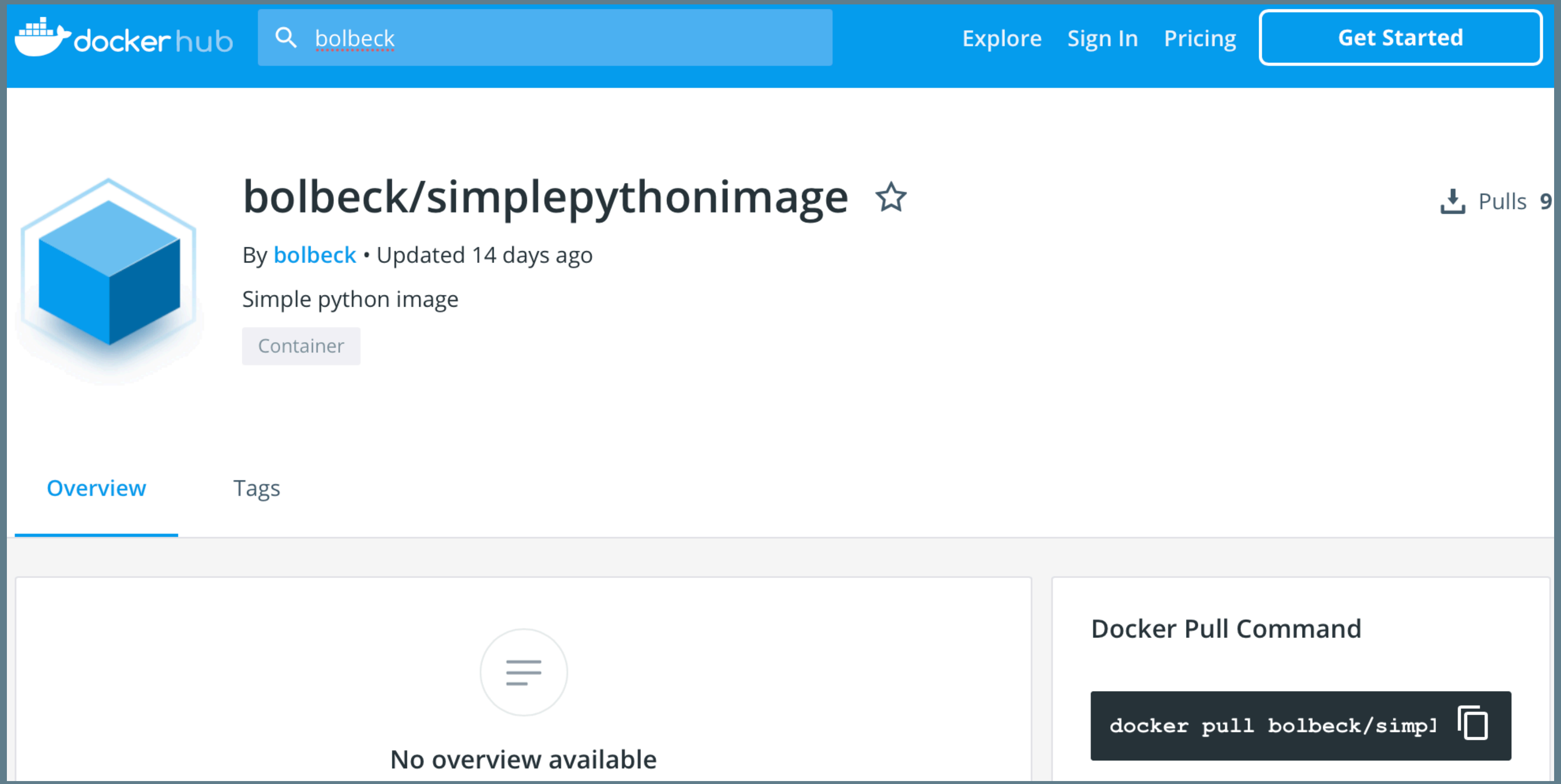
```
docker login
```

- Tag your image

```
docker tag firstpythonimg bolbeck/simplepythonimage
```

- Push image to docker

```
docker push bolbeck/simplepythonimage
```



bolbeck/simplepythonimage

By bolbeck • Updated 14 days ago

Simple python image

Container

Pulls 9

No overview available

Docker Pull Command

```
docker pull bolbeck/simpl
```

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Problems? ... Solutions!

Problem	**Solution**	✔
Long installs	Docker pull <image name>	✔
Incompatible libraries	Container isolation	✔
Data Mocking	Multi-container app	✔
Multiple versions of an app	Image tags	✔
Inconsistent environments	Self contained apps	✔
Different code deployed to prod	Same image everywhere	✔
Deploying and rolling back apps	*Automated* deploy and rollback	✔
Performance and scaling	Multi-containers, microservices , serverless	✔

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Sounds good, but when are containers not a good fit ?

- Desktop self contained applications with no backend (e.g. Paint)
- Application does not scale horizontally and requires 100% of the hardware power
- Existing databases that do not scale horizontally (e.g.: SQL Server) will not benefit much either

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Queries ?

Reflections?

Contemplations?

Inquiries?

Doubts?

Using containers

to accelerate your projects

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Appendix

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Photos

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Photo by Jonathan Francisca on Unsplash
- Photo by Markus Spiske on Unsplash
- Photo by Joey Kyber on Unsplash
- Photo by Alexas_Fotos on Pixabay

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