ORACLE

Modern Cloud Day 2019 - Paris

Docker & Kubernetes

Pour deployer les technologies Oracle....

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Safe Harbor Statement

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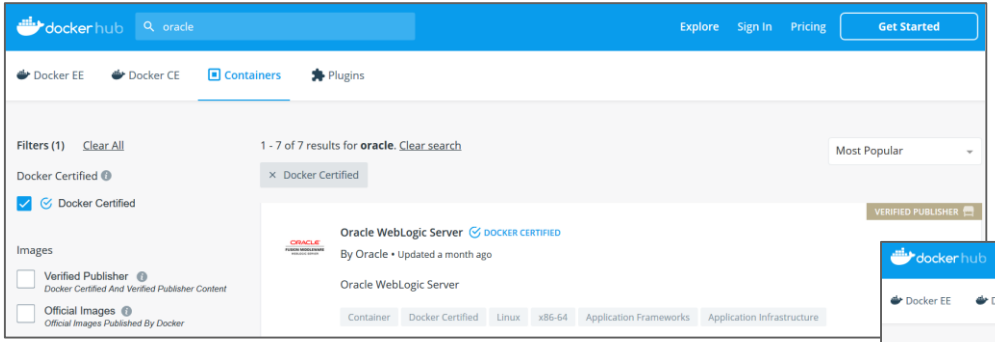
Agenda

1. Les Images Docker Oracle
2. Licencing
3. Support
4. Focus Java
5. Focus Oracle Database
6. Focus Oracle WebLogic & Coherence
7. Oracle Cloud Infrastructure Service Broker
8. Alternatives/Compléments à Docker & Kubernetes

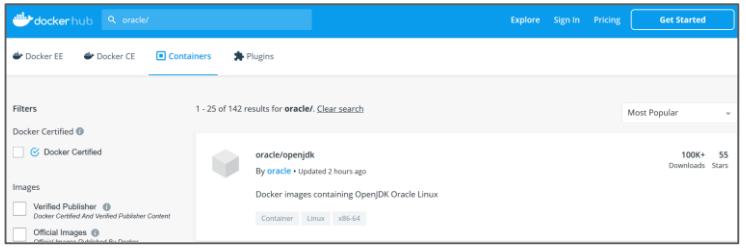
Les images Docker Oracle

Docker Hub (url)



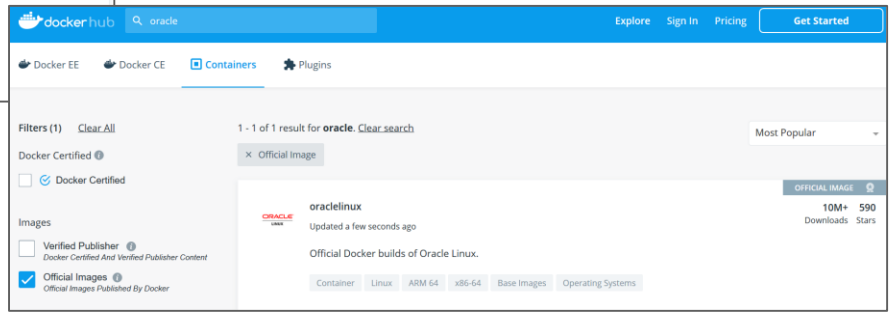
Docker Certified (8)

- Oracle WebLogic Server
- Oracle Web Tier
- Oracle Java 8 SE (Server JRE)
- Oracle Instant Client
- Oracle Fusion Middleware Infrastructure
- Oracle Database Enterprise Edition
- MySQL Server Enterprise Edition
- Oracle Coherence



Others (142)

