Christophe Laporte

SQL Server dans un conteneur Docker

2017

MS Cloud Summit Paris
24 – 25 janvier 2017

MVP Microsoft Most Valuable Professional

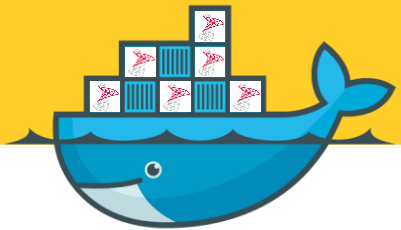
@Conseilit

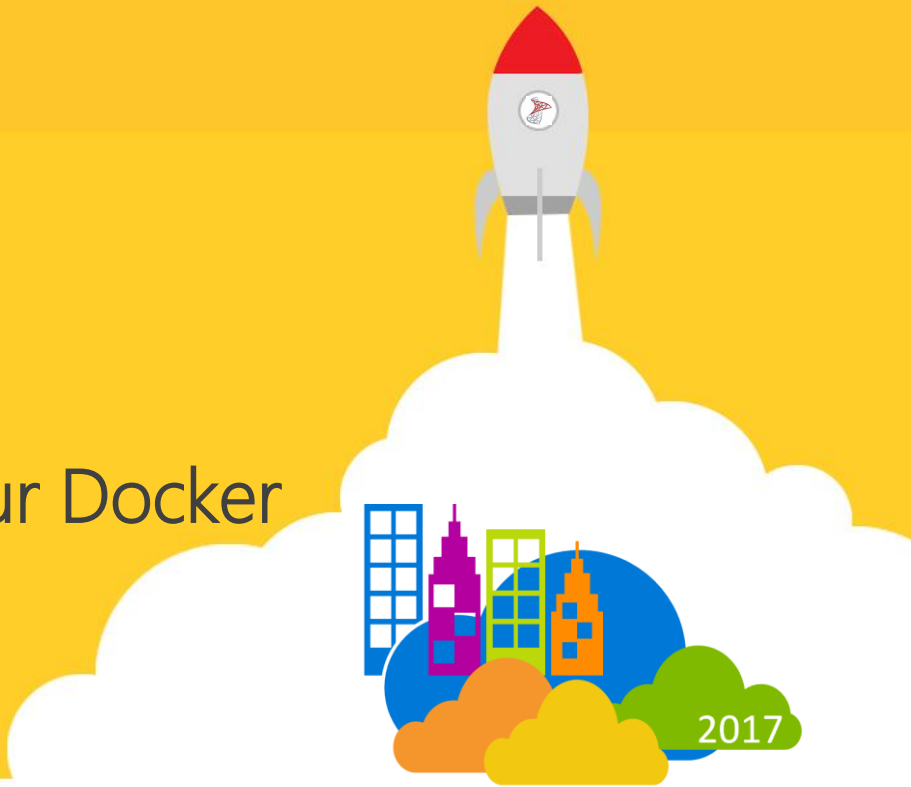
SQL Server dans un conteneur Docker

Christophe Laporte

Consultant @ Conseil IT

@conseilit





conseilit@MSCloudSummit:~$ docker info

~ depuis 1997

6.5 <= SQL Server <= v.Next

christophe_laporte@hotmail.fr

http://conseilit.wordpress.com/

@conseilit

Microsoft MVP Most Valuable Professional

Microsoft Certified Master

Microsoft Certified Trainer

MS Cloud Summit Paris 2017

Agile.Net – aOS – AZUG FR – CMD - GUSS

- Conseil
  - Infrastructure / Architecture
  - Virtualisation / Cloud
  - Haute disponibilité / Montée en charge
  - Optimisation / Dépannage
- Audit

- Migrations
- Formations
- Remote DBA
- Hébergement BDD

Merci beaucoup à nos sponsors!
Thank you to all our sponsors!

