Building a data warehouse with Pentaho and Docker

OPEN DATA CASE STUDY: CENIPA - AERONAUTICAL ACCIDENT INVESTIGATION AND PREVENTION CENTER
http://dados.gov.br/dataset/ocorrencias-aeronauticas-da-aviacao-civil-brasileira

Sources
https://github.com/wmarinho/edw_cenipa

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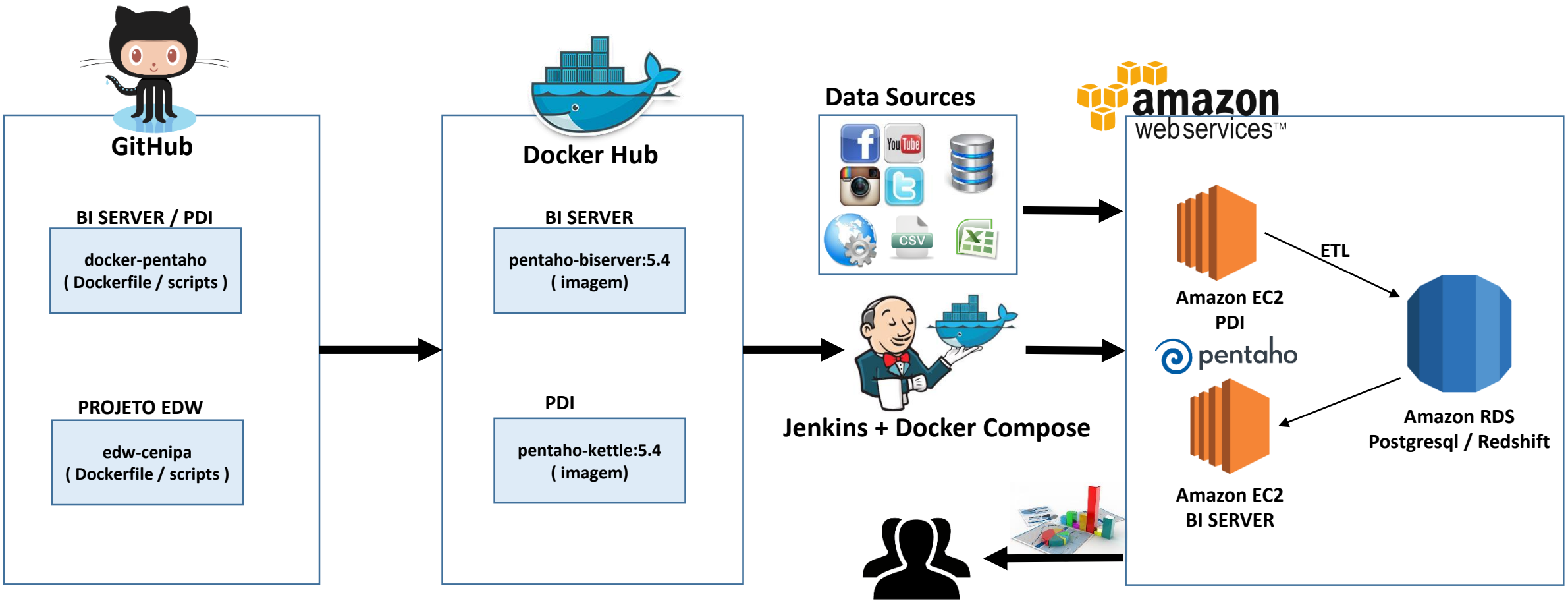
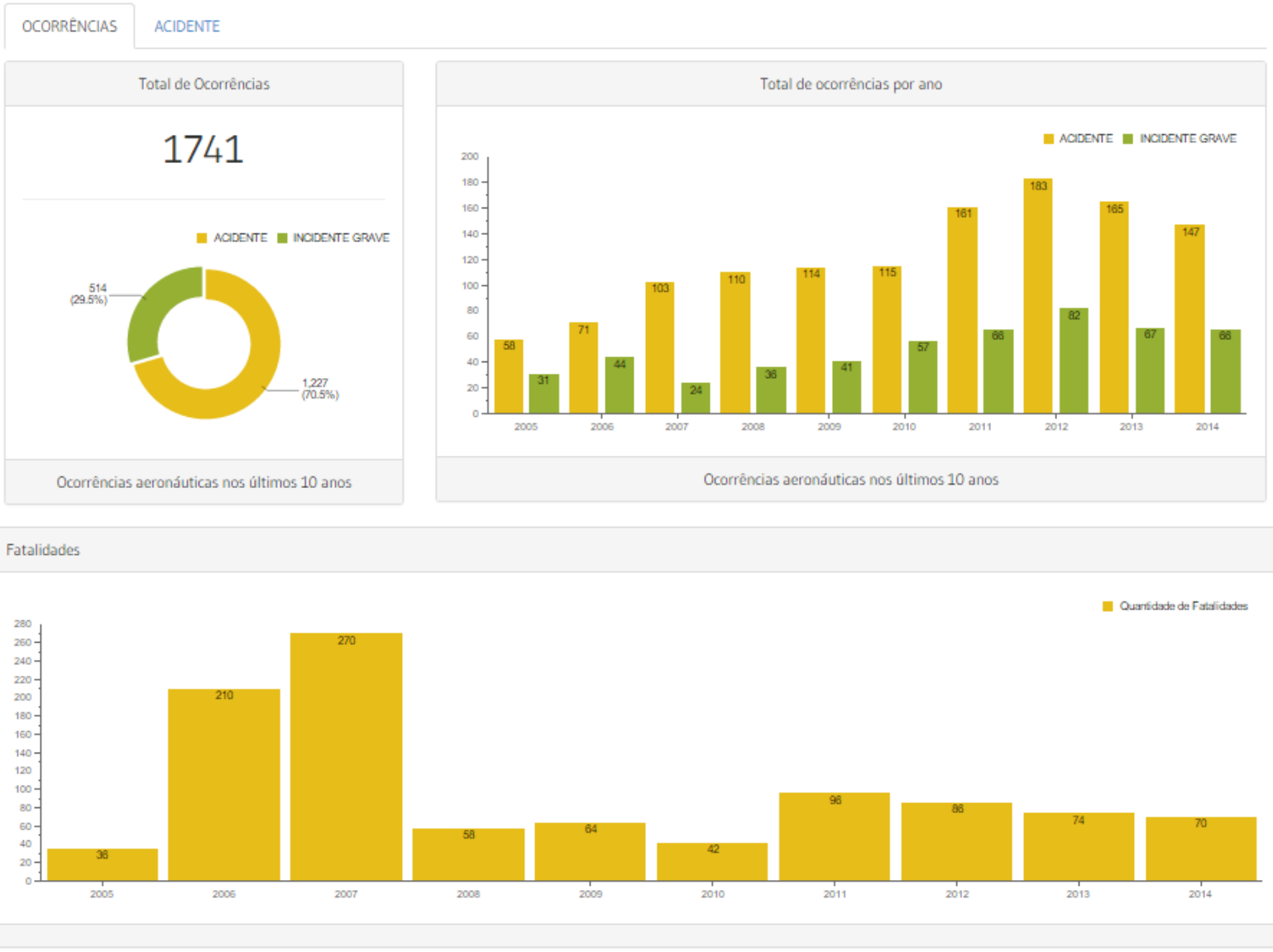
Architecture

