

Christophe Laporte



Matinée SQL Server

Modernisation de la plateforme



Job Schedule Properties - SQL Server - Modernisation de la plateforme

Name:	Vendredi 26 juin 2020 à 9:30 - Teams Live Event	Jobs in Schedule
Schedule type:	One time	<input checked="" type="checkbox"/> Enabled
One-time occurrence		
Date:	26/06/2020	Time: 09:30:00
Frequency		

LIVE STREAMING



Microsoft en France

Plan région – Experiences Labs



Notre mission

Donner à chaque individu et
chaque organisation les moyens
de réaliser ses ambitions

Microsoft en France

Experiences Lab

Une plateforme à votre service



Une plateforme disponible dans 5 Experiences Labs en FY21



Microsoft Experience Lab :

- Espace de réception de 20 à 100 personnes
- Lieu d'Idéation : Surface Hub 2
- Conférence : Surface Hub 84 ou Vidéoprojecteur
- Plots de démo: PC + Ecran 55' Tactile
- Equipements Poly / Jabra / Logitech
- Des démos IoT
- Devices bar Flycase – dernières Surface
- Tenant de démo Microsoft 365
- Salle de Formation 24 places
- Des places de co-working

Réservation et agenda

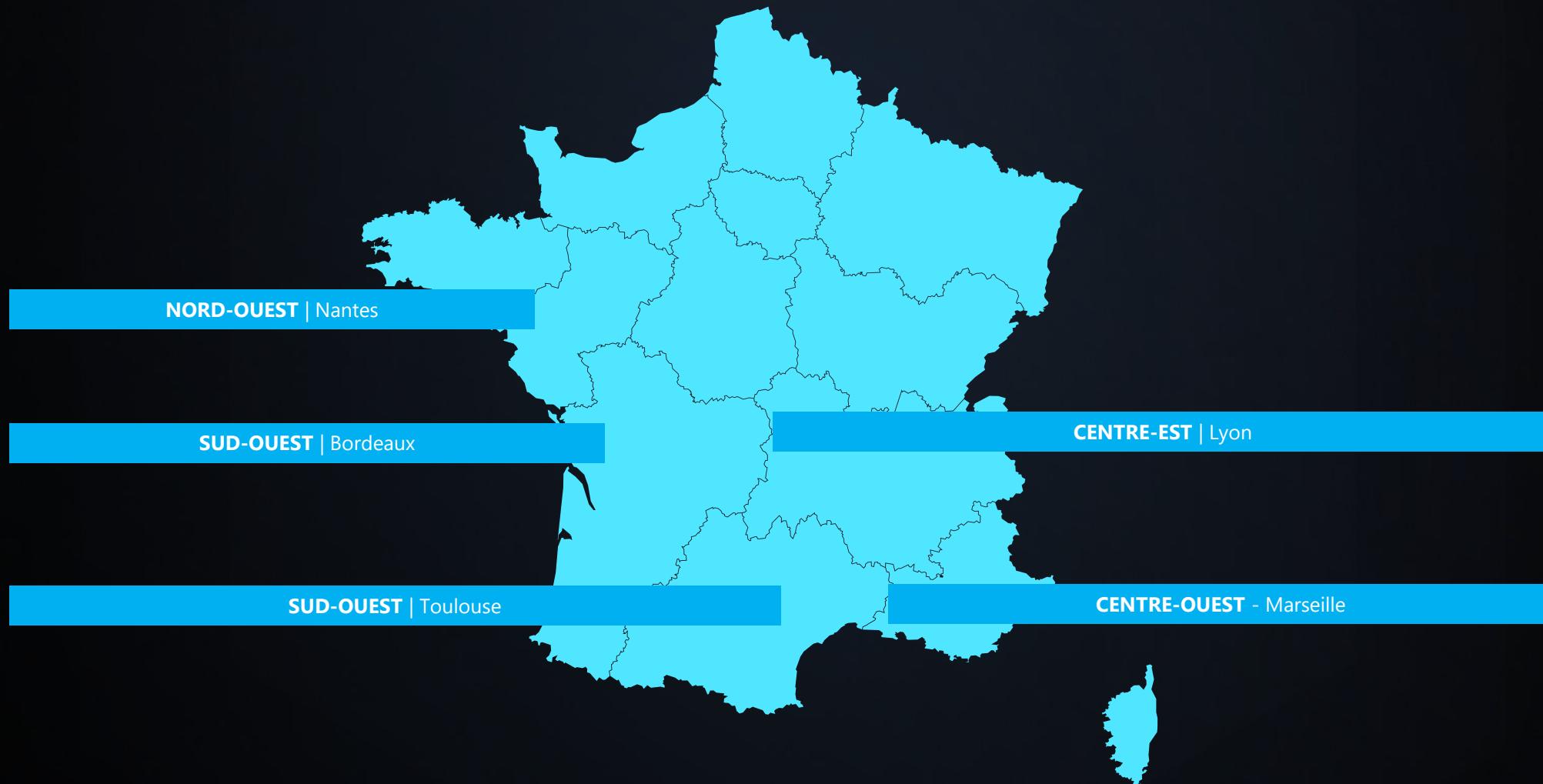
- Réservation simple via Bookings
- Une page internet par Microsoft Experiences Lab
- Agenda public synchronisé avec experiences.microsoft.com
- Relais des événements via la page LinkedIn du lab Manager



Venez découvrir

- Les demos du MTC et de nos partenaires dans un Compositeur Digital
- Des démos IoT présentes en physique dans les labs (ie Copeeks, PTC, Prodware, Codit ...)
- Des parcours développés par le Lab Manager
- Tenant de démo Microsoft 365 / Dynamics 365
- Des sessions formatées
- Des sessions d'idéation

Une plateforme disponible dans 5 Experiences Labs en FY21



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Matinée SQL Server

Modernisation de la plateforme



Job Schedule Properties - SQL Server - Modernisation de la plateforme

Name: Vendredi 26 juin 2020 à 9:30 - Teams Live Event

Schedule type: One time Enabled

One-time occurrence

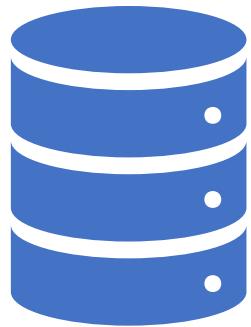
Date: 26/06/2020 Time: 09:30:00

Frequency

LIVE STREAMING

A screenshot of a Windows Task Scheduler dialog box showing a scheduled job named "Vendredi 26 juin 2020 à 9:30 - Teams Live Event". The schedule type is set to "One time" and is enabled. The date is 26/06/2020 at 09:30:00. A "LIVE STREAMING" button is visible at the bottom right of the dialog.