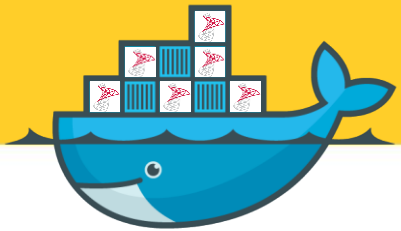
Join the conversation

#MSCloudSummit
@MSCloudSummit

Agile.Net – aOS – AZUG FR – CMD - GUSS

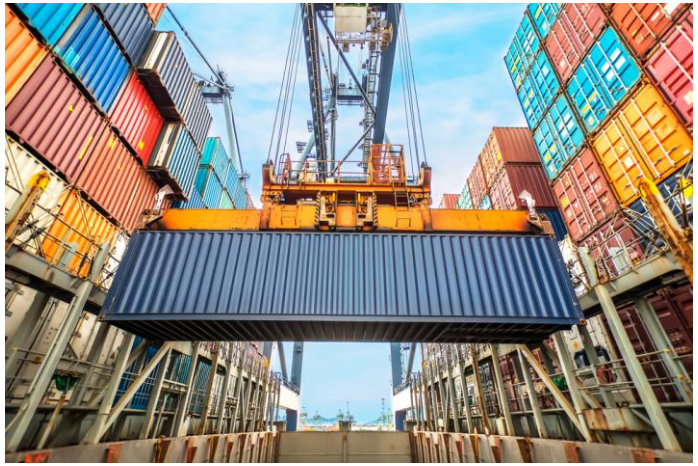
Agenda

- Micro services et conteneurs
- Installation de Docker
- Création d'un conteneur
- Exécution d'un conteneur
- Scenarii SQL Server
- Q/A



Micro services et conteneurs

- Fin des applications monolithiques
- Nouvelle approche du développement
  - Ensemble de processus rendant des services simples
  - Briques légères pouvant évoluer de manière indépendante
- Pourquoi des containers
  - Emprunte système faible, efficacité des serveurs hôtes
  - Une seule création d'image, puis exécution multiples (dev / test / prod)
  - Démarrage rapide pour supporter une montée en charge
  - Complexité globale résolue par des sous tâches simples
  - Sans état
  - Eviter «cela fonctionne sur ma machine»
- Déploiement
  - Déploiement granulaire
  - Mode DevOps
  - Déploiement à large échelle
  - Déploiement rapide
  - Hautement automatisable

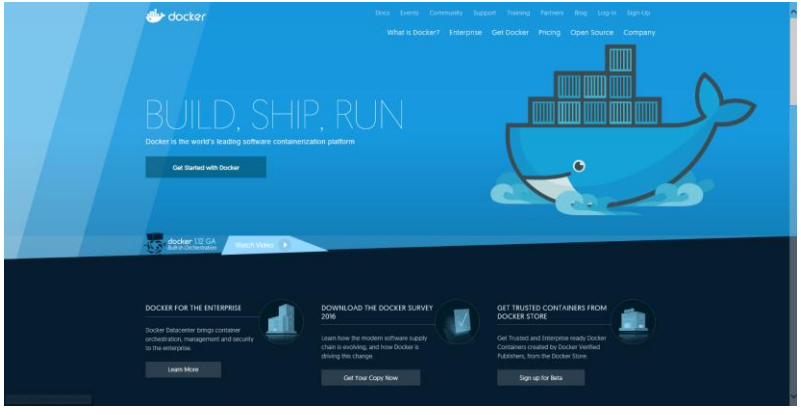


Comment ?