- OpenJDK, noSQL, openstack, …

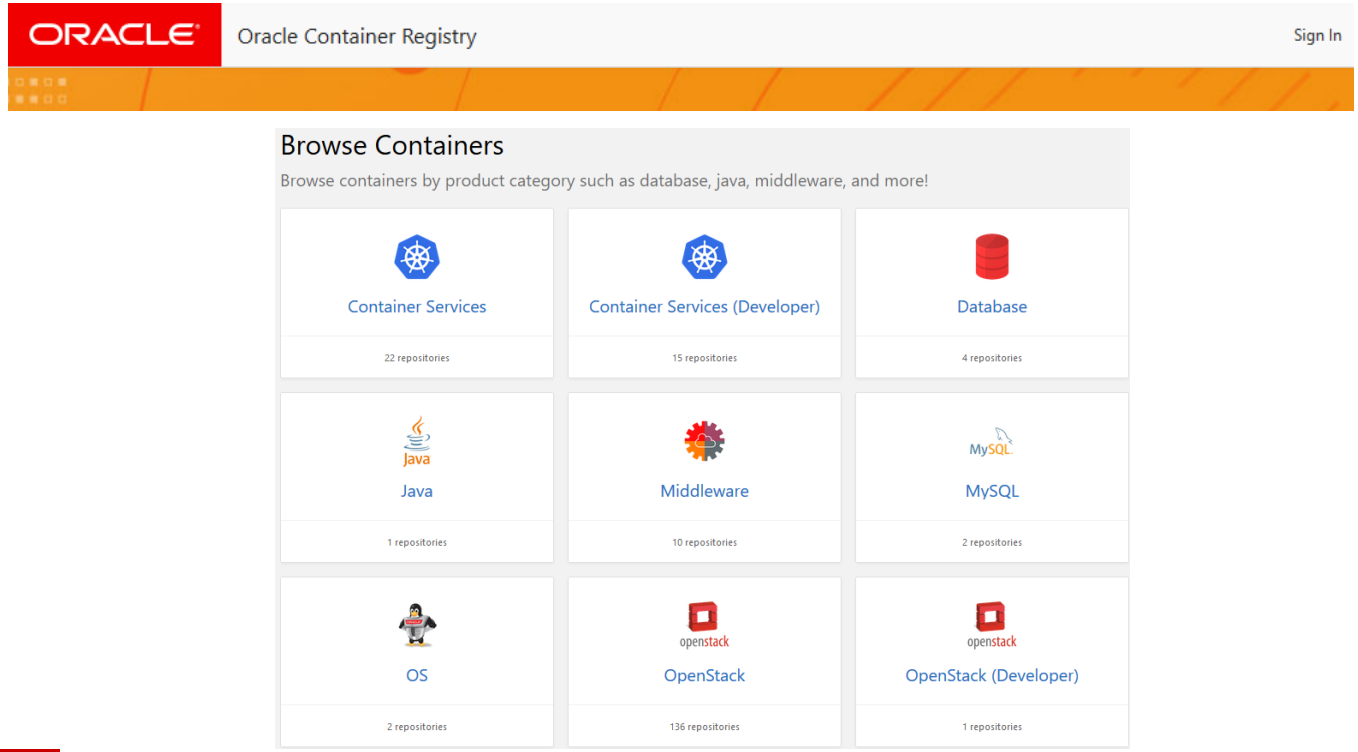


Official Image (1)

- Oracle Linux

Les images Docker Oracle Database

Oracle Container Registry (url)



Les images Docker Oracle

Oracle GitHub images (url)

Spécificité

- Vous construisez l'image vous-même, ce qui vous permet de modifier le fichier build pour faire du "sur mesure" par rapport à vos contraintes.

Why GitHub? Enterprise Explore Marketplace Pricing Search Sign in Sign up

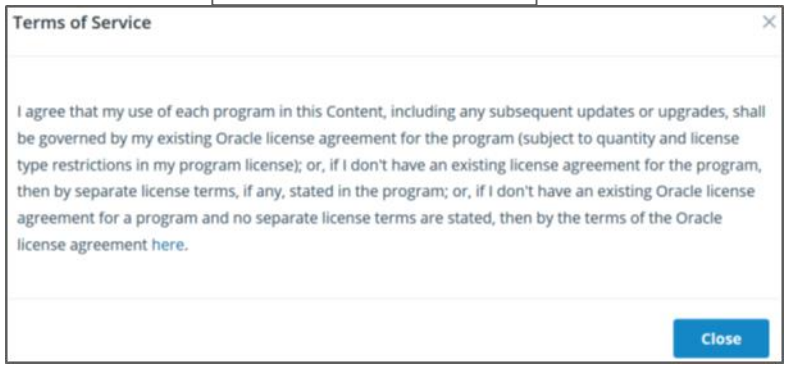
oracle / docker-images Watch 374 Star 3,176 Fork 2,875