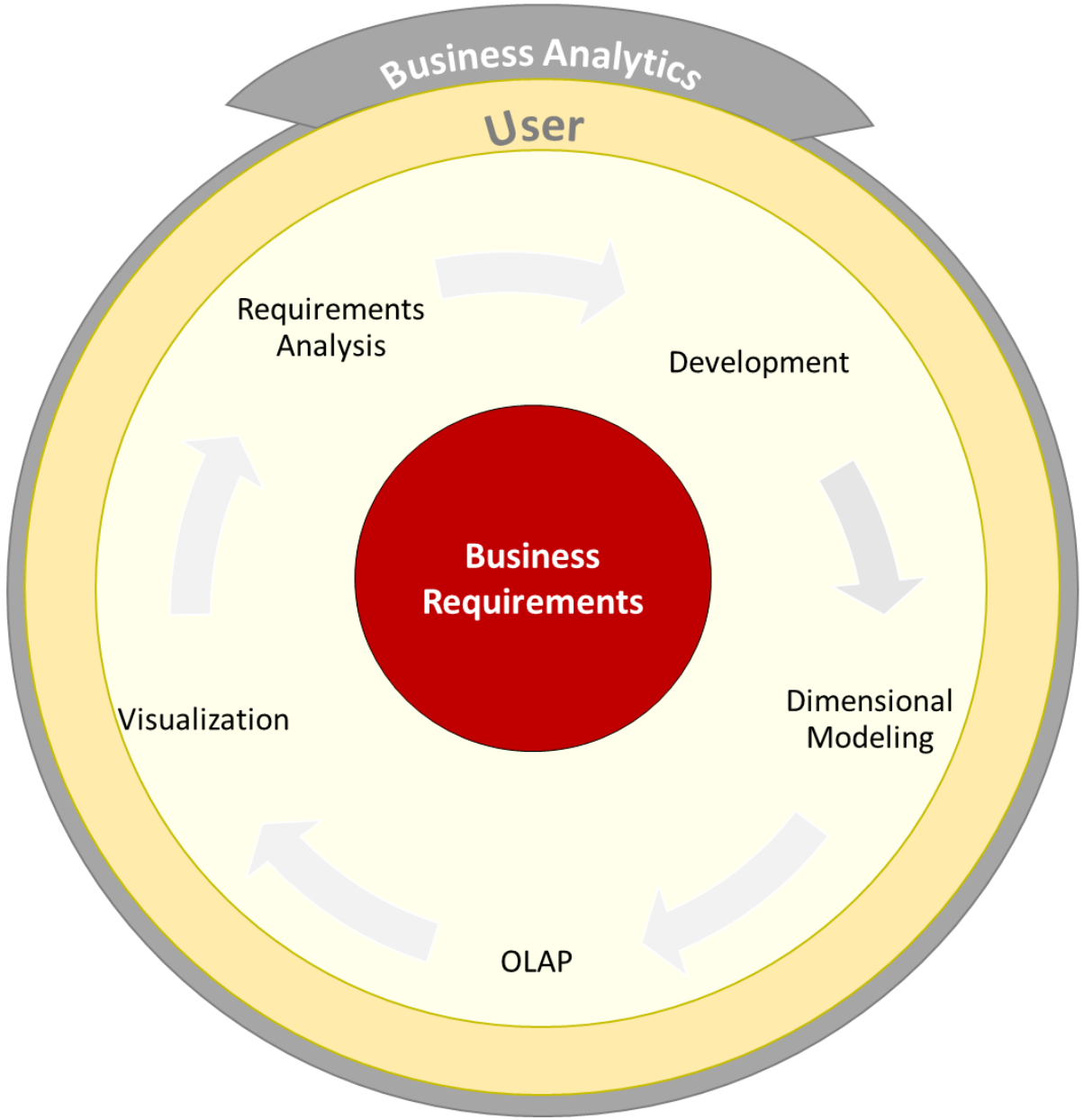


Dashboards – Aeronautical Accident & Incident

http://localhost/pentaho/plugin/cenipa/api/ocorrencias



Business Analytics



CASE STUDY- EDW CENIPA

EDW CENIPA is a opensource project designed to enable analysis of aeronautical incidentes that occured in the brazilian civil aviation. The project uses techniques and BI tools that explore innovative low-cost technologies. Historically, Business Intelligence platforms are expensive and impracticable for small projects. BI projects require specialized skills and high development costs. This work aims to break this barrier.