Azure
AWS
Red Hat OpenShift
Windows containers & Hyper-V containers
Docker

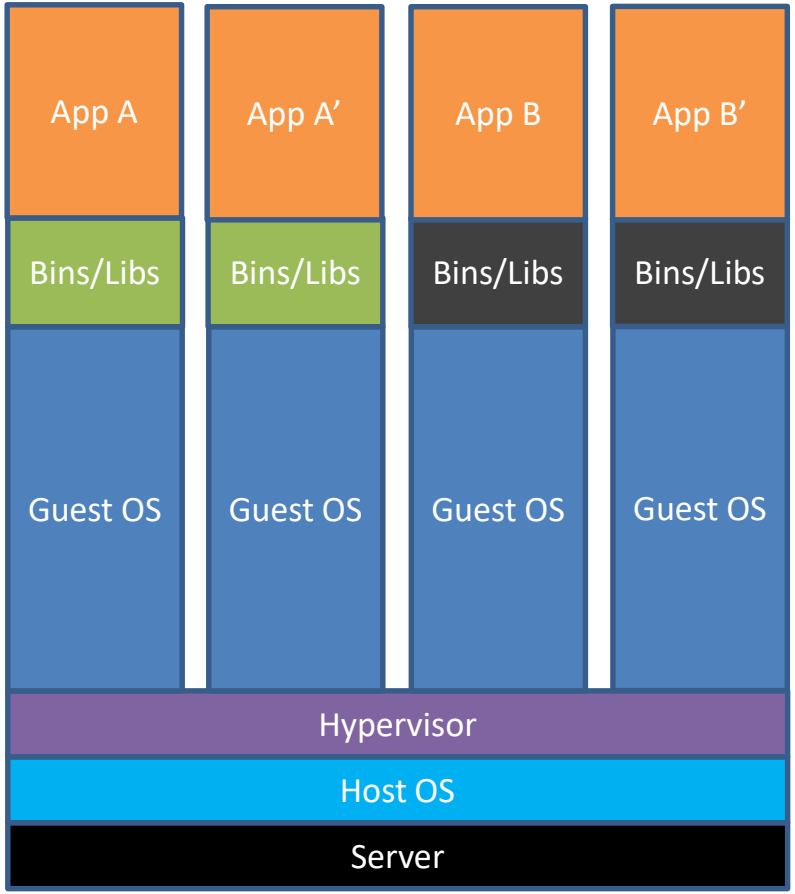
Docker

- Société
  - dotCloud
    - » Créée en 2008 à Montrouge par Solomon Hykes et Sébastien Pahl
  - 2010 : mise en avant du concept de conteneur
  - 2011 : dotCloud s'implante dans la Sillicon Valley
  - 2013 : Passage en mode open-source
  - 2013 : fondation d'une nouvelle société Docker Inc
- Terminologie
  - Image
  - Conteneur

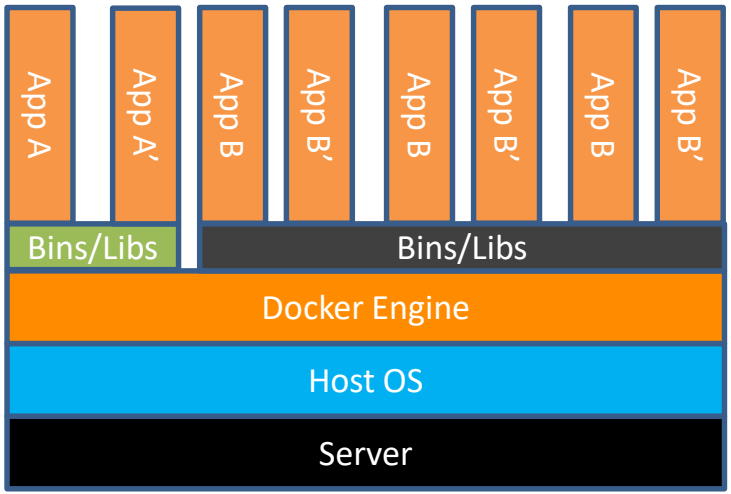


dotCloud

docker



Machines virtuelles versus conteneurs



DÉMO – INSTALLATION DE DOCKER

Windows Server 2016

```
Install-Module -Name DockerMsftProvider -Repository PSGallery -Force
Install-Package -Name docker -ProviderName DockerMsftProvider
Restart-Computer -Force
```

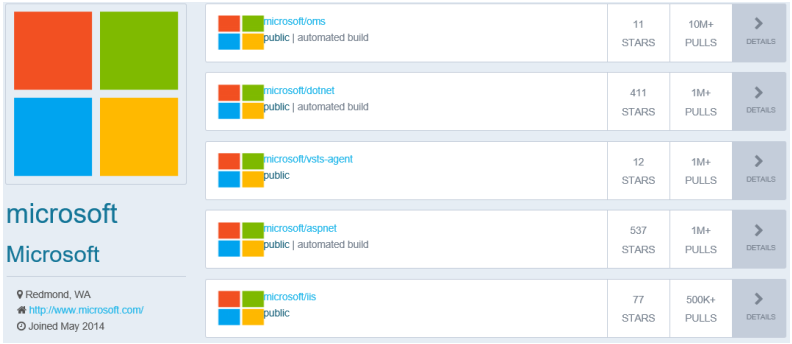
Xenial Xerus
(Ubuntu 16.04)