Agenda



SQL Server plateforme de choix
et choix de plateforme



SQL Server sur Azure

Christophe Laporte



Audit
Conseil
Formation
Remote DBA



/conseilit



@conseilit



/christophelaporte

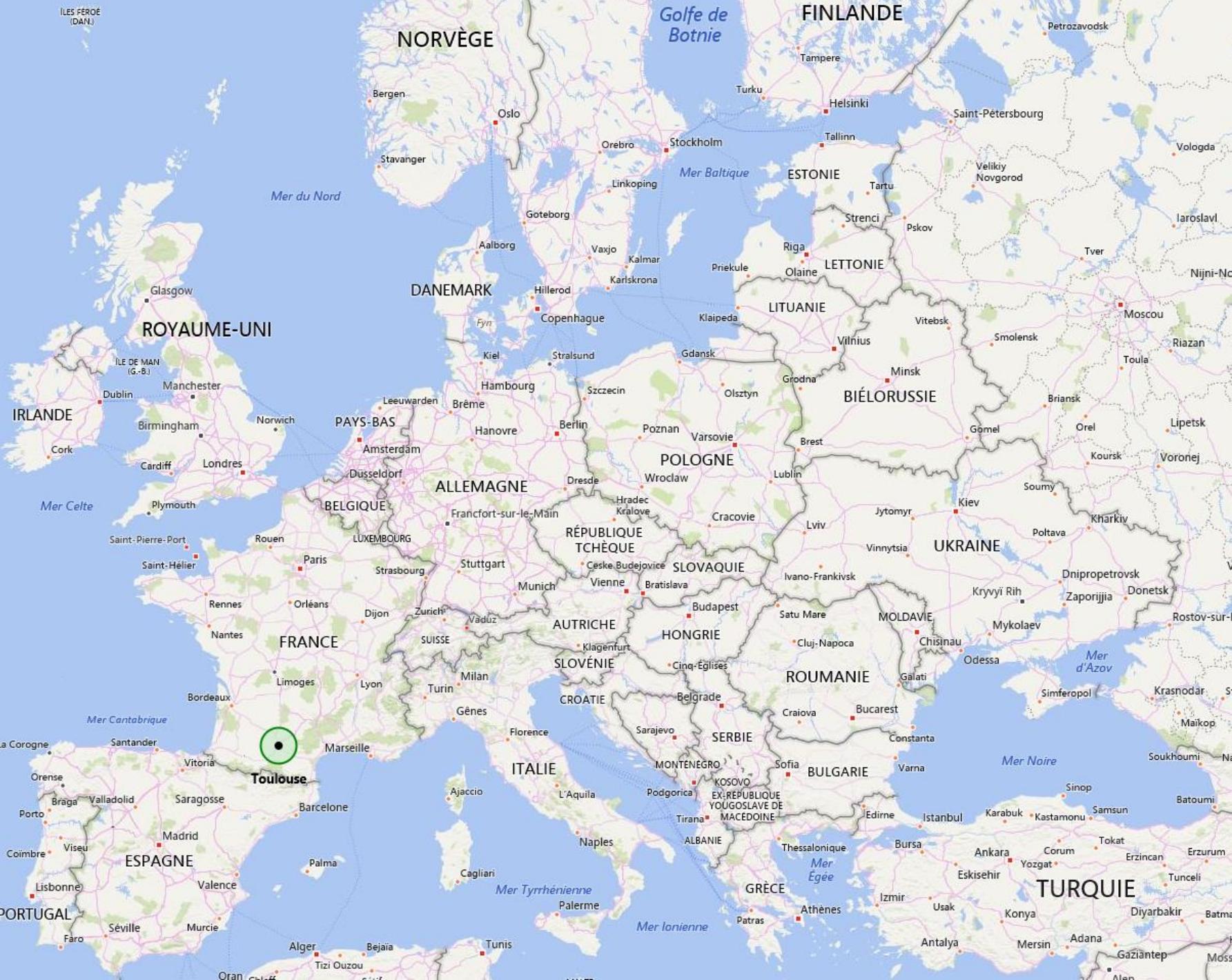


conseilit@outlook.com



Microsoft
CERTIFIED
Master

Microsoft
CERTIFIED
Trainer

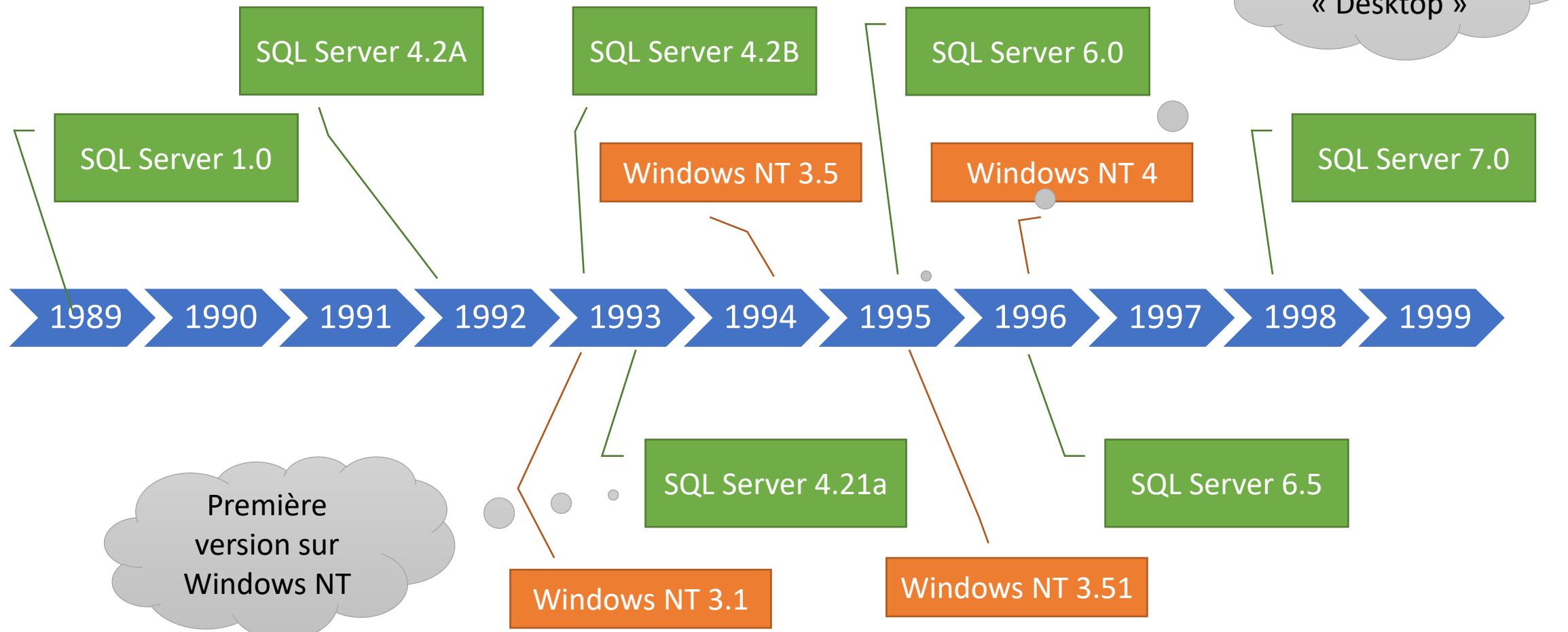


~ since 1997 : SQL 6.5 / WinNT4

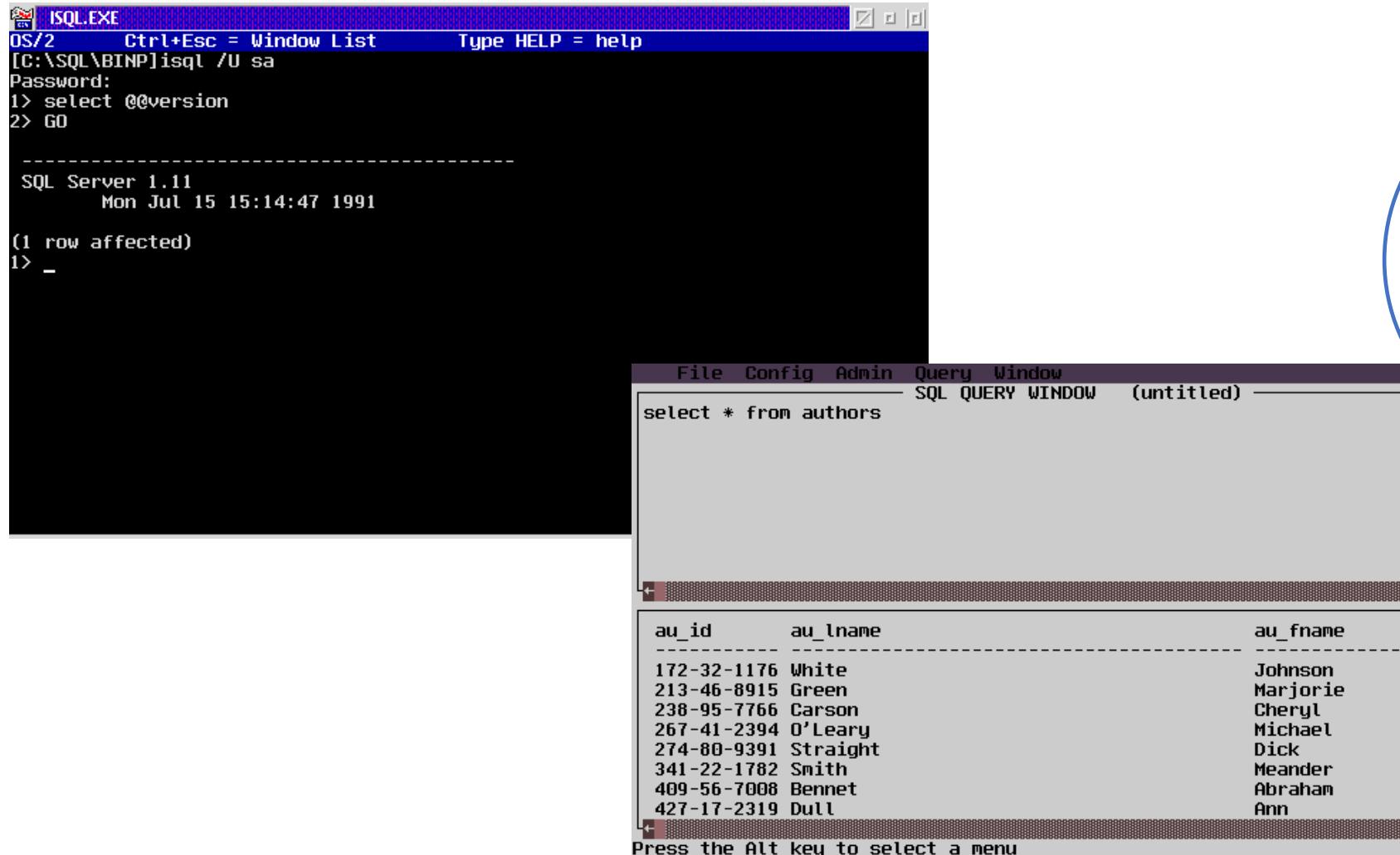
SQL Server au siècle dernier

La genèse

SQL Server : au siècle dernier



SQL Server : au siècle dernier



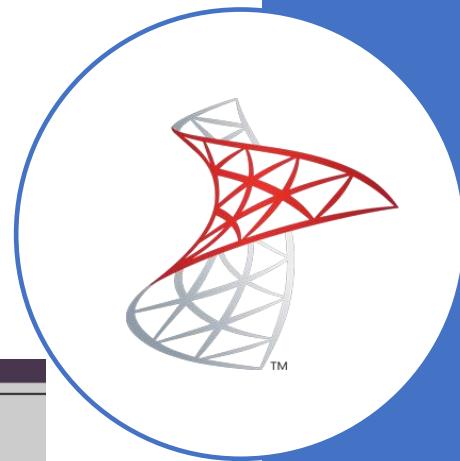
ISQL.EXE
OS/2 Ctrl+Esc = Window List Type HELP = help
[C:\SQL\BINP]isql /U sa
Password:
1> select @@version
2> GO

SQL Server 1.11
Mon Jul 15 15:14:47 1991
(1 row affected)
1> -

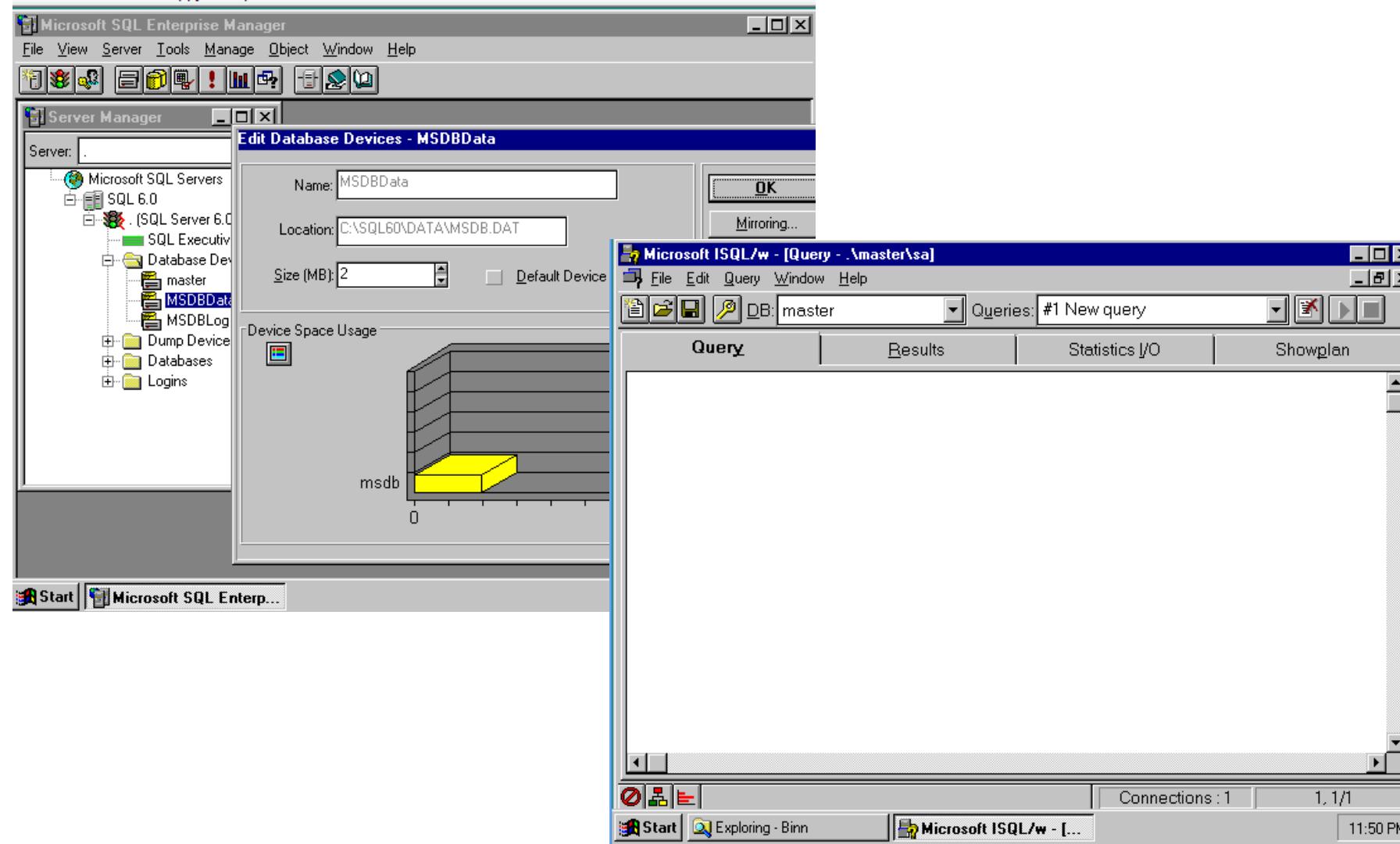
File Config Admin Query Window SQL QUERY WINDOW (untitled)
select * from authors

au_id	au_lname	au_fname
172-32-1176	White	Johnson
213-46-8915	Green	Marjorie
238-95-7766	Carson	Cheryl
267-41-2394	O'Leary	Michael
274-80-9391	Straight	Dick
341-22-1782	Smith	Meander
409-56-7008	Bennet	Abraham
427-17-2319	Dull	Ann