All analyzes are based on open data provided by CENIPA with historical events of the last 10 years :

- http://dados.gov.br/dataset/ocorrencias-aeronauticas-da-aviacao-civil-brasileira

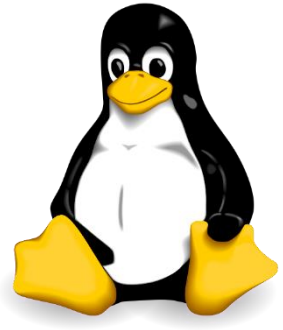
The graphics were inspired by the report available on the link:

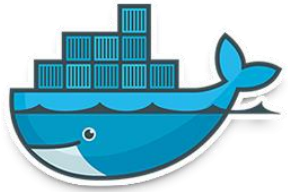
- http://www.cenipa.aer.mil.br/cenipa/index.php/estatisticas/estatisticas/panorama.

Tools

Here are some resources, tools and platforms that were used to develop and deploy the project

- Amazon Web Services - https://aws.amazon.com/
- Linux Operating System - CentOS 6 / Ubuntu 14
- GitHub - https://github.com/ - Powerful collaboration, code review, and code management for open source and private projects
- Docker - https://www.docker.com/ - An open platform for distributed applications for developers and sysadmins.
- Pentaho - http://www.pentaho.com/ e http://community.pentaho.com/ - Big data integration and analytics solutions.





Requirements

- Linux Operating System 4GB RAM and 10GB available hard disk space
- Docker v1.7.1
  - CentOS: https://docs.docker.com/installation/centos/
  - Ubuntu: https://docs.docker.com/installation/ubuntulinux/
  - Mac : https://docs.docker.com/installation/mac/
- Docker Compose v1.4.2 - https://docs.docker.com/compose/install/

Fast deployment on Amazon Linux AMI

```
$ yum update -y
$ yum install -y docker
$ service docker start
$ usermod -a -G docker ec2-user
$ yum install -y git
$ pip install -U docker-compose
$ PATH=$PATH:/usr/local/bin
```

Comandos básicos

```
$ docker info
$ docker --help
$ docker COMMAND --help
$ docker run --rm -it busybox echo "Olá, esse é meu primeiro container“
$ docker ps
$ docker images
$ docker build –t repositorio/imagem:tag .
```

Criar um arquivo Dockerfile

```
FROM busybox

CMD ["echo", "Olá, esse é meu primeiro container"]
```