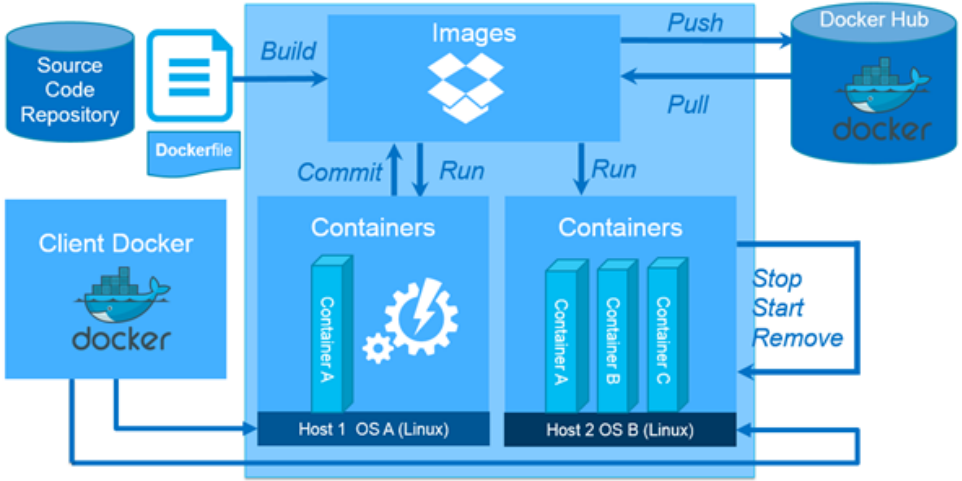
```
sudo apt-get install linux-image-extra-$(uname -r) linux-image-extra-virtual
sudo apt-get install docker.io
sudo service docker start
```

Docker --help

- Docker hub
  - Recherche d'images (IIS, SQL Server, MongoDB, MySQL, ...)
- Docker engine
  - Exécution des conteneurs
- Docker client
  - Ligne de commande
  - 45 instructions (v1.13.0-dev)

Logiciel "traditionnel"	Commande Docker
Trouver le logiciel …	Docker search
Télécharger, monter l'ISO	Docker pull
Créer un ISO / Zip	Docker build
Installer un logiciel	Docker create
Exécuter un logiciel	Docker start
Télécharger, installer et executer un logiciel	Docker run
Stopper un logiciel	Docker stop
Désinstaller un logiciel	Docker rm





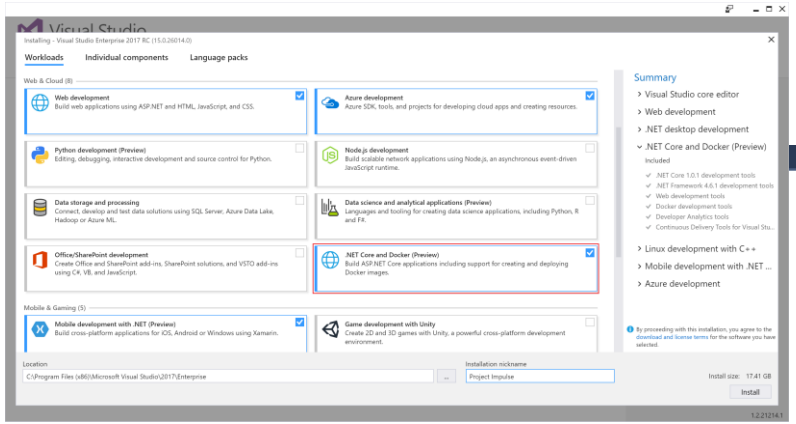
Commandes : docker --help

- attach Attach to a running container
- build Build an image from a Dockerfile
- commit Create a new image from a container's changes
- cp Copy files/folders between a container and the local filesystem
- create Create a new container
- diff Inspect changes on a container's filesystem
- events Get real time events from the server
- exec Run a command in a running container
- export Export a container's filesystem as a tar archive
- history Show the history of an image
- images List images
- import Import the contents from a tarball to create a filesystem image
- info Display system-wide information
- inspect Return low-level information on a container, image or task
- kill Kill one or more running containers
- load Load an image from a tar archive or STDIN
- login Log in to a Docker registry.
- logout Log out from a Docker registry.
- logs Fetch the logs of a container
- network Manage Docker networks
- node Manage Docker Swarm nodes
- pause Pause all processes within one or more containers
- port List port mappings or a specific mapping for the container
- ps List containers
- pull Pull an image or a repository from a registry
- push Push an image or a repository to a registry
- rename Rename a container
- restart Restart a container
- rm Remove one or more containers
- rmi Remove one or more images
- run Run a command in a new container
- save Save one or more images to a tar archive (streamed to STDOUT by default)
- search Search the Docker Hub for images
- service Manage Docker services
- start Start one or more stopped containers
- stats Display a live stream of container(s) resource usage statistics
- stop Stop one or more running containers
- swarm Manage Docker Swarm
- tag Tag an image into a repository
- top Display the running processes of a container
- unpause Unpause all processes within one or more containers
- update Update configuration of one or more containers
- version Show the Docker version information
- volume Manage Docker volumes
- wait Block until a container stops, then print its exit code