ContainerCloud	fix typos (#1029)	8 months ago
GraalVM/CE	Adding GraalVM-CE 19.0 Dockerfiles (#1313)	9 days ago
NoSQL	Moving file to the right place. (#847)	last year
OpenJDK	Replacing yum clean all across the repo (#607)	2 years ago
OracleBI	fix typos (#1029)	8 months ago
OracleCloudInfrastructure	Must use Oracle Linux yum server release package (#1307)	18 days ago
OracleCoherence	Add instructions to ensure Coherence 12.2.1.3 base Docker image is na...	2 months ago
OracleDataIntegrator	Oracle Data Integrator - 12.2.1.3.0 Docker scripts (#623)	2 years ago
OracleDatabase	Fix bug, Register the ASM instance against the listener running on th...	9 days ago
OracleEDQ	EDQ 12.2.1.3.0 Docker Scripts (#666)	2 years ago
OracleFMWInfrastructure	edit READMEs	19 days ago
OracleGoldenGate	Oracle GoldenGate on Docker (#1273)	2 months ago
OracleHTTPServer	Modified Readme file for patching and domain creation script	6 months ago
OracleInstantClient	Remove duplication and simplify (#1318)	3 hours ago
OracleJava	Apr 2019 Java SE CPU (#1248)	2 months ago
OracleRestDataServices	Add checksum for 18.4 (#1171)	3 months ago
OracleSOASuite	rand_pwd should only echo password and not INFO: (#1317)	6 hours ago
OracleTuxedo	Update Copyright and LICENSE according to Legal's request (#851)	last year
OracleUnifiedDirectory	Initial release of OUD on docker for oracle/docker-images (#911)	last year
OracleWebCenterSites	Adding Machine and Cluster functionality (#1314)	6 days ago
OracleWebLogic	Remove files that are no longer used in the sample (#1312)	12 days ago

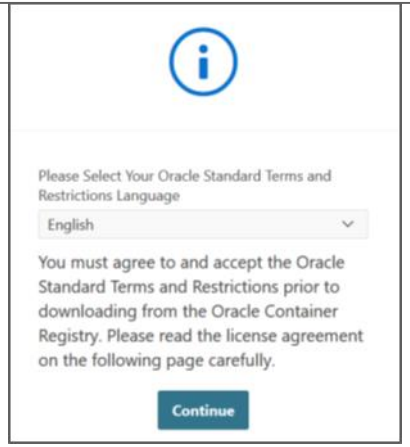
Licencing

Les produits Oracle sont généralement soumis à une licence.

Docker Hub



Oracle Container Registry



Oracle Github

Obligation de télécharger la distribution sur oracle.com

Rmq : Attention à ne pas mettre en public une image Oracle ou à utiliser une image Oracle ne venant pas d'Oracle

Licencing

Attention au soft partitioning [information non contractuelle]

Docker is not in the list of hard partitioning technologies of this document:
http://www.oracle.com/us/corporate/pricing/partitioning-070609.pdf

So this is considered soft partitioning like VMware. So the same VMware policies apply to deployment on Docker.

Meaning if you have a farm of 10 servers with Kubernetes and Oracle in a Docker Container you would need to licence ALL Physical CPU of all the servers FARM (10 servers)? Just like in VMware Farm having a Oracle database in a Virtual Machine is equal to licence the whole ESX Farm of all the physical server that compose the farm.

Licencing

Licence gratuite pour le développeur

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…

Support

Quid du support Oracle sous Docker ?