Construir umaa imagem

```
$ docker build -t teste/myimage .
```

Criar um container

```
$ docker run --rm teste/myimage
```

Pentaho + Docker – Building an image from a Dockerfile

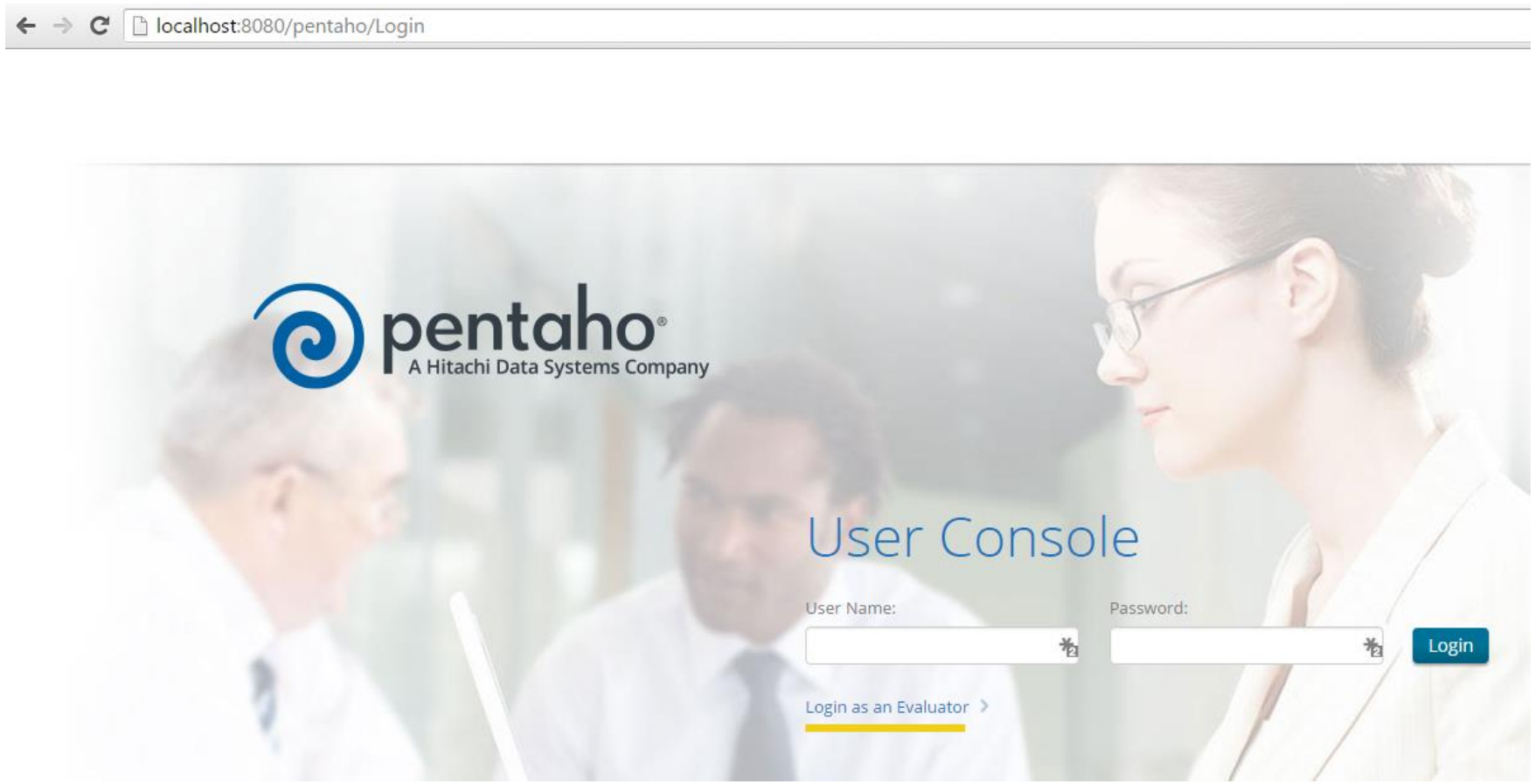
```
FROM java:7

MAINTAINER Wellington Marinho wpmarinho@globo.com

# Init ENV
ENV BISERVER_VERSION 5.4
ENV BISERVER_TAG 5.4.0.1-130

ENV PENTAHO_HOME /opt/pentaho

# Apply JAVA_HOME
RUN . /etc/environment
ENV PENTAHO_JAVA_HOME $JAVA_HOME
ENV PENTAHO_JAVA_HOME /usr/lib/jvm/java-1.7.0-openjdk-amd64
ENV JAVA_HOME /usr/lib/jvm/java-1.7.0-openjdk-amd64

# Install Dependences
RUN apt-get update; apt-get install zip -y; \
    apt-get install wget unzip git -y; \
    apt-get clean && rm -rf /var/lib/apt/lists/* /tmp/* /var/tmp/*;

RUN mkdir ${PENTAHO_HOME};

# Download Pentaho BI Server
RUN /usr/bin/wget --progress=dot:giga http://downloads.sourceforge.net/project/pentaho/Business%20Intelligence%20Server/${BISERVER_VERSION}/biserver-ce-${BISERVER_TAG}.zip
-O /tmp/biserver-ce-${BISERVER_TAG}.zip; \
    /usr/bin/unzip -q /tmp/biserver-ce-${BISERVER_TAG}.zip -d  $PENTAHO_HOME; \
    rm -f /tmp/biserver-ce-${BISERVER_TAG}.zip $PENTAHO_HOME/biserver-ce/promptuser.sh; \
    sed -i -e 's/\(exec ".*"\) start/\1 run/' $PENTAHO_HOME/biserver-ce/tomcat/bin/startup.sh; \
    chmod +x $PENTAHO_HOME/biserver-ce/start-pentaho.sh

RUN useradd -s /bin/bash -d ${PENTAHO_HOME} pentaho; chown -R pentaho:pentaho ${PENTAHO_HOME};

#Always non-root user
USER pentaho
WORKDIR /opt/pentaho

EXPOSE 8080
CMD ["sh", "/opt/pentaho/biserver-ce/start-pentaho.sh"]
```