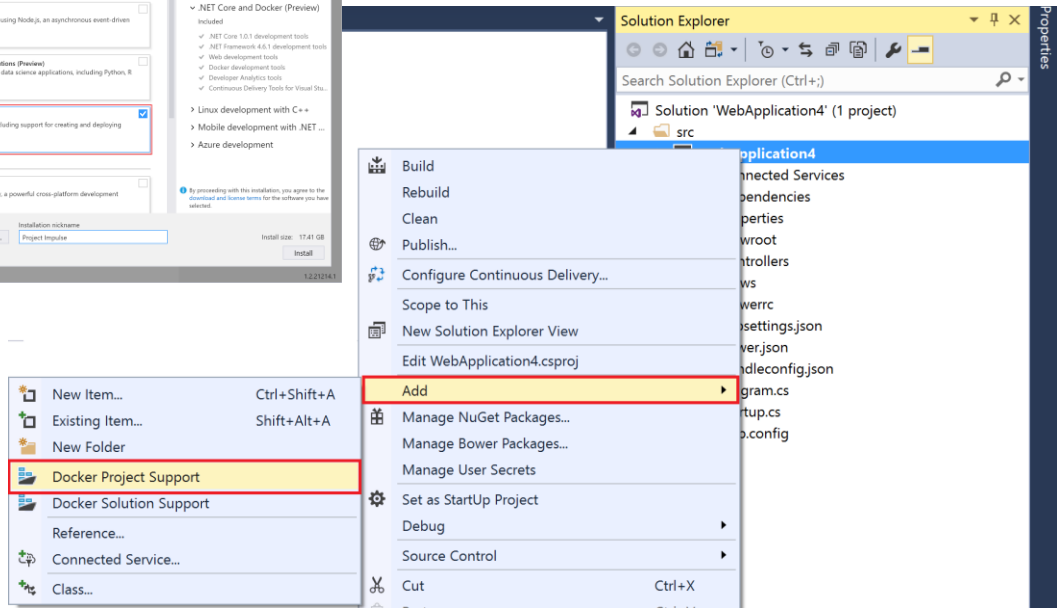
Docker & SQL Server

- Support natif du multi instance -> pourquoi containeriser ?
- Vitesse
  - Instanciation en quelques secondes
    - Parfait pour du dev, du support (durée de vie courte)
  - Economie
    - Instances de dev, moins de ressources car 1 seule VM partagée (réduction 1-10x)
    - Coût de licence réduits (Windows …)
  - Portabilité
    - Docker Windows, Mac, Linux, public cloud
- Tendance du marché

Intégré à Visual Studio 2017



https://blogs.msdn.microsoft.com/pakistan/2017/01/20/visual-studio-2017-brings-docker-home/



Docker & SQL Server

Docker Pull

- Docker Pull
  - Images officielles Microsoft
    - SQL Server 2016 SP1
    - SQL Server v.Next

```
1
2   ## SQL Server Express 2016 SP1
3   docker pull microsoft/mssql-server-windows-express
4
5   ## SQL Server developper v.Next
6   docker pull microsoft/mssql-server-windows
```

Fichier Dockerfile

- Docker build
  - Image personalisée

```
1
2   ## Custome SQL Server Express
3   docker.exe build -t sqlexpress .
```

Docker & SQL Server

Docker Pull

- Docker Pull
  - Images officielles Microsoft
    - SQL Server 2016 SP1
    - SQL Server v.Next

```
1
2   ## SQL Server Express 2016 SP1
3   docker pull microsoft/mssql-server-windows-express
4
5   ## SQL Server developper v.Next
6   docker pull microsoft/mssql-server-windows
```