Quelques métriques

- Tous les produits Oracle ne sont pas supportés sous Docker (ex TimesTen n'est pas supporté)
- Quand un produit est supporté sous Docker (ex Oracle Db), toutes les versions ne sont pas supportées.
- Quand un produit est supporté sous Docker c'est tout le temps avec un OS de type Oracle Linux 7

Exemples : Oracle Db 12.1.0.2 supporté, WebLogic Server supporté depuis la 12.1.3 jusqu'à la 12.2.1.3, etc…

Focus Java

Les potentiels problèmes avec Docker sont sous contrôle

Le Problème

Docker uses control groups (cgroups) to limit resources. It's definitely a good idea to limit memory and CPU while running applications in containers — it prevents an application from using the whole available memory and/or CPU, which makes other containers running on the same system unresponsive.
The JVM "sees" the whole memory and all CPU cores available on the system and aligns its resources to it

Aujourd'hui sous contrôle

The new Java version (10 and above) docker support is already built-in.
The good news: Docker support was also backported to Java 8 (8u212).

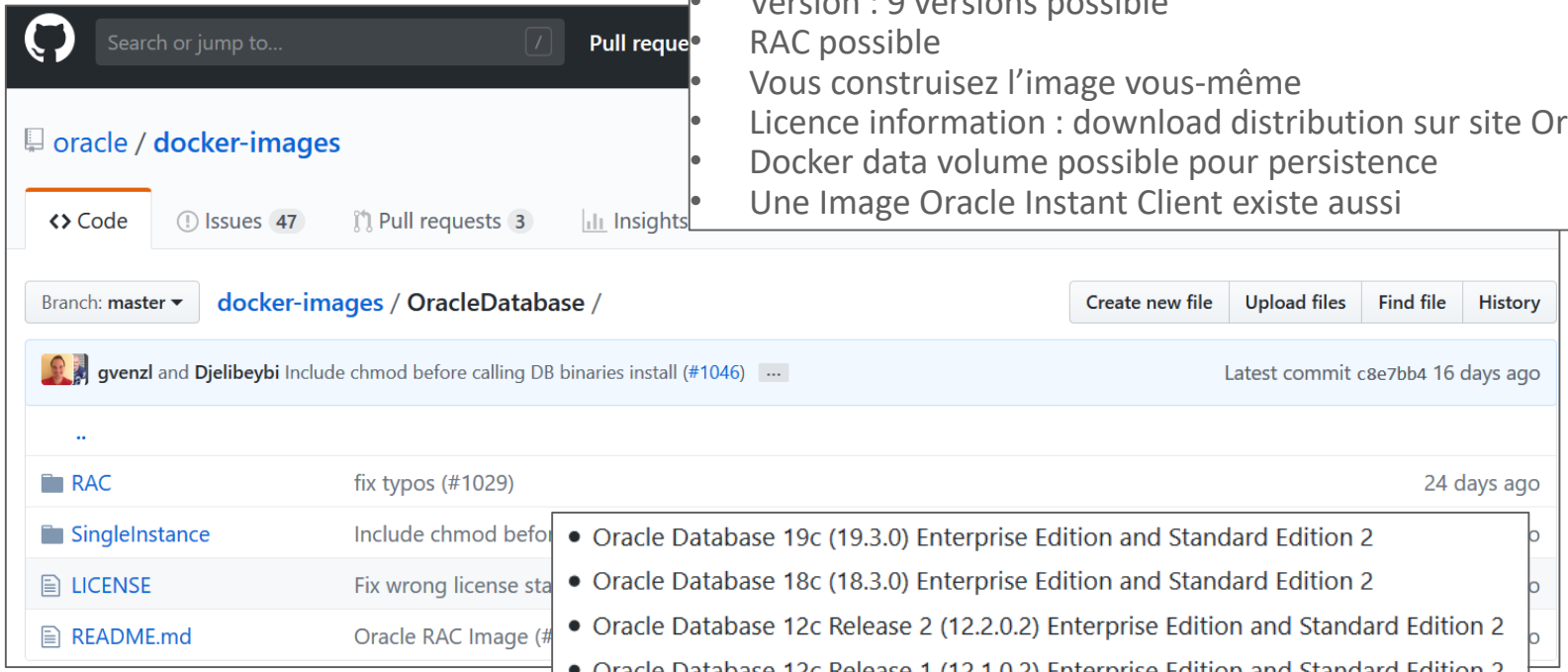
It's extremely important to set correct heap size for JVM-based applications. With the newest Java 8 version you can rely on the default settings which are safe (but quite conservative, though). There is no need to use any hacky workarounds in a docker entrypoint, nor setting Xmx as fixed value anymore