Press the Alt key to select a menu



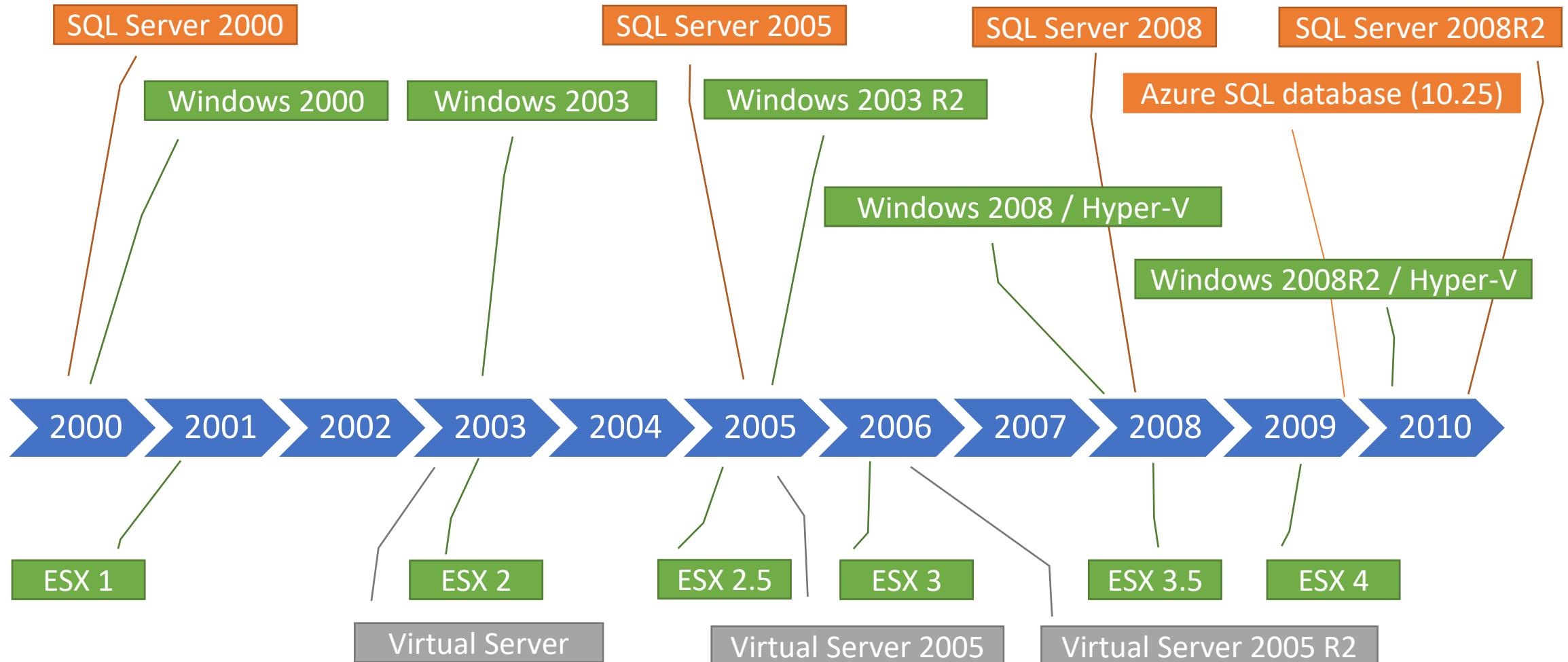
SQL Server : au siècle dernier



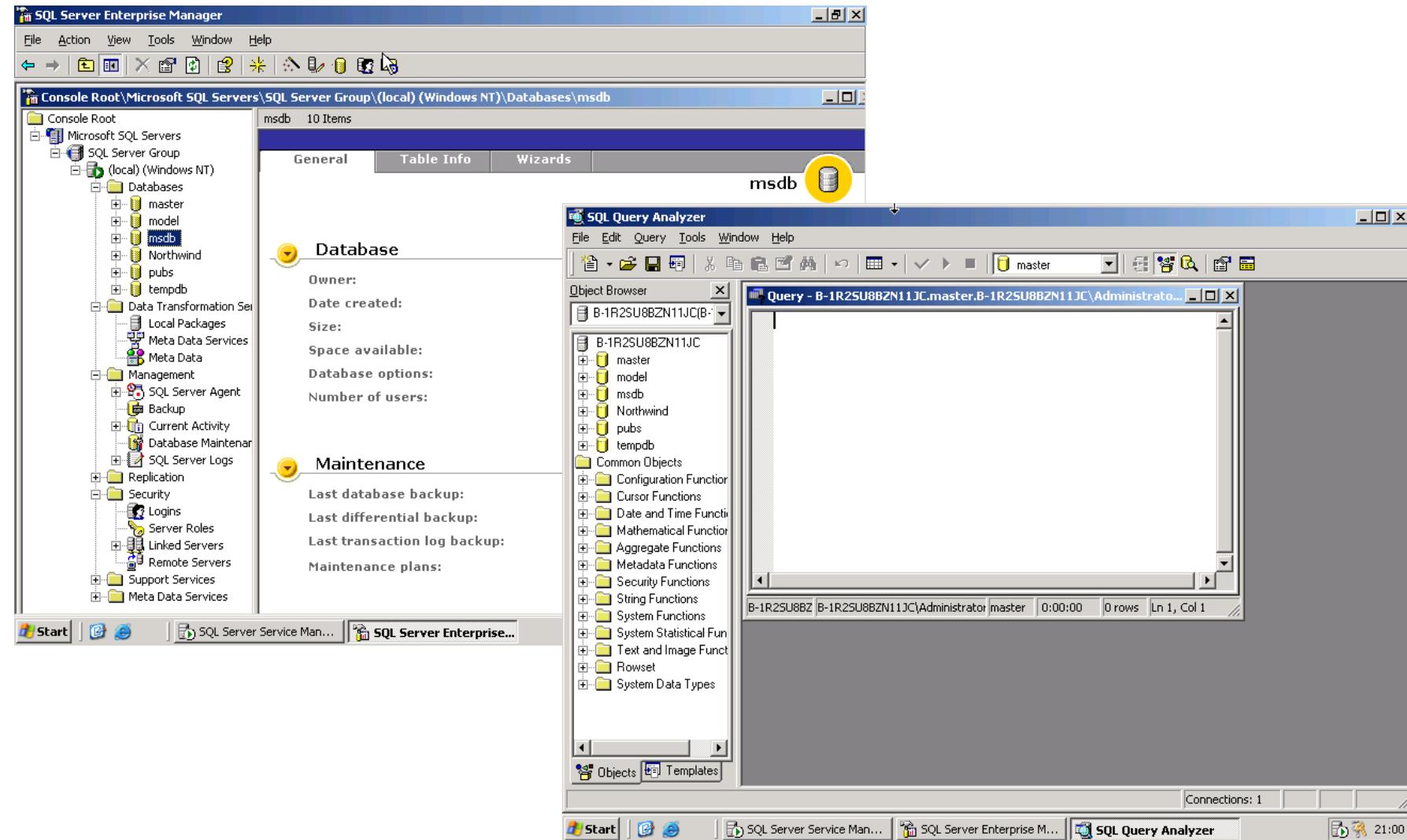
SQL Server les années 2000

La renaissance de SQL Server

SQL Server : Les années 2000

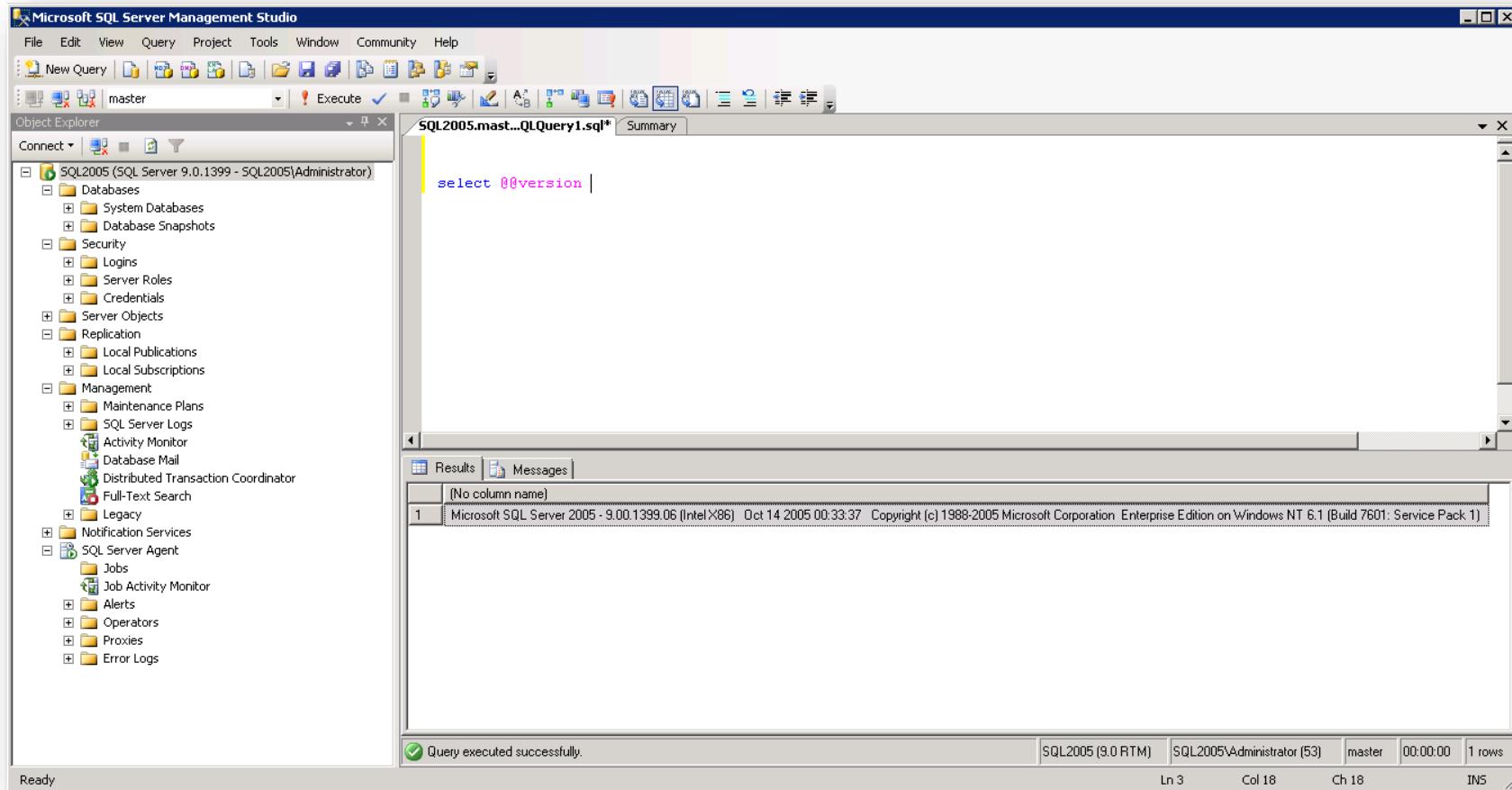


SQL Server : les années 2000



SQL Server : les années 2000

- SQL Server 2005 : Une nouvelle IHM



What's new ...

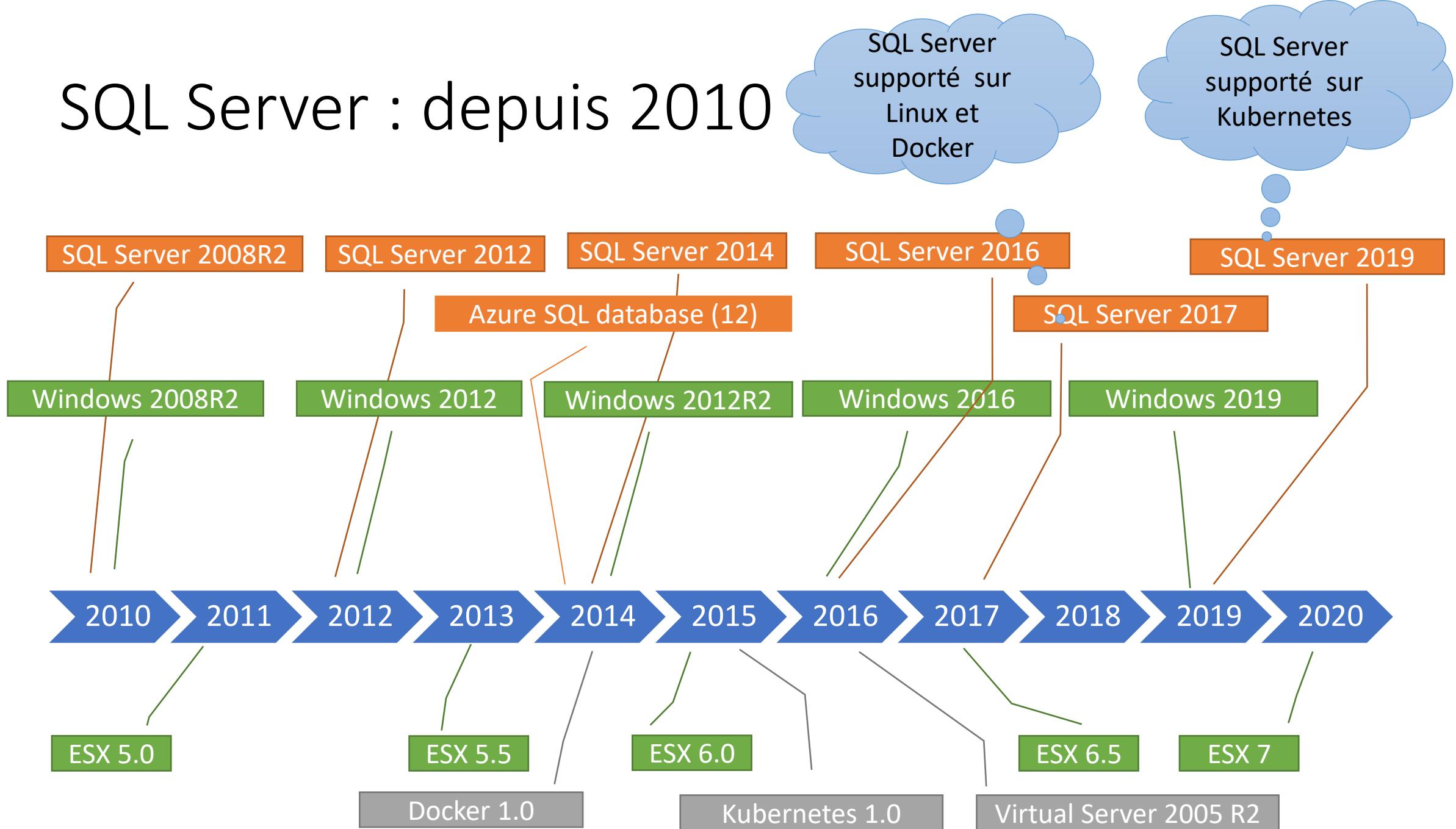
- Niveau d'isolation snapshot
- Database mirroring
- Vues indexées
- Vues partitionnées
- Tables partitionnées
- Types BigInt, XML, Date, Time, Datetime2, HierarchyID, Geometry, Geography
- Gestion des erreurs Try/Catch
- Intégration de .Net
- Service broker
- Merge command
- Grouping Sets
- FileStream
- Transparent data encryption
- Clause Output, Pivot, Over
- Common table expressions



SQL Server depuis 2010

Un vent de nouveautés ...

SQL Server : depuis 2010



What's new ...

- Columnstore indexes
- Hekaton
- Availability Groups
- Databases files SMB
- File tables
- Buffer pool extension
- Delayed Durability
- Support de JSON
- Polybase for Data virtualization
- Always Encrypted
- Accelerated Database Recovery
- Query store
- Stretch database
- Row level security
- Temporal tables
- TempDB Scalability
- Contained databases
- Dynamic Data masking
- SQL Server Language Extensions
- Nouveau CE
- Distributed AGs
- Graph databases
- Intelligent QP



SQL Server 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



Choix de plateforme

Une offre pléthorique

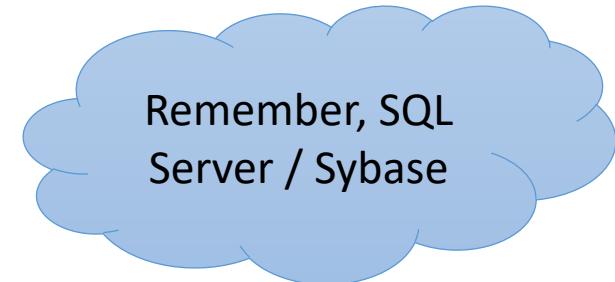
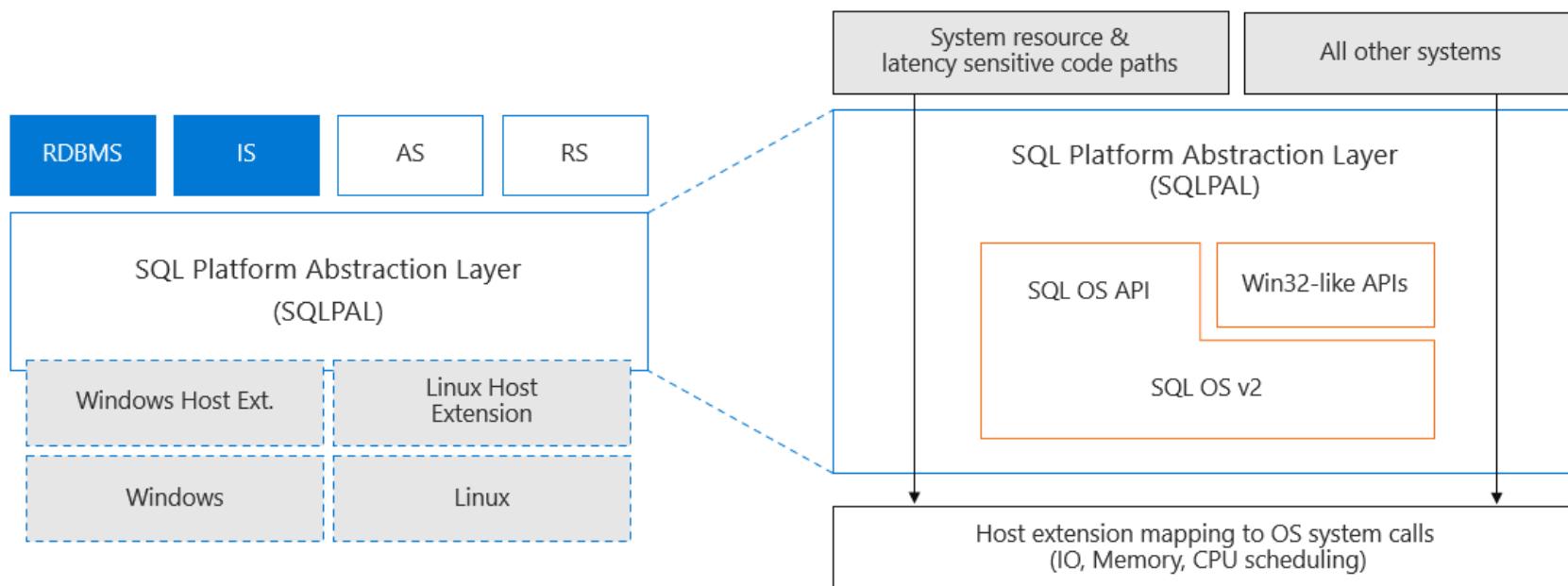
SQL Server sur Linux

- Une demande de la part des ISVs



SQL Server sur Linux

- Exécuter SQL Server sur un nouvel OS
 - Une finalité ?
 - ... ou bien un nouveau chapitre pour SQL Server ...