Fichier Dockerfile

```
FROM microsoft/dotnet35

MAINTAINER Christophe Laporte

ENV sqlinstance SQL
ENV sqlsapassword Password1
ENV sql c:\\sql
ENV sqldata c:\\sql\\data
ENV sqlbackup c:\\sql\\backup

COPY . /install

WORKDIR /install

RUN  /install/sqlexpr_x64_enu.exe /q /x:/install/setup \
 && /install/setup/setup.exe /q /ACTION=Install /INSTANCENAME=%sqlinstance% /FEATURES=SQLEngine /UPDATE
ENABLED=0 \
    /SECURITYMODE=SQL /SAPWD=%sqlsapassword% /SQLSVCACCOUNT="NT AUTHORITY\System"  /SQLSYSADMI
NACCOUNTS="BUILTIN\ADMINISTRATORS" \
    /INSTALLSQLDATADIR=%sqldata% /SQLUSERDBLOGDIR=%sqldata% /SQLBACKUPDIR=%sqlbackup% \
    /TCPENABLED=1 /NPENABLED=0 /IACCEPTSQLSERVERLICENSETERMS \
 && powershell ./Set-SqlExpressStaticTcpPort %sqlinstance% \
 && powershell ./Move-dirs-and-stop-service %sqlinstance% %sql% %sqldata% %sqlbackup% \
 && del sqlexpr_x64_enu.exe \
 && rmdir .\setup /s /q

CMD powershell ./start detached %sqlinstance% %sqldata% %sqlbackup%
```

CRÉATION D'UN CONTENEUR

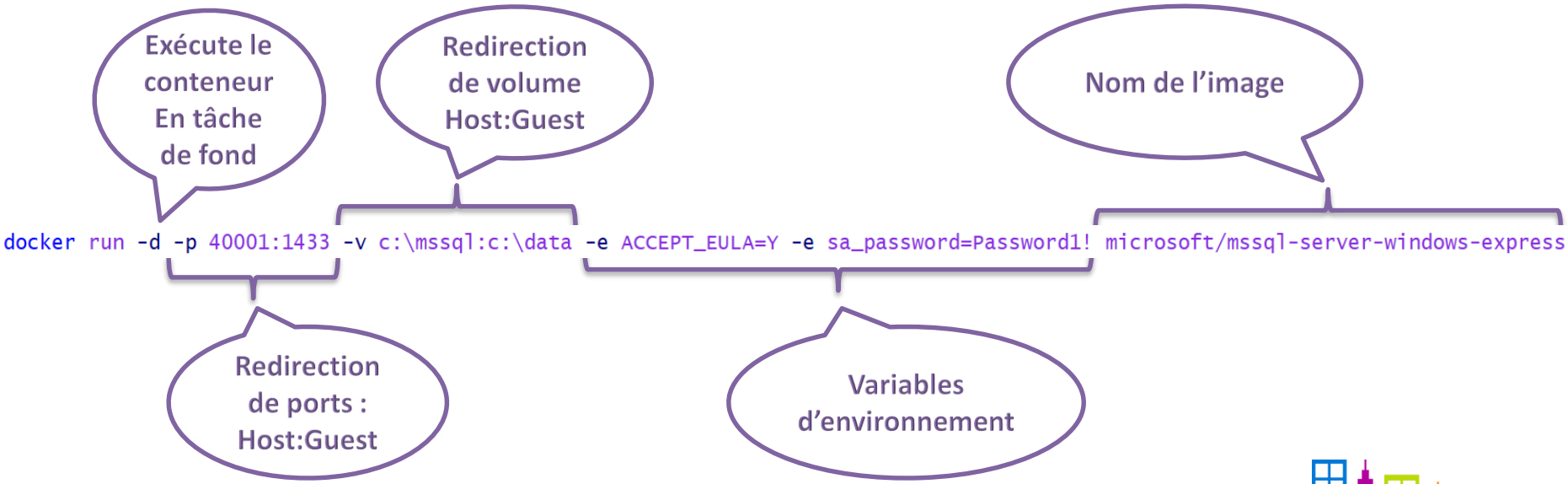
Windows Server 2016

```
## SQL Server Express 2016 SP1
docker pull microsoft/mssql-server-windows-express

## SQL Server developper v.Next
docker pull microsoft/mssql-server-windows
```

Xenial Xerus
(Ubuntu 16.04)

```
## SQL Server v.Next on Docker Linux
sudo docker pull microsoft/mssql-server-linux
```

Exécution du conteneur : Docker run



EXÉCUTION D'UN CONTENEUR

Windows Server 2016

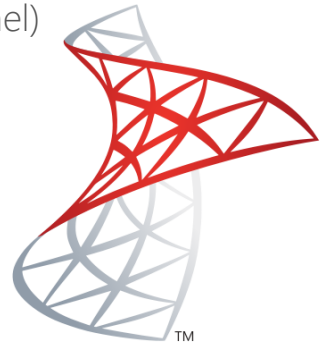
```
docker run --name sqldocker01 -d -p 40001:1433 -e sa_password=Password1! -e ACCEPT_EULA=Y microsoft/mssql-server-windows
docker logs sqldocker01
docker exec -it sqldocker01 powershell.exe
```