Focus Oracle Database

Oracle GitHub images (url)

Rmq :

- Version : 9 versions possible
- RAC possible
- Vous construisez l'image vous-même
- Licence information : download distribution sur site Oracle
- Docker data volume possible pour persistence
- Une Image Oracle Instant Client existe aussi



- Oracle Database 19c (19.3.0) Enterprise Edition and Standard Edition 2
- Oracle Database 18c (18.3.0) Enterprise Edition and Standard Edition 2
- Oracle Database 12c Release 2 (12.2.0.2) Enterprise Edition and Standard Edition 2
- Oracle Database 12c Release 1 (12.1.0.2) Enterprise Edition and Standard Edition 2
- Oracle Database 11g Release 2 (11.2.0.2) Express Edition.

Focus Oracle Database

Exemple de run avec docker

```
docker run --name <container name> \
-p <host port>:1521 -p <host port>:5500 \
-e ORACLE_SID=<your SID> \
-e ORACLE_PDB=<your PDB name> \
-e ORACLE_PWD=<your database passwords> \
-e ORACLE_CHARACTERSET=<your character set> \
-v [<host mount point>:]/opt/oracle/oradata \
oracle/database:18.3.0-ee

Parameters:

  --name: The name of the container (default: auto generated)
  -p: The port mapping of the host port to the container port. Two ports are exposed: 1521 (Oracle Listener), 5500 (OEM Express)
  -e ORACLE_SID: The Oracle Database SID that should be used (default: ORCLCDB)
  -e ORACLE_PDB: The Oracle Database PDB name that should be used (default: ORCLPDB1)
  -e ORACLE_PWD: The Oracle Database SYS, SYSTEM and PDB_ADMIN password (default: auto generated)
  -e ORACLE_CHARACTERSET: The character set to use when creating the database (default: AL32UTF8)
  -v /opt/oracle/oradata The data volume to use for the database. Has to be writable by the Unix "oracle" (uid: 54321) user inside the container! If omitted the database will not be persisted over container recreation.
  -v /opt/oracle/scripts/startup | /docker-entrypoint-initdb.d/startup Optional: A volume with custom scripts to be run after database startup. For further details see the "Running scripts after setup and on startup" section below.
```

Focus Oracle Database

Avec Kubernetes ca fonctionne mais…

- Oracle Database sous Kubernetes sans persistence : AUCUN PROBLEME
- Oracle Database sous Kubernetes avec persistence : FAIRE ATTENTION

  - Problème : Dans le container Oracle Database est lancée via le user oracle et pas par root donc Oracle Database n'a pas le droit d'écrire sur un Persistent Volume par défaut.

  - Solution idéale : Il faut jouer sur le security context au niveau de la définition du deployment kubernetes :

```
securityContext:
    # Set fsGroup to oracle's user GID so that the PVC can be accessed inside the container
    fsGroup: 54321
```

Focus Oracle Database

Avec Kubernetes sur OCI (PaaS), l'utilisation de Helm facilite les choses

Il suffit de consulter le projet GitHub à cet url.

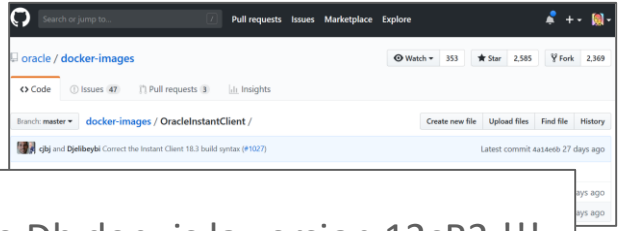
Liste des fichiers de Helm :

- Values.yaml : Déclaration des variables à personnaliser
- pvc.yaml : Création du Persistent Volume Claim. Utilisation de la class de stockage OCI afin de créer un Block Storage OCI attaché en iscsi au "worker" Kubernetes.
- Deployment.yaml : Déploiement kubernetes de Oracle Db. Utilisation du security contex afin que Oracle Db puisse écrire sur le Persistent Volume
- service.yaml, ingress.yaml : Définition de la partie réseau permettant d'accéder au port 1521 d'Oracle Db.