SQL Server sur Linux

- Plusieurs distributions supportées
- Performance
- Fonctionnalités
 - - (StretchDB, Filetables, FileStream)

TPC-H data warehousing top results by TPC-H configuration (size)

Company	System	Performance Price/QphH	Database Operating System
Hewlett Packard Enterprise	HPE Proliant DL380 Gen10	1,244,450 QphH@3000GB 0.38 USD	Microsoft SQL Server 2017 Enterprise Edition SUSE Linux Enterprise Server 15
Hewlett Packard Enterprise	HPE Proliant DL380 Gen9	717,101 QphH@1000GB 0.61 USD	Microsoft SQL Server 2017 Enterprise Edition Red Hat Enterprise Linux Server 7.3
CISCO	Cisco UCS C460 M4 Server	1,115,298 QphH@10000GB 0.87 USD	Microsoft SQL Server 2016 Enterprise Edition Microsoft Windows Server 2016 Standard Edition



SQL Server sur Linux

DEMO

- Installation simple
- Configuration du service

```
# ubuntu
wget -qO- https://packages.microsoft.com/config/ubuntu/16.04/mssql-server.list | sudo tee /etc/apt/sources.list.d/mssql-release.list
sudo add-apt-repository "$"
sudo apt-get update
sudo apt-get install -y ms
sudo /opt/mssql/bin/mssql-conf setup

# RedHat
sudo curl -o /etc/yum.repos
sudo yum install -y mssql-
sudo /opt/mssql/bin/mssql-conf setup

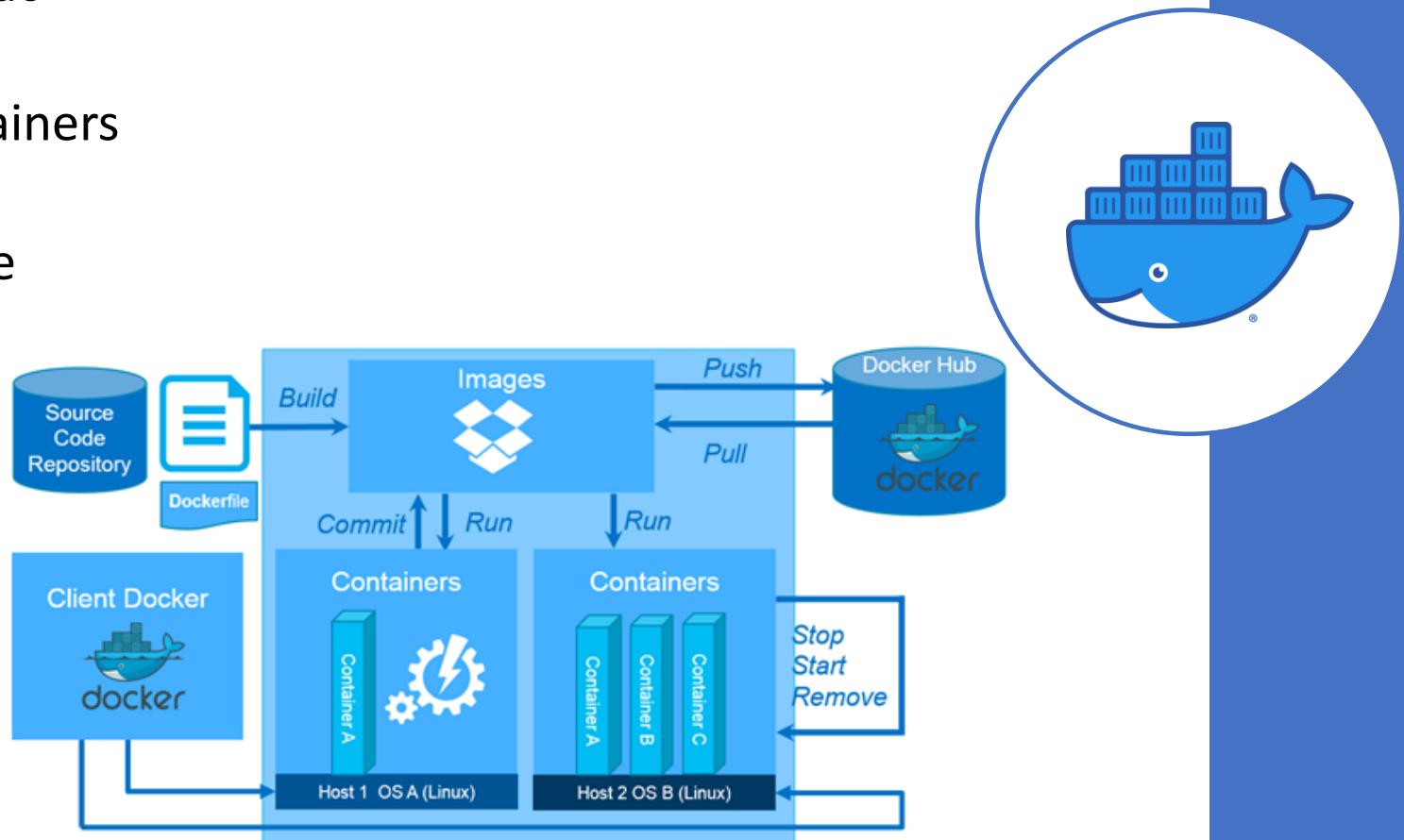
# Suse
sudo zypper addrepo -fc ht
sudo zypper --gpg-auto-imp
sudo zypper install -y mss
sudo /opt/mssql/bin/mssql-conf setup

Preparing to unpack .../7-libc6-dbg_2.27-3ubuntu1_amd64.deb ...
Unpacking libc6-dbg:amd64 (2.27-3ubuntu1) ...
Selecting previously unselected package libsss-nss-idmap0.
Preparing to unpack .../8-libsss-nss-idmap0_1.16.1-1ubuntu1.5_amd64.deb ...
Unpacking libsss-nss-idmap0 (1.16.1-1ubuntu1.5) ...
Selecting previously unselected package ...
Preparing to unpack .../9-mssql-server usermod: no changes
Unpacking mssql-server (15.0.4033.1-2) ...
Setting up libc++abi1:amd64 (6.0-2) ...
Setting up libcc1-0:amd64 (8.4.0-1ubun
Setting up libc6-dbg:amd64 (2.27-3ubun
Setting up libsss-nss-idmap0 (1.16.1-1)
Setting up gdbserver (8.1-0ubuntu3.2) ...
Setting up libasasl2-modules-gssapi-mit
Setting up libbabeltrace1:amd64 (1.5.5 ...
Setting up libc++1:amd64 (6.0-2) ...
Setting up gdb (8.1-0ubuntu3.2) ...
Setting up mssql-server (15.0.4033.1-2) ...
+-----
Please run 'sudo /opt/mssql/bin/mssql-conf setup' to complete the setup of Microsoft SQL Server.
Enter your edition(1-8): 2
The license terms for this product can be found in /usr/share/doc/mssql-server or downloaded from: https://go.microsoft.com/fwlink/?LinkId=2104294&clcid=0x409
The privacy statement can be viewed at: https://go.microsoft.com/fwlink/?LinkId=853010&clcid=0x409
Do you accept the license terms? [Yes/No]:Yes
Enter the SQL Server system administrator password:
Confirm the SQL Server system administrator password:
Configuring SQL Server...
ForceFlush is enabled for this instance.
ForceFlush feature is enabled for log durability.
Created symlink /etc/systemd/system/multi-user.target.wants/mssql-server.service → /lib/systemd/system/mssql-server.service.
Setup has completed successfully. SQL Server is now starting.
Christophe@lxSQL-vm:~$
```



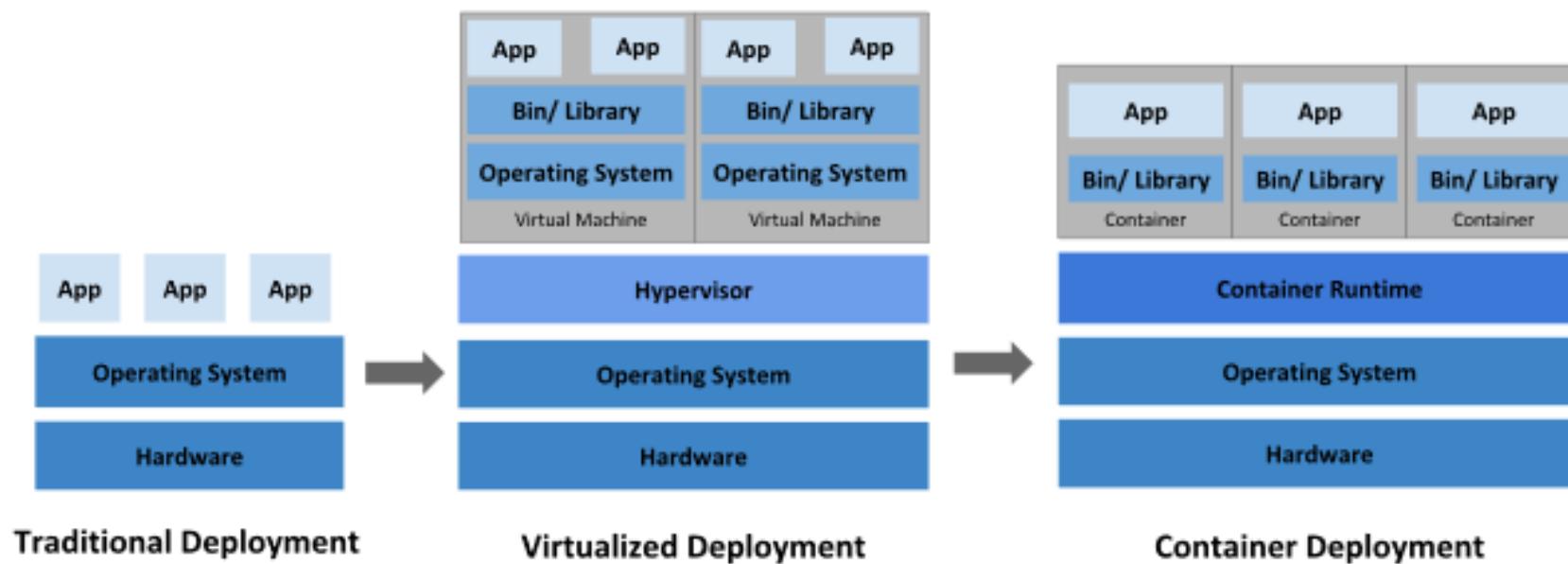
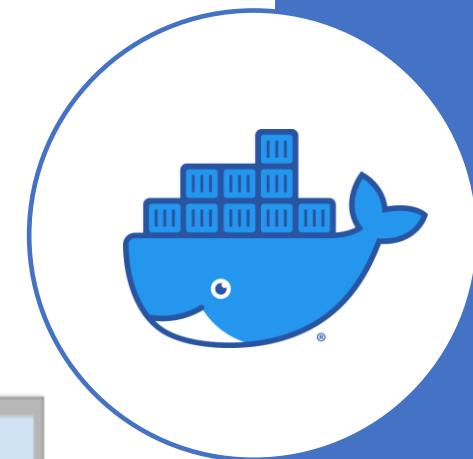
Introduction aux conteneurs

- Multi OS
 - Windows, Linux, Mac
- Docker engine
 - Exécution des containers
- Docker client
 - Ligne de commande
- Terminologie
 - Image
 - Conteneur
 - Référentiel



Introduction aux conteneurs

- Empreinte système réduite
 - léger -> meilleure efficacité des serveurs hôtes
- Une seule image
 - Déploiements multiples (dev / test / prod)
 - Eviter : “Cela fonctionne sur ma machine” !



Mon premier conteneur

```
# Survival kit : Docker commands
docker

## Display Docker version and info
docker version
docker info

## Docker images CLI commands
docker image --help
docker image ls # <=> docker images

## Docker container CLI commands
docker container --help
docker container ls      # <=> docker ps
docker container ls --all # <=> docker ps -a

# Running my first container
docker run hello-world
```



```
root@lxDocker:/home/chris# docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
1b930d010525: Pull complete
Digest: sha256:9572f7cdcee8591948c2963463447a53466950b3fc15a247fcad1917ca215a2f
Status: Downloaded newer image for hello-world:latest

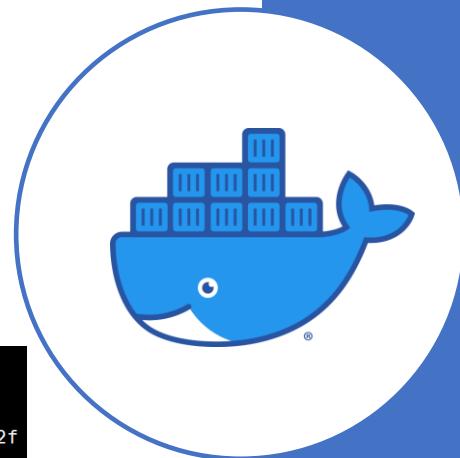
Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
```



SQL Server dans un conteneur

- Il est possible d'utiliser SQL Server sur Linux
- Donc, pourquoi pas dans un conteneur ?
- Pas de visibilité des service du conteneur
 - Redirection de ports
- Stockage persistant
 - Redirection de volume

5	3
Estimated number of years to port SQL Server to Linux natively	Weeks to working prototype using SQLPAL



SQL Server dans un conteneur

DEMO

```
# Run (Pull+Create+Start) the container in detach mode
docker run --detach \
    --name sqldocker \
    --hostname sqldocker \
    --env 'MSSQL_PID=developer' \
    --env 'SA_PASSWORD=Password1!' \
    --env 'ACCEPT_EULA=Y' \
    --volume /mssql:/var/opt/mssql/data \
    --publish 1433:1433 \
    mcr.microsoft.com/mssql/server:2019-latest
```



Parfait ... et maintenant ?