Xenial Xerus
(Ubuntu 16.04)

```
sudo docker run -d -e 'ACCEPT_EULA=Y' -e 'SA_PASSWORD=Password1!' -p 40001:1433 microsoft/mssql-server-linux
```

SQL Server Express

- Pourquoi SQL Server Express ?
  - Version légère de SQL Server (200MB pour les sources d'installation)
    - » limitée en mémoire
    - » Limitée en taille de bases
    - » Service simple (seulement le moteur relationnel)
- Cas d'utilisation
  - Développement sur Machines Mac / Linux
  - Tests
  - Montée en charge : Répartition de charge
    - » Mise à jour des données
      - » /!\ Réplication ne fonctionne pas !
      - » Service broker (client seulement)
      - » Serveur lié
- Philosophie typique du micro-service



Microsoft® SQL Server® Express

SQL 2016 SP1

Surface de programmation similaire entre éditions

Feature	RTM				SP1			
	Standard	Web	Express	Local DB	Standard	Web	Express	Local DB
Row-Level Security	Yes	No	No	No	Yes	Yes	Yes	Yes
Dynamic Data Masking	Yes	No	No	No	Yes	Yes	Yes	Yes
Change Data Capture	No	No	No	No	Yes	Yes	No	No
Database Snapshot	No	No	No	No	Yes	Yes	Yes	Yes
Columnstore	No	No	No	No	Yes	Yes	Yes	Yes
Partitioning	No	No	No	No	Yes	Yes	Yes	Yes
Compression	No	No	No	No	Yes	Yes	Yes	Yes
In Memory OLTP	No	No	No	No	Yes	Yes	Yes	No
Always Encrypted	No	No	No	No	Yes	Yes	Yes	Yes
PolyBase	No	No	No	No	Yes	Yes	Yes	No
Fine Grained Auditing	No	No	No	No	Yes	Yes	Yes	Yes
Mulitple Filestream Containers	No	No	No	No	Yes	Yes	Yes	No

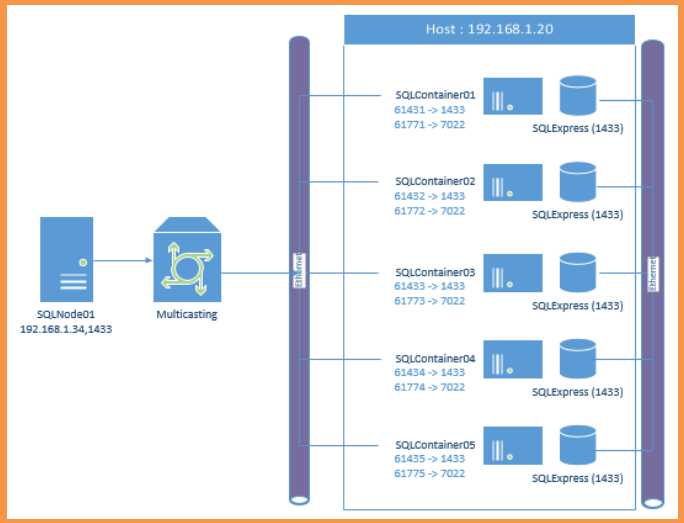
SCÉNARII DOCKER SQL SERVER

- Instances Dev (Windows, Mac, Linux)
- Instances de test à la demande
- Instances de production (ISV, Cloud, ScaleOut)