Pentaho BI Server

Building an image and runing docker container

```
$ docker build -t pentaho/biserver:5.4 .
$ docker run --rm -p 8080:8080 -it pentaho/biserver:5.4
```

Open Pentaho BI Server



Deploying Project

Deploying EDW CENIPA project

```
$ wget -O - https://raw.githubusercontent.com/wmarinho/edw_cenipa/master/easy_install | sh
```

Installation can take over 30 minutes , depending of server configuration and Internet bandwidth .

Check if containers are running

```
$ docker ps
```

The project has 3 containers :

- edwcenipa_db_1 – PostgreSQL database container
- edwcenipa_pdi_1 – Pentaho Data Integration container
- edwcenipa_biserver_1 – Pentaho BI Server container

Check logs

```
$ docker logs -f edwcenipa_pdi_1
$ docker logs -f edwcenipa_biserver_1
```

Docker Compose

docker-composse.yml – Define and run all docker applications

```
 pdi:
  image: image_cenipa/pdi
  links:
     - biserver:edw_biserver
  volumes:
    - /data/stage:/tmp/stage
  environment:
    - PGHOST=172.17.42.1
    - PGUSER=pgadmin
    - PGPASSWORD=pgadmin.
    - PENTAHO_DI_JAVA_OPTIONS=-Xmx2014m -XX:MaxPermSize=256m
biserver:
  image: image_cenipa/biserver
  ports:
    - "80:8080"
  links:
    - db:edw_db
  environment:
    - PGUSER=pgadmin
    - PGPASSWORD=pgadmin.
    - INSTALL_PLUGIN=saiku
    - CUSTOM_LAYOUT=y
db:
  image: wmarinho/postgresql:9.3
  ports:
    - "5432:5432"
```

Pentaho + Docker + Amazon

With the following command and the appropriate credentials , you can run the project on Amazon Web Services. REMEMBER to replace the variables before running the command (check the parameters in the AWS console) .

```
$ SUBNET_ID=
$ SGROUP_IDS=
$ KEY_NAME=
$ aws ec2 run-instances \
        --image-id ami-e3106686 \
        --instance-type c4.large \
        --subnet-id ${SUBNET_ID} \
        --security-group-ids ${SGROUP_IDS} \
        --key-name ${KEY_NAME} \
        --associate-public-ip-address \
        --user-data "https://raw.githubusercontent.com/wmarinho/edw_cenipa/master/aws/user-data.sh" \
        --count 1
```

Thank you!

Thanks:
Marcelo Módolo – Globosat
Caio Moreno – IT4Biz
Fernando Maia – IT4Biz

Sources:
https://github.com/wmarinho/edw_cenipa
https://github.com/wmarinho/docker-pentaho
https://hub.docker.com/r/wmarinho/pentaho/