- Il faudrait ajouter un peu d'orchestration
 - Vérifier la santé du conteneur --> restart container
 - Vérifier la santé du host --> Restart sur host différent
 - Fournir un accès au conteneur depuis le réseau
 - Fournir un stockage persistant accessible par tous les nœuds
 - Gérer les ressources des conteneurs (CPU, RAM ...)
- Et si possible fournir une expérience de déploiement similaire
 - OnPrem
 - Cloud Public

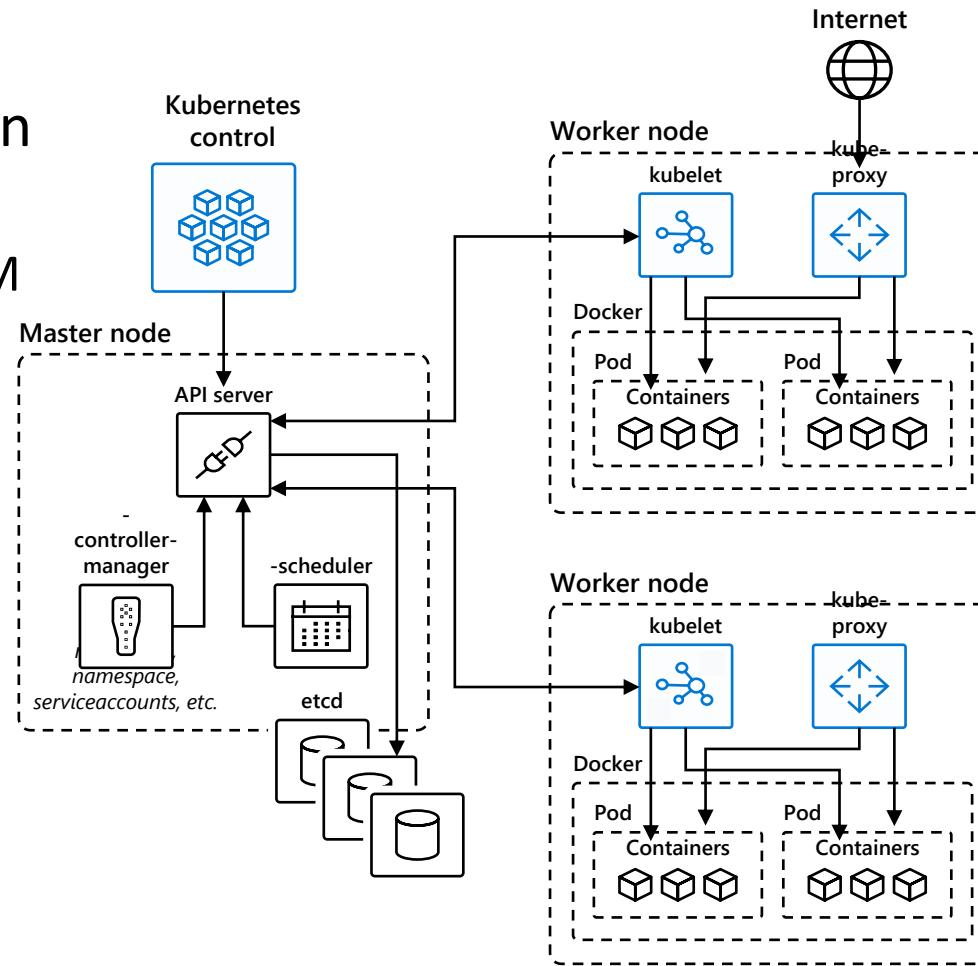
Comme une impression de déjà vu ...
Hey, c'est un cluster !



kubernetes

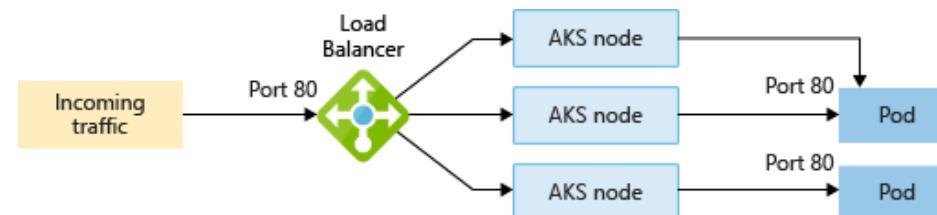
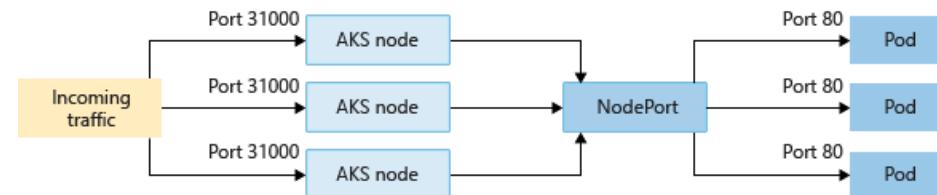
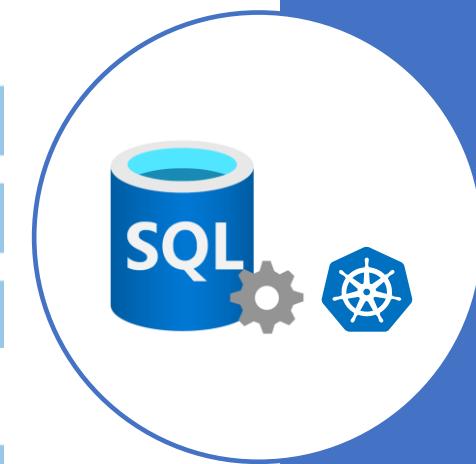
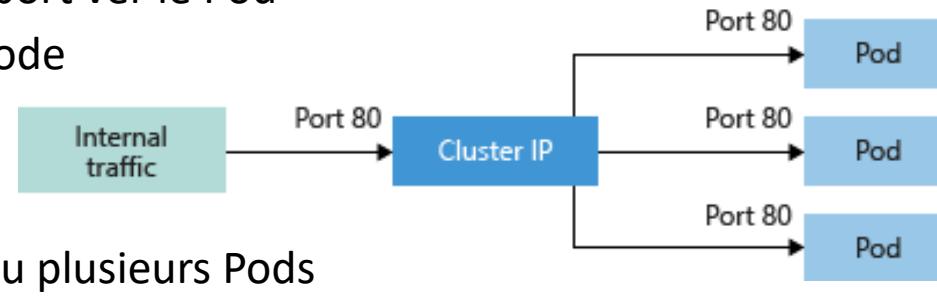
Kubernetes : les bases

- Besoin d'orchestration
 - Stockage, réseau
 - Ressources CPU, RAM
 - Planification
- Terminologie
 - Container
 - Pod
 - Master node
 - Worker node
- Haute disponibilité
 - « par défaut »

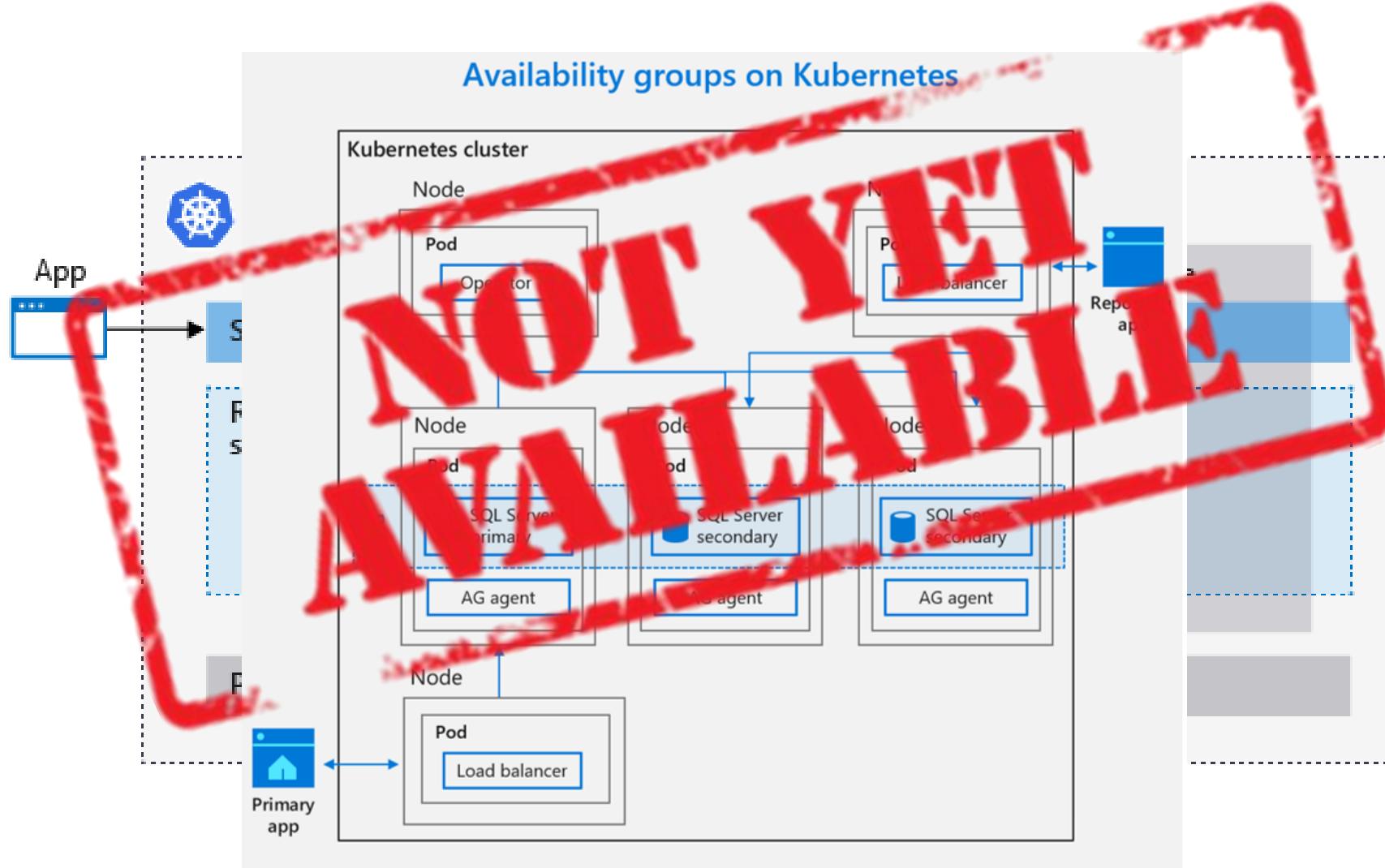


Kubernetes : les bases

- Les connections passent par le kube-proxy
 - Routage et translation de port vers le Pod
 - Quel que soit de worker node
- Services
 - Exposent des applications
 - Abstraction logique d'un ou plusieurs Pods
- Différent types de services
 - ClusterIP
 - Node Port
 - Load Balancer

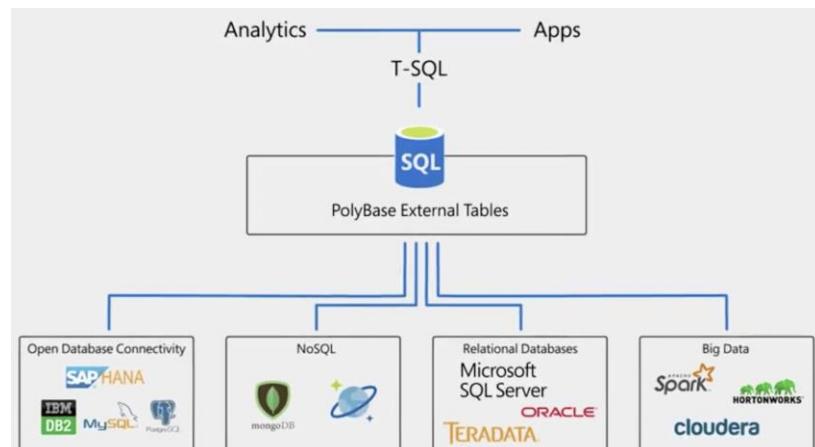


SQL Server dans Kubernetes

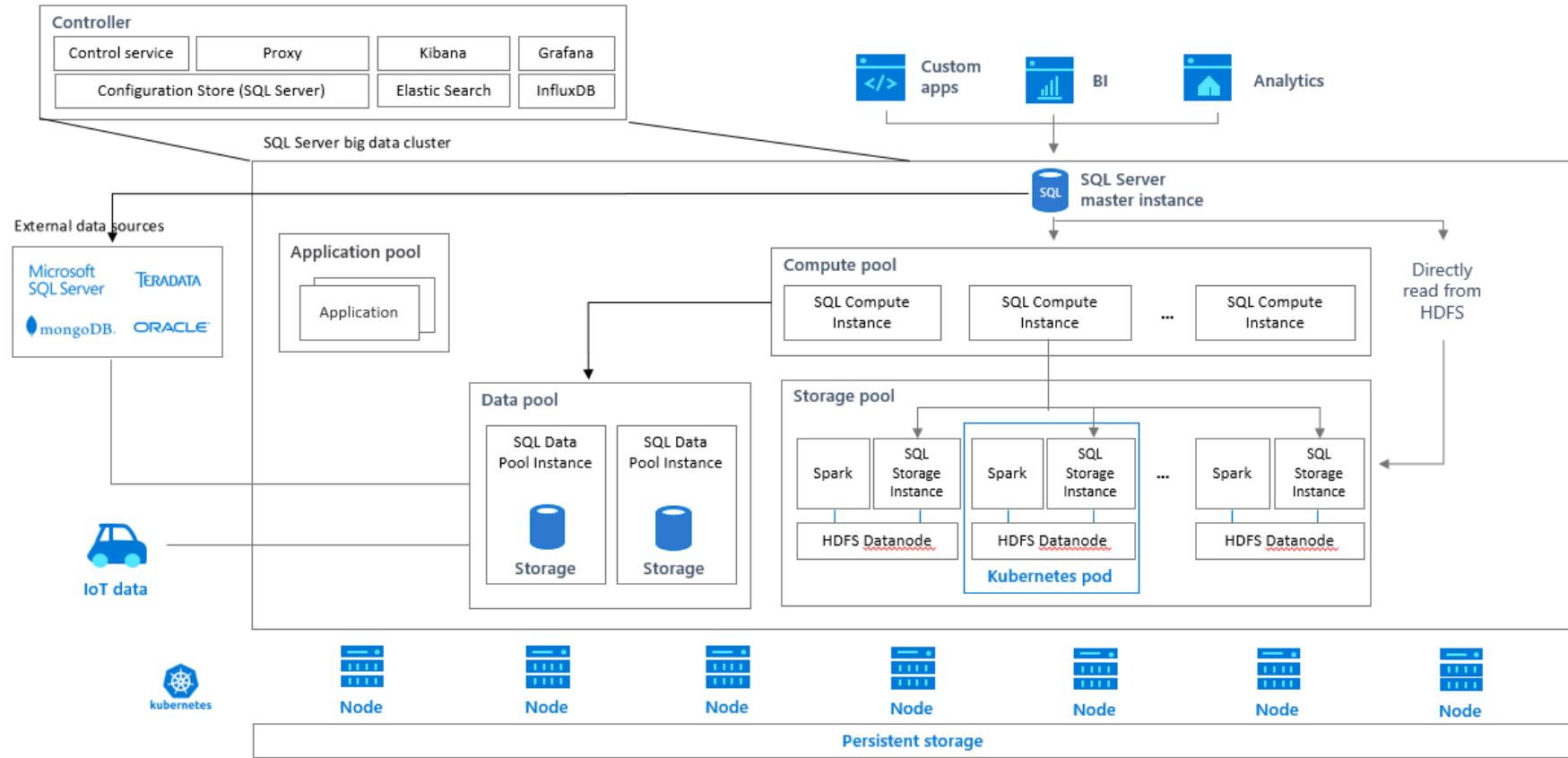


Minute papillon ...