Rmq : Après déploiement le service name par défaut de la PDB est "pdb1.local"

Focus Oracle Database

Oracle Instant Client sous docker & IAC



NEWS

Oracle Instant Client incorpore les outils d'import et d'export Oracle Db depuis la version 12cR2 !!!

1) L'image Docker Oracle Instant Client de GitHub ne contient pas par défaut imp/exp et impdb/expdb. En effet, si on regarde le Dockerfile seule le package de "base" et "sqlplus" sont installés donc il faut ajouter dans le Dockerfile le package tools qui contient les outils d'import/export. Dans le Dockerfile modifier l'installation yum comme ci-dessous

"yum -y install oracle-instantclient18.3-basic oracle-instantclient18.3-devel oracle-instantclient18.3-sqlplus oracle-instantclient18.3-tools "

2) On peut alors faire un import/export Oracle Db depuis nimporte quelle container qui voit la database sur le réseau

docker run -dit --name impexpcontainer cpruvost/devopsforms bash
docker cp ./tnsnames.ora impexpcontainer:/usr/lib/oracle/18.3/client64/tnsnames.ora
docker cp ./workshop_summit_schema.dmp impexpcontainer:workshop_summit_schema.dmp
docker exec impexpcontainer imp $DBUSER$SLACH$DBPASSWORD@MYPDB file=./workshop_summit_schema.dmp FROMUSER=SUMMIT TOUSER=SUMMIT
docker stop impexpcontainer
docker rm impexpcontainer

Focus Oracle WebLogic

No need for a Wls Cluster with Kubernetes and a simple war

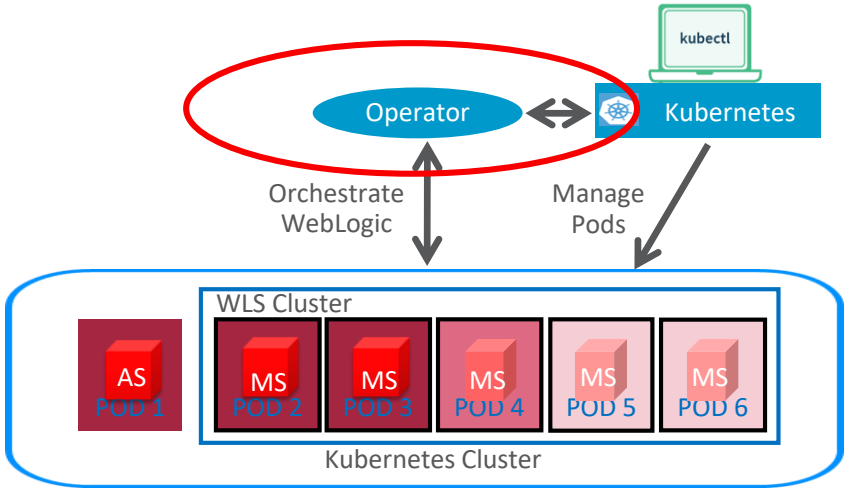
- Step 1 : Build de l'image WebLogic Server avec un domaine inclus + des ressources déployées (application, datasource, jms, ..) grâce a wlst offline.
- Step 2 : Déploiement de l'image Wls contruite avec les fonctionnalités standard de Kubernetes (deployment, ingress, …).

→ Ici Kubernetes gère tout à la place de WebLogic donc pas besoin de cluster, pas besoin de Node Manager, etc..