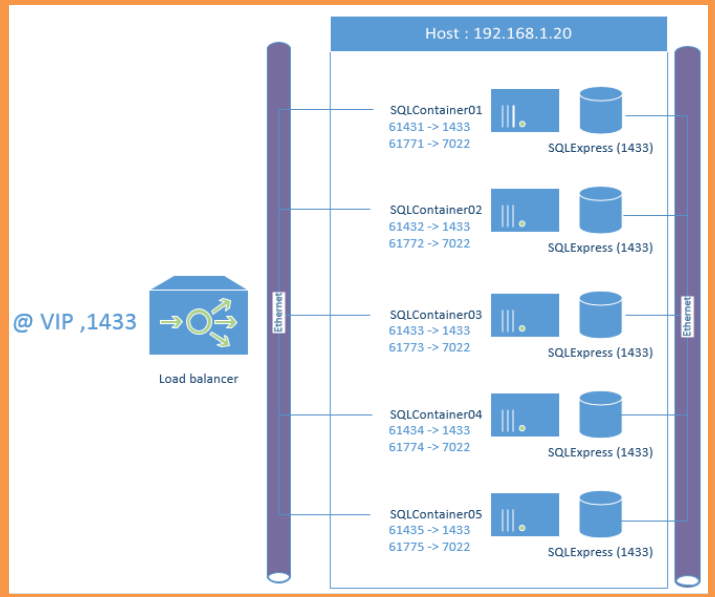
DOCKER – SSB - MULTICASTING

```
BEGIN TRANSACTION;

    BEGIN DIALOG @DialogHandleSQL01
     FROM SERVICE InitiatorService
     TO SERVICE   N'TargetServiceSQL01'
     ON CONTRACT  SampleContract
     WITH ENCRYPTION = OFF;

    BEGIN DIALOG @DialogHandleSQL02
     FROM SERVICE InitiatorService
     TO SERVICE   N'TargetServiceSQL02'
     ON CONTRACT  SampleContract
     WITH ENCRYPTION = OFF;

    BEGIN DIALOG @DialogHandleSQL03
     FROM SERVICE InitiatorService
     TO SERVICE   N'TargetServiceSQL03'
     ON CONTRACT  SampleContract
     WITH ENCRYPTION = OFF;

    BEGIN DIALOG @DialogHandleSQL04
     FROM SERVICE InitiatorService
     TO SERVICE   N'TargetServiceSQL04'
     ON CONTRACT  SampleContract
     WITH ENCRYPTION = OFF;

    BEGIN DIALOG @DialogHandleSQL05
     FROM SERVICE InitiatorService
     TO SERVICE   N'TargetServiceSQL05'
     ON CONTRACT  SampleContract
     WITH ENCRYPTION = OFF;


    SEND ON CONVERSATION (
        @DialogHandleSQL01,@DialogHandleSQL02,@DialogHandleSQL03,@DialogHandleSQL04,@DialogHandleSQL05
    )
         MESSAGE TYPE RequestMessage (@RequestMsg);

    SELECT @RequestMsg AS SentRequestMsg;

COMMIT TRANSACTION;
```

Multiple Begin Dialog
Single Send on Conversation



DOCKER – LOAD BALANCING



- Windows NLB
- 3rd party hardware
  - Kemp
  - F5
  - Cisco
  - Citrix
  - Radware
- 3rd party software
  - Kemp
  - Pfsense
  - Scalearc
  - Nginx
  - …

DÉMO

- Multicast Service Broker
- NLB conteneurs Docker

		Queue			Session rate			Sessions						Bytes	
		Cur	Max	Limit	Cur	Max	Limit	Cur	Max	Limit	Total	LbTot	Last	In	Out
☐	Conteneur01	0	0	-	0	10		0	10	-	10	10	4h21m	9 160	15 780
☐	Conteneur02	0	0	-	0	10		0	10	-	10	10	4h21m	9 160	15 780
☐	Conteneur03	0	0	-	0	10		0	10	-	10	10	4h21m	9 160	15 780
☐	Conteneur04	0	0	-	0	10		0	10	-	10	10	4h21m	9 160	15 780
☐	Conteneur05	0	0	-	0	10		0	10	-	10	10	4h21m	9 160	15 780
	Backend	0	0		0	50		0	50	200	50	50	4h21m	45 800	78 900

Automatisation & gestion de configuration

- Infrastructure en tant que code

- Installation / gestion sur machine existante

Evaluez les sessions…

…et tentez de gagner une Surface Pro 4

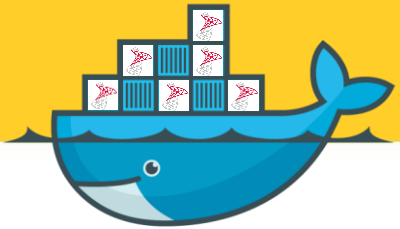
http://bit.ly/MSCSevalJ1

MS Cloud Summit Paris 2017

Agile.Net – IoG – AZUG FR – CMD - GLSS

Q & A

- SQL Server on Docker rocks !
- Merci pour votre attention



MS Cloud Summit Paris

Agile.Net – aOS – AZUG FR – CMD - GUSS

Merci Beaucoup! Thank you!

Join the conversation

#MSCloudSummit
@MSCloudSummit