- Aujourd’hui SQL Server est plus qu’un SGBD
 - SQL Server propose la virtualisation de données avec Polybase
- K8s peut exécuter tout type d’application
- K8s peut exécuter SQL Server
 - ~~Avec des groupes de disponibilité~~
- Un Pod peut héberger plusieurs conteneurs
- Ajoutons des conteneurs « Big Data »
 - Avec un moteur Spark
 - Et un stockage HDFS

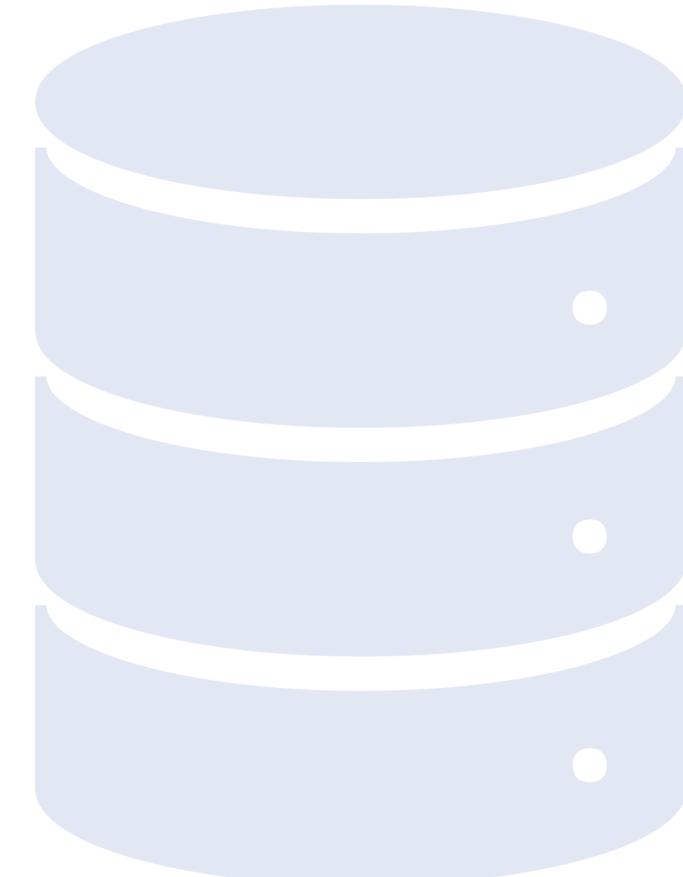


SQL Server 2019 Big Data Cluster

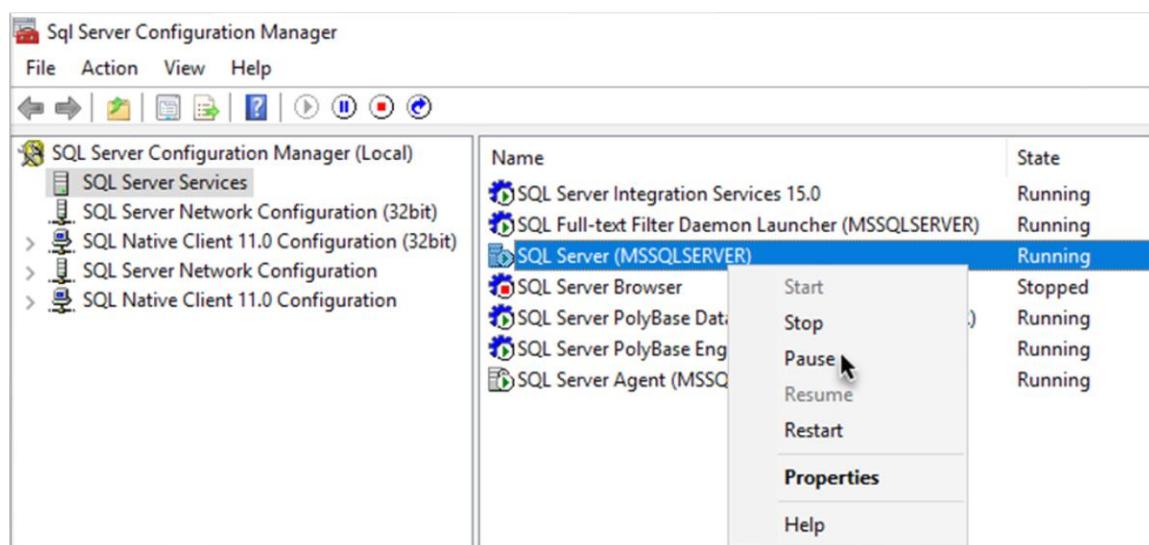




Plateforme de choix
et
Choix de plateforme



Jamais une offre de SGBDR n'aura été aussi complète



SQL Server & Azure

L'âge de raison

Bref rappel historique

- Il y a 10 ans se posaient les questions
 - Dois-je virtualiser SQL Server ?
 - De nos jours la quasi totalité des instances sont virtualisées OnPrem
- Il y a 10 ans, Microsoft présentait Windows Azure Platform

Microsoft Cloud Services Vision Becomes Reality With Launch of Windows Azure Platform

November 17, 2009 |

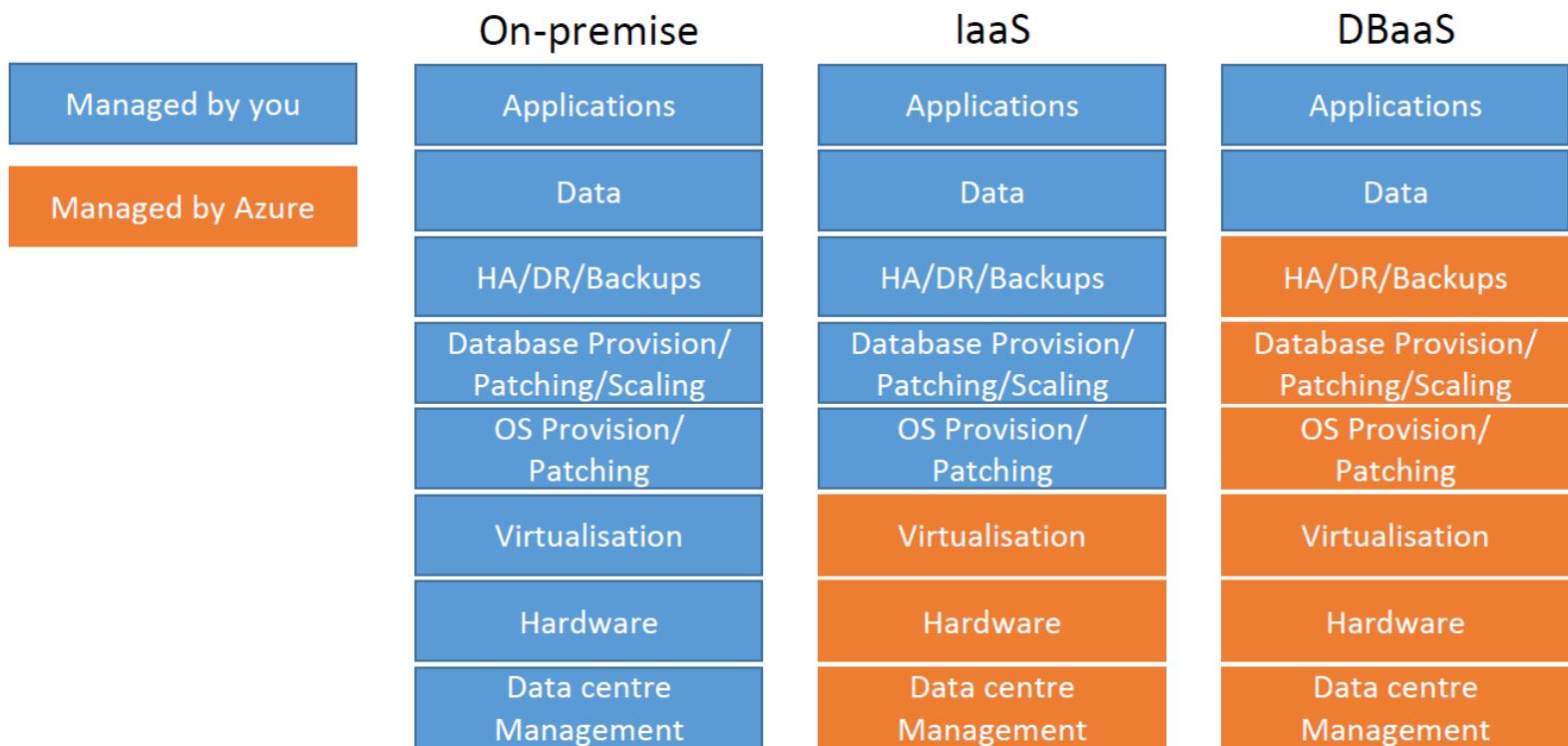


LOS ANGELES — Nov. 17, 2009 — Microsoft Corp. today announced the availability of the Windows Azure platform at the Microsoft Professional Developers Conference (PDC). In his opening keynote address, Ray Ozzie, chief software architect at Microsoft, described Windows Azure and SQL Azure as core elements of the company's cloud services strategy. The company also announced a set of new Windows Azure features, Windows Server capabilities, and marketplace offerings that will make it easier for developers to build profitable businesses from their Microsoft-based solutions.



SQL Server on Azure

- Offre multiple
- Cas d'usages multiples



Azure : SQL Server VMs

- Pas une simple VM
 - Images préconfigurées
 - Options spécifiques dans le portail Azure
- Backup automatisé
- Haute disponibilité
 - Failover Cluster Instances
 - AlwaysOn Availability Groups
- Performance
- Cas d'usage
 - modernisation des bases de données
 - Accès au système d'exploitation
 - Fast Lift and shift, support étendu pour SQL Server 2008/R2

Azure Premium FileShare
Azure Shared Disks



VM type D, E ou M
Disk burst
Azure NetApp Files

Azure SQL Server VM sur Linux

```
#Define the VM marketplace image details.  
$azureVmPublisherName = "MicrosoftSQLServer"  
$azureVmOffer = "sql2019-ubuntu1804"  
$azureVmSkus = "sqldev"  
  
#Create the public IP address.  
$azurePublicIp = New-AzPublicIpAddress -Name $azurePublicIpName  
    -ResourceGroupName $ResourceGroupName  
    -Location $Location -AllocationMethod Static -Sku standard  
  
#Create the NIC and associate the public ipAddress.  
$azureVnetSubnet = (Get-AzVirtualNetwork -Name $virtualnetworkName -ResourceGroupName $ResourceGroupName).Subnets | Where-Object {$_.  
Name  
Get-AzNetworkSecurityGroup -name $NetworkSecurityGroupName -ResourceGroupName $ResourceGroupName  
$azureNIC = New-AzNetworkInterface -Name $azureNicName  
    -ResourceGroupName $ResourceGroupName  
    -Location $Location  
    -SubnetId $azureVnetSubnet.Id  
    -PublicIpAddressId $azurePublicIp.Id  
    -NetworkSecurityGroupId $nsg.ID  
  
#Store the credentials for the local admin account.  
$vmCredential = New-Object System.Management.Automation.PSCredential ($vmAdminUsername, $vmAdminPassword)  
  
#Define the parameters for the new virtual machine.  
$VirtualMachine = New-AzVMConfig -VMName $azureVmName -VMSize $azureVmSize  
$VirtualMachine = Set-AzVMOperatingSystem -Linux -VM $VirtualMachine -ComputerName $azureVmName -Credential $vmCredential  
$VirtualMachine = Add-AzVMNetworkInterface -VM $VirtualMachine -Id $azureNIC.Id  
$VirtualMachine = Set-AzVMSourceImage -VM $VirtualMachine -PublisherName $azureVmPublisherName -Offer $azureVmOffer -Skus $azureVmSkus -Version "latest"  
$VirtualMachine = Set-AzVMBootDiagnostic -VM $VirtualMachine -Disable  
$VirtualMachine = Set-AzVMOSDisk -VM $VirtualMachine -StorageAccountType "Premium_LRS" -Caching ReadWrite -Name $azureVmOsDiskName -CreateOption FromImage  
  
#Create the virtual machine.  
New-AzVM -ResourceGroupName $ResourceGroupName -Location $Location -VM $VirtualMachine -Verbose  
  
#Test connection.  
Test-NetConnection -computer $azureVmName -Port 1433
```



Azure SQL VM Windows / Extension SQL

Create a virtual machine

Basics Disks Networking Management Advanced **SQL Server settings** Tags Review + create

SQL connectivity * Private (within Virtual Network)

Port * 1433

SQL Authentication

SQL Authentication Disable Enable

Login name * Christophe

Password * *****

Azure Key Vault integration Disable Enable

Storage configuration

Customize performance, size, and workload type to optimize storage for this virtual machine. For optimal performance, separate drives will be created for data and log storage by default. [Learn more about SQL Server best performance practices.](#)

The default storage configuration for SQL virtual machines has changed, now including OLTP optimization and separate drives for data and log storage.

Storage

Storage optimization: **Transactional processing**

SQL Data: 1024 GiB, 5000 IOPS, 200 MB/s
SQL Log: 1024 GiB, 5000 IOPS, 200 MB/s
SQL TempDb: Use local SSD drive

[Change configuration](#)

SQL Server License

Save up to 43% with licenses you already own. Already have a SQL Server license? [Learn more](#)

SQL Server License No Yes

Automated patching

Set a patching window during which all Windows and SQL patches will be applied.

Automated patching Enabled Sunday at 2:00 [Change configuration](#)

Automated backup

Automated backup Disable Enable

R Services(Advanced Analytics)

SQL Server Machine Learning Services (In- Database) Disable Enable

[Review + create](#) < Previous Next : Tags >

Configure storage

Storage optimization General **Transactional processing** Data warehousing

Data storage

These disks will be attached to your virtual machine as data disks and will be stored in storage as page blobs.

Data drive location * F:\data Disk type * Premium SSD

Disk type 32 GiB, Premium SSD (P4) Size (GiB) 32 Max IOPS 120 Max throughput 25 Number of disks 1

Log storage

Transaction logs are a critical component of the database as they record all transactions and database modifications made by each transaction.

Shared drive space * Use a separate drive for log... Log drive location * G:\log Disk type * Premium SSD

Disk type 16 GiB, Premium SSD (P3) Size (GiB) 16 Max IOPS 120 Max throughput 25 Number of disks 1

TempDb storage

The tempDb system database is a global resource that is available to all users connected to the instance of SQL Server. It is used to store temporary user objects and internal objects created by the database engine.