Focus Oracle WebLogic

WebLogic Kubernetes Operator with a JEE App

- The Oracle WebLogic Server Kubernetes Operator contains a set of useful built-in knowledge about how to perform various lifecycle operations on a domain correctly.
- The Operator using a common set of Kubernetes APIs, provides advanced user experience, automating operations such as:
  - provisioning
  - life cycle management
  - updates
  - scaling
  - Security
- The operator is not an administrator of the WebLogic domain. The operator has only limited interest in the domain configuration, with its main concern being the high-level topology of the domain.
- Rmq : Coherence Operator is there too



Oracle Cloud Infrastructure Service Broker

Open Service Broker API

OCI Service Broker

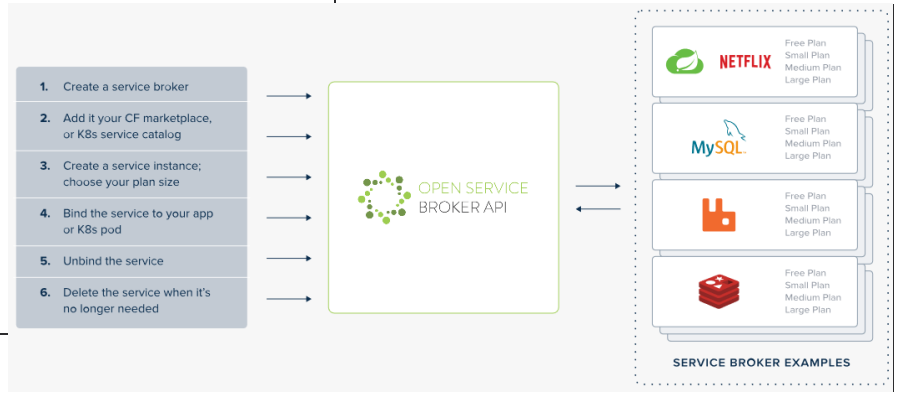
Introduction

The OCI Service Broker is an open source implementation of Open service broker API Spec for OCI services. Customers can use this implementation to install Open Service Broker in Oracle Container Engine for Kubernetes or in other Kubernetes clusters. This implementation is targeted to achieve:

- Easy installation.
- Easy extension.
- Provide OOTB implementations for common OCI services.
- OCI Service Broker Installation.

Services Supported

1. Object Storage
2. Autonomous Transaction Processing
3. Autonomous Data Warehouse
4. Oracle Streaming Service



Alternatives/Compléments à Docker & Kubernetes

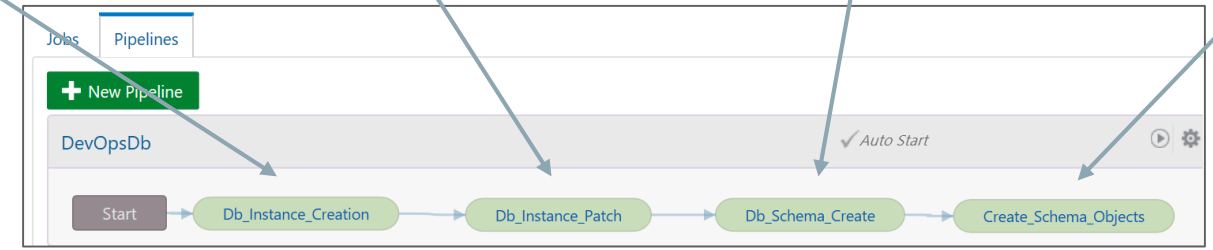
Infra As Code sur Oracle Cloud Infrastructure (OCI)

Création d'une Database As a Service avec Terraform

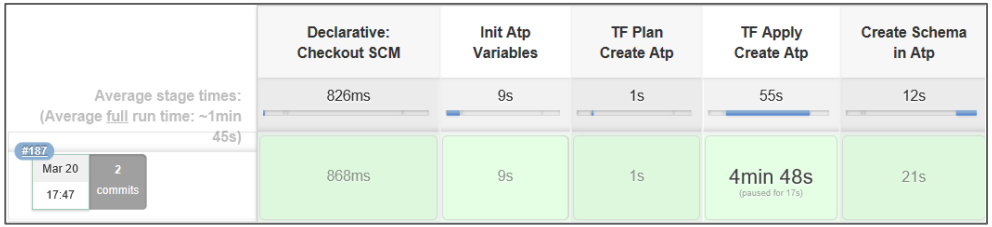
PatchDatabase As a Service avec OCI Command Line Interface