Shared drive space * Use local SSD drive TempDb drive location D:\tempDb

DEMO

-  sqlp-vm
-  sqlp-vm
-  sqlp-vm561
-  sqlp-vm_DataDisk_0
-  sqlp-vm_DataDisk_1
-  sqlp-vm_OsDisk_1_62788d14336b4e98a629bb58f9b0276d

- Virtual machine
- SQL virtual machine
- Network interface
- Disk
- Disk
- Disk



Azure : SQL Server in containers

- Consistance des images
- Isolation des conteneurs
- Mise en place de pipeline CI/CD
- ACI : Azure Container Instance
- Cas d'usage :
 - Portabilité
 - déploiement simple et rapide
 - Durabilité éphémère



```
# create a resource group
az group create --name sqlserver-aci --location westeurope

# and create a container inside ACI
az container create --resource-group sqlserver-aci \
    --name mssqlaci \
    --image mcr.microsoft.com/mssql/server:2019-latest \
    --ip-address public --ports 1433 \
    --environment-variables ACCEPT_EULA=Y MSSQL_SA_PASSWORD=P@ssw0rd1! \
    --dns-name-label conseilit-sqlserver-aci \
    --cpu 4 --memory 16

# and finally connect to the SQL Server instance
/opt/mssql-tools/bin/sqlcmd -S conseilit-sqlserver-aci.westeurope.azurecontainer.io \
    -U SA -P 'P@ssw0rd1!' -Q "SELECT name from sys.databases;"
```

DEMO

Azure : SQL Server on Kubernetes

- AKS : Azure Kubernetes Service
 - Cluster K8s managed
 - Orchestration de conteneurs

```
apiVersion: apps/v1beta1
kind: Deployment
metadata:
  name: mssql-deployment
spec:
  replicas: 1
  template:
    metadata:
      labels:
        app: mssql
    spec:
      terminationGracePeriodSeconds: 10
      securityContext:
        fsGroup: 1000
      containers:
        - name: mssql
          image: mcr.microsoft.com/mssql/server:2019-latest
          ports:
            - containerPort: 1433
          env:
            - name: MSSQL_PID
              value: "Developer"
            - name: ACCEPT_EULA
              value: "Y"
            - name: MSSQL_SA_PASSWORD
              valueFrom:
                secretKeyRef:
                  name: mssql
                  key: SA_PASSWORD
          volumeMounts:
            - name: mssqldb
              mountPath: /var/opt/mssql
        volumes:
          - name: mssqldb
            persistentVolumeClaim:
              claimName: mssql-data
```

```
# Create a dedicated Namespace
kubectl create namespace mssql-standalone
kubectl get namespaces

# Create a secret to be used by SQL Server deployment
kubectl create secret generic mssql --from-literal=SA_PASSWORD="MyC0m91&xP@ssw0rd" --namespace mssql-standalone

# Deploy a SQL Server Pod with a single YAML file containing
#   - Storage Class
#   - Persistent Volume Claim
#   - Deployment
#   - Service
cat sqlserver-standalone/sqlserver-standalone.yaml
kubectl apply -f sqlserver-standalone/sqlserver-standalone.yaml --namespace mssql-standalone
```



- Case d'usage :
 - Conteneurs en haute disponibilité
 - Durabilité du service SQL



Azure : Azure SQL Databases

- Service totalement géré
- Haute disponibilité et répliques en lecture seule
- Disponibilité
 - [SLA](#) 99,9 -> 99,995%
 - RPO 5 secondes, RTO 30 secondes
- Cas d'usage:
 - Philosophie cloud moderne
 - Performance prédictibles
 - Mutualisation des couts

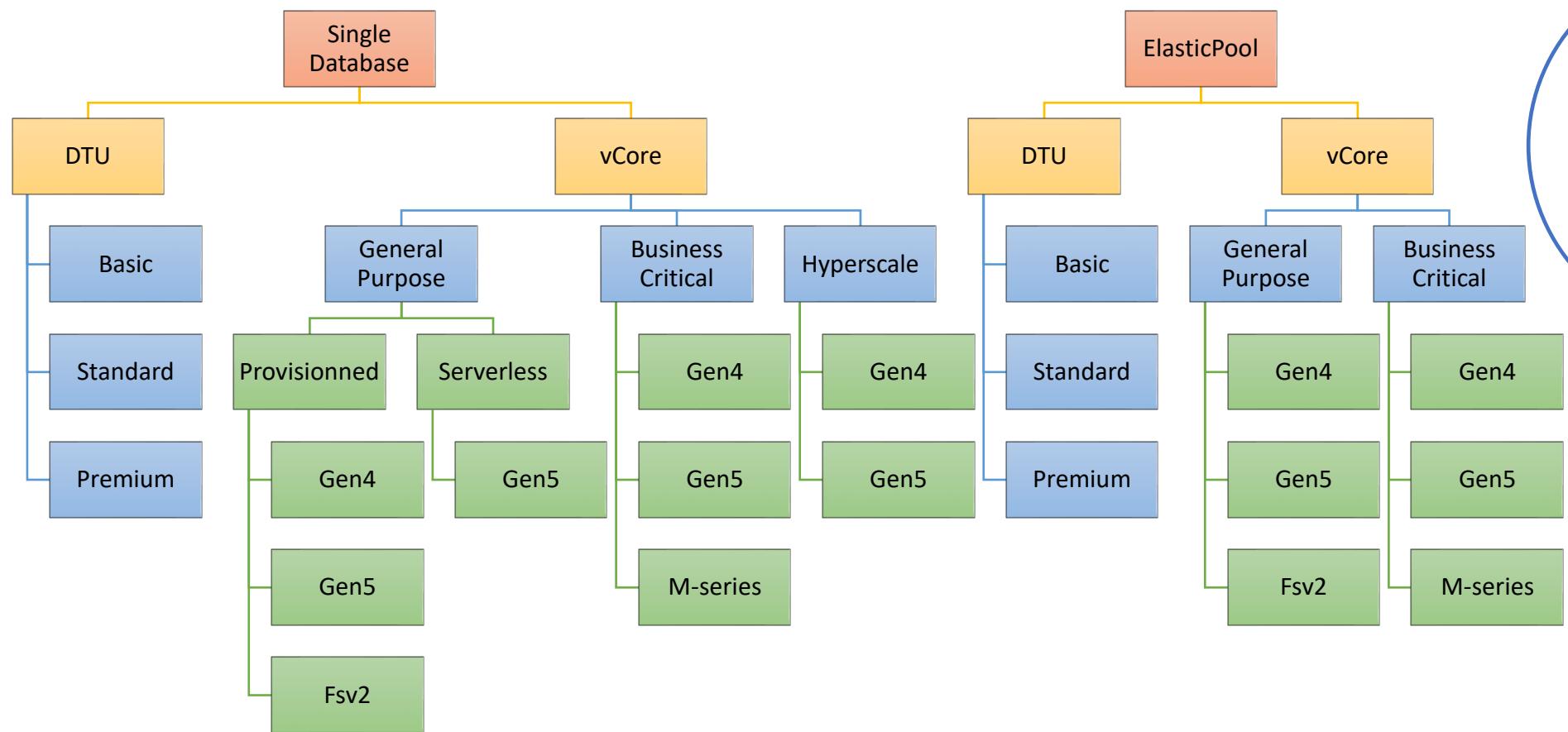


Azure : Azure SQL Databases

- Service tiers
 - General Purpose
 - Business critical
 - Hyperscale
- Fonction de
 - Stockage
 - Ressources en calcul
 - InMemory OLTP (Hekaton)
 - Scaling (up / down / in / out)
 - Haute disponibilité

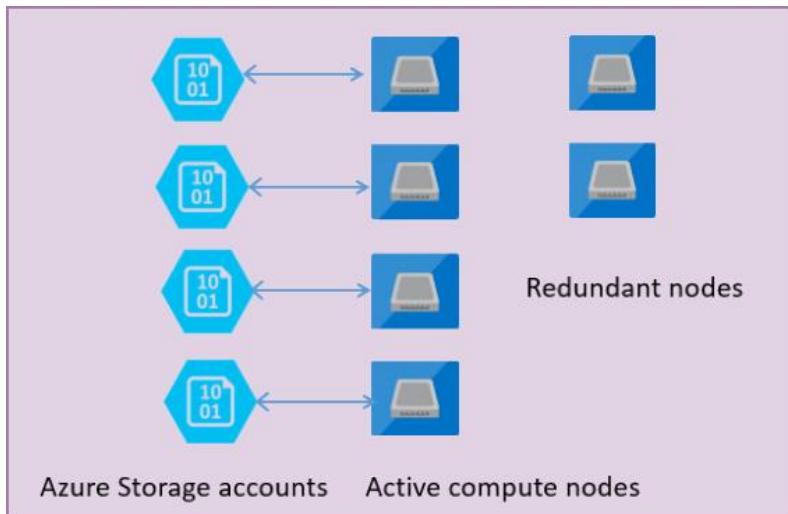


Azure : Azure SQL Databases



Azure : Azure SQL – General Purpose

- Séparation du compute et storage
- Azure Blob Storage
 - Réplication transparente des fichiers
 - Pas de perte de données

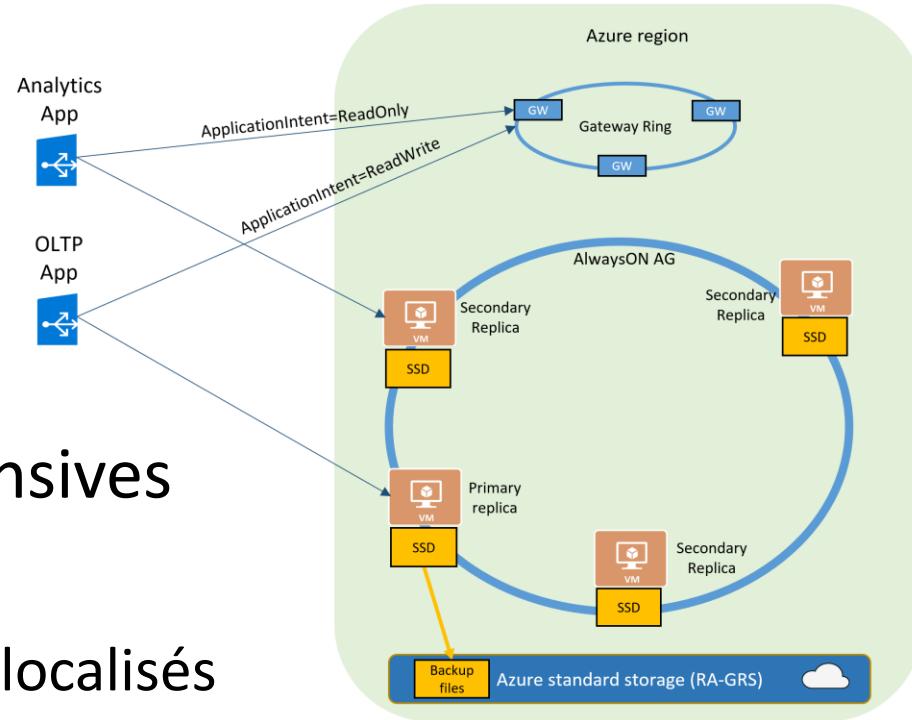


```
CREATE CREDENTIAL [https://testdb.blob.core.windows.net/data]
WITH IDENTITY='SHARED ACCESS SIGNATURE',
SECRET = '<your SAS key>'

CREATE DATABASE testdb
ON
( NAME = testdb_dat,
  FILENAME = 'https://testdb.blob.core.windows.net/data/TestData.mdf' )
LOG ON
( NAME = testdb_log,
  FILENAME = 'https://testdb.blob.core.windows.net/data/TestLog.ldf' )
```

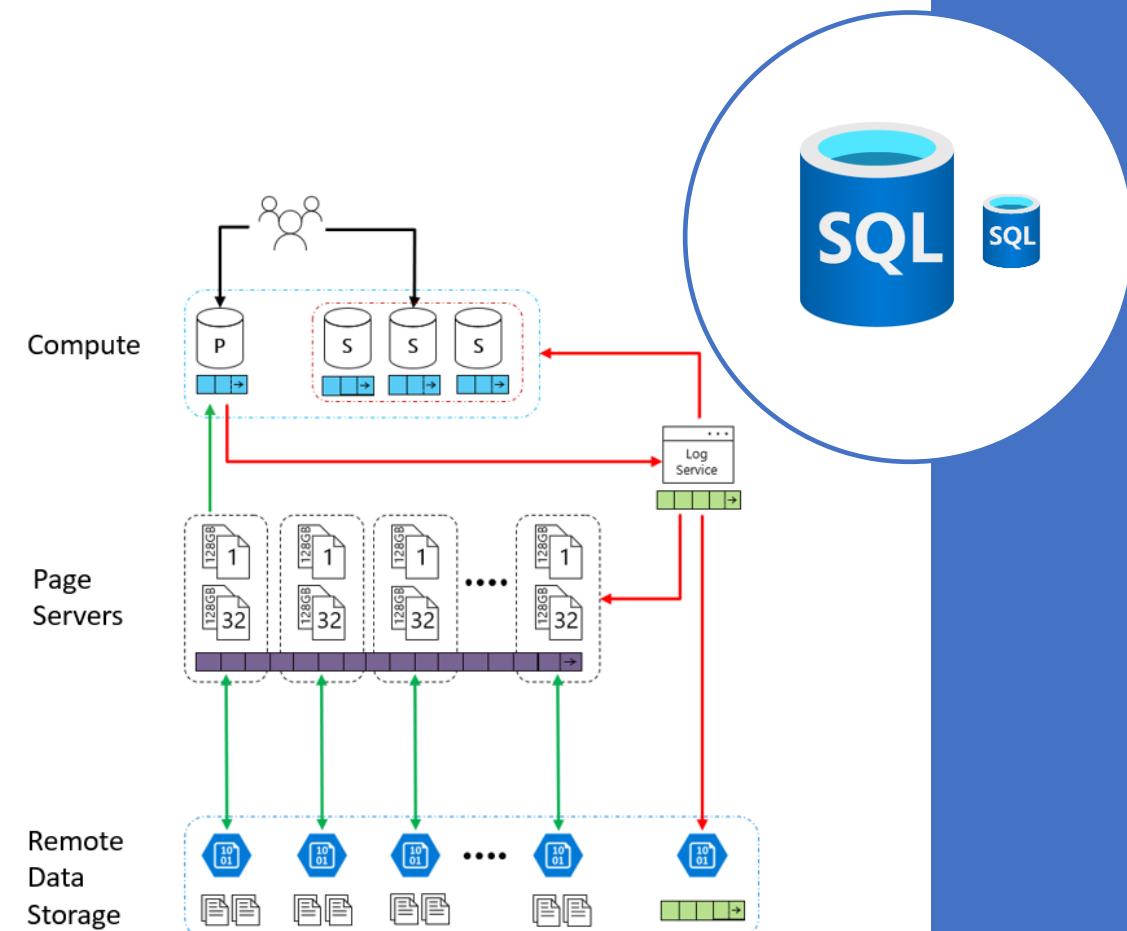
Azure : Azure SQL – Business Critical

- Charges de travail intensives
- Cluster 4 nœuds
 - Compute et storage colocalisés
 - Similaire Groupes de disponibilités
 - Stockage local type SSD
 - Réplica en lecture ([read scale-out](#))