Création du Schéma avec SQL cl

Import Db avec datapump dans container Docker Oracle Instant Client



Création d'une Autonomous Db en moins de 5 min via Terraform

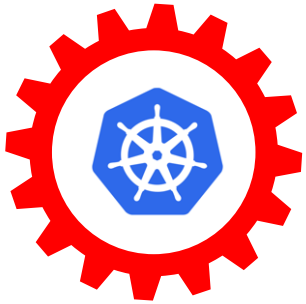


Produits Oracle prêts pour Oracle Container Native Platform

A Full Suite of Container Native Capabilities

Container Pipelines

A market leading solution for application lifecycle management with a Docker centric product view



Container Engine

Fully managed container service based on Kubernetes

Microservices

A collection of services, frameworks and libraries for the modern cloud developer; based on Cloud Native Compute Foundation

Serverless

Function as a Service for any language, best of class for Java with distributed state management

Java Diagnostics Performance/ Tuning

Highly optimized and self tuning JVM for the Oracle Cloud
Java language features for building distributed systems.

Build --- Deploy --- Operate

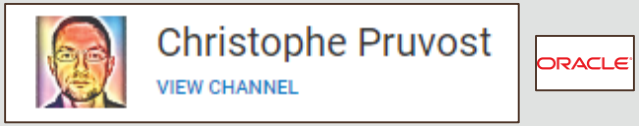
Conclusions

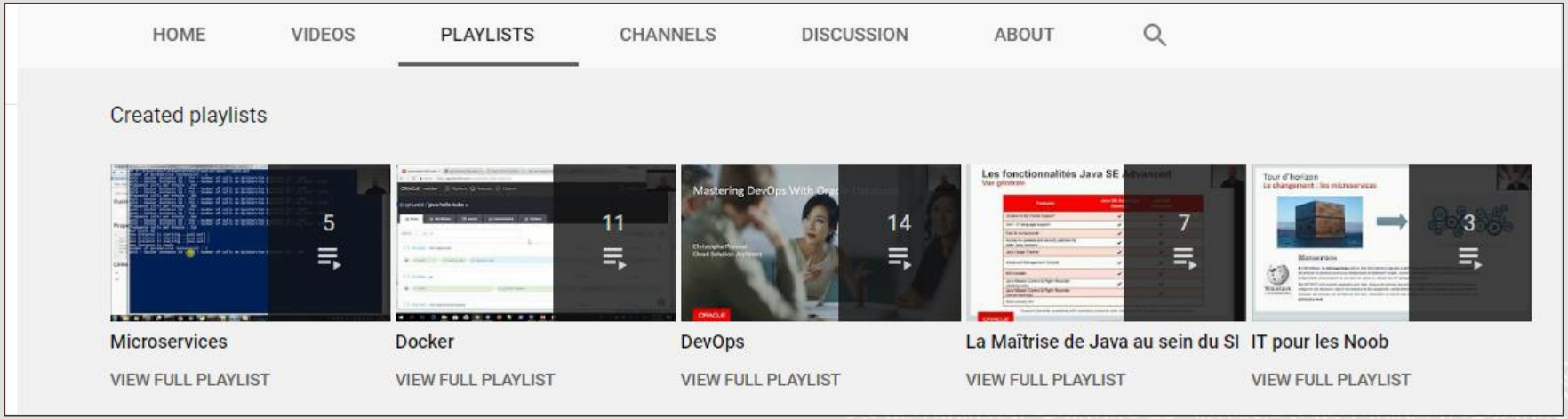
Avec Oracle vous parliez de :

Stabilité
Peformance
Gestion de gros volumes
Clustering
Etc…

Désormais vous parlerez DevOps, Docker, Kubernetes...

Chaîne Youtube





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