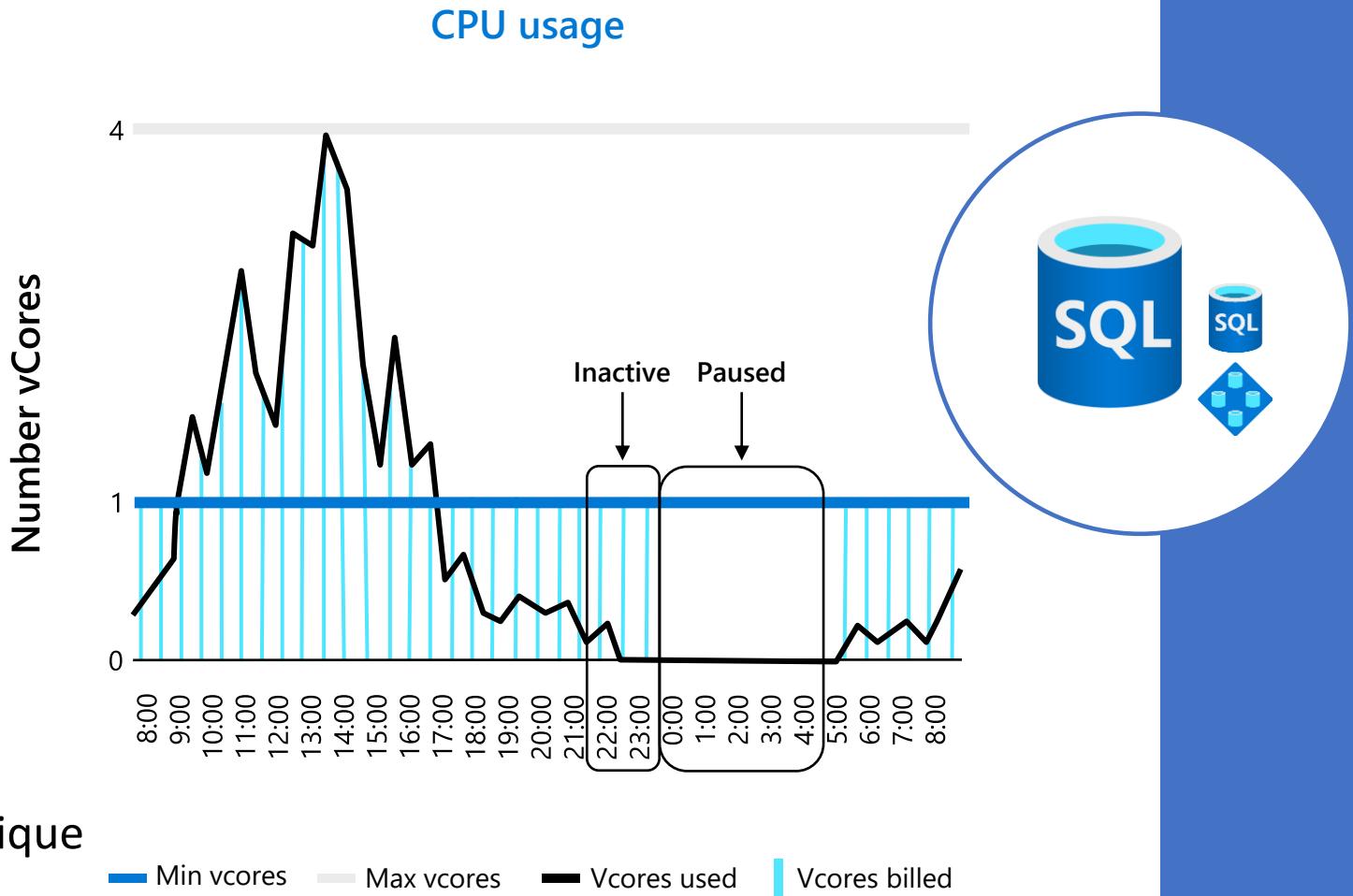
Azure : Azure SQL Database Hyperscale

- Compute
 - 1 nœud read/write
 - -> 3 nœuds read-only / failover
 - Disques locaux SSD -> cache local
 - Scale Up / Out rapide
- Page servers
 - Scale Out storage engine
 - Volumétrie -> 100TB
 - Disques locaux SSD -> cache local
 - Backup et Restore rapides
- Log Service
 - Accepte les enregistrements du serveur de compute
 - Stocké sur des disques locaux SSD
 - Propage les modifications sur les nœuds read-only
 - Propage les modifications aux page servers
- Azure Storage
 - Backup
 - Réplication inter-régions
 - Fichiers maintenus par Page Servers



Azure : Azure SQL Database Serverless

- General Purpose
- Single Database
- Usage
 - Intermittent
 - Non prédictible
- Paiement à l'usage
 - Facturé à la seconde
 - Stockage + compute
 - Mise à l'échelle automatique



Azure : Azure SQL Database

```
$ProjectName = "sqlazure-demo"
$ResourceGroupName = $ProjectName + "-rg"
$Location = "FranceCentral"
$serverName = $ProjectName + "-sql"

# Resource Group Creation
$ResourceGroup = New-AzResourceGroup -Name $ResourceGroupName -Location $Location
$ResourceGroup

$adminSqlLogin = "Christophe"
$password = "Password1!"

# Create a server with a system wide unique server name
$server = New-AzSqlServer -ResourceGroupName $resourceGroupName ` 
    -ServerName $serverName
    -Location $location
    -SqlAdministratorCredentials $($New-Object -TypeName System.Management.Automation.PSCredential ` 
        -ArgumentList $adminSqlLogin,
        $(ConvertTo-SecureString -String $password -AsPlainText -Force))

# Create a server firewall rule that allows access from the specified IP range
$startIp = "0.0.0.0"
$endIp = "0.0.0.0"
$serverFirewallRule = New-AzSqlServerFirewallRule -ResourceGroupName $resourceGroupName ` 
    -ServerName $serverName
    -FirewallRuleName "AllowedIPs"
    -StartIpAddress $startIp
    -EndIpAddress $endIp
```

DEMO

```
$PoolName1 = "Pool1"
$PoolName2 = "Pool2"
$DatabaseName1 = "SampleDatabase1"
$DatabaseName2 = "SampleDatabase2"

# Create two elastic database pools
$firstPool = New-AzSqlElasticPool -ResourceGroupName $resourceGroupName ` 
    -ServerName $serverName
    -ElasticPoolName $PoolName1
    -Edition "Standard"
    -Dtu 50
    -DatabaseDtuMin 10
    -DatabaseDtuMax 20
$secondPool = New-AzSqlElasticPool -ResourceGroupName $resourceGroupName ` 
    -ServerName $serverName
    -ElasticPoolName $PoolName2
    -Edition "Standard"
    -Dtu 50
    -DatabaseDtuMin 10
    -DatabaseDtuMax 50

# Create two blank databases in the first pool
$firstDatabase = New-AzSqlDatabase -ResourceGroupName $resourceGroupName ` 
    -ServerName $serverName
    -DatabaseName $DatabaseName1
    -ElasticPoolName $PoolName1

$secondDatabase = New-AzSqlDatabase -ResourceGroupName $resourceGroupName ` 
    -ServerName $serverName
    -DatabaseName $DatabaseName2
    -ElasticPoolName $PoolName2
```



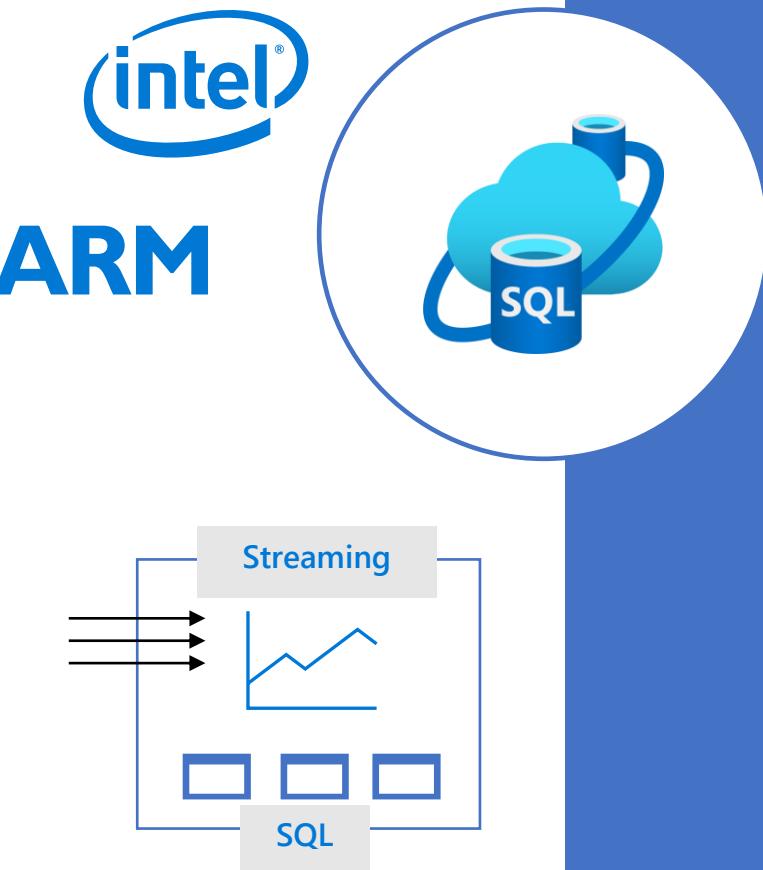
Azure : SQL Managed instances

- Service tiers / Hardware generation
 - General Purpose (single node, remote SSD, 8TB)
 - Business Critical (HA -> Ags, local SSD, 4TB, 1 read-only replica)
 - Gen4 (7GB RAM/core, up to 24 cores)
 - Gen5 (5,1GB RAM/core, up to 80 cores)
- Déploiement
 - Single instance
 - Instance pools
- Surface quasi identique à SQL Server
 - Requêtes cross database
 - Agent SQL, Service broker, Database Mail, CLR
- Cas d'usage:
 - Lift and Shift vers un service manage
 - Migration via Log Shipping (~ zero downtime)



Hybrid : Azure SQL Database Edge

- SQL Server porté sur des Edge devices
 - < 500Mb d'emprunte pour le moteur
 - Déployé au travers d'Azure IoT
- Support de différents processeurs
- Time-Series et Steaming embarqué
- Compatibilité avec SQL Server
- Cas d'usage:
 - Machine learning avec des données IoT

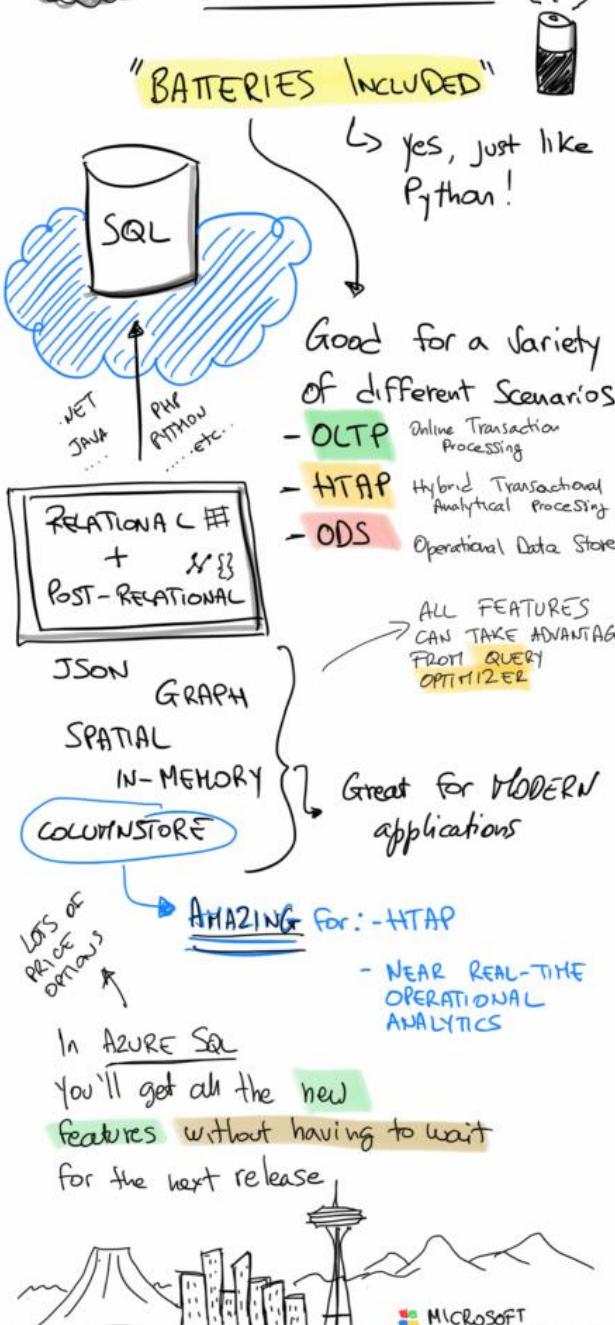


Fonctionnalités favorites

En tant que DBA ...

Best
Database
For Dev!

AZURE SQL



Service PaaS

- Service managé
 - update, backup, monitoring
- Nouvelles fonctionnalités
 - Accessibles d'abord sur Azure SQL
- Pas de fin de support
 - Pas de migration !



SQL Server Version	Mainstream Support	Extended Support
SQL Server 2005	April 12, 2011	April 12, 2016
SQL Server 2008 and 2008 R2	July 8, 2014	July 9, 2019
SQL Server 2012	July 11, 2017	July 12, 2022
SQL Server 2014	July 9, 2019	July 9, 2024
SQL Server 2016	July 13, 2021	July 14, 2026
SQL Server 2017	October 11, 2022	October 12, 2027
SQL Server 2019	January 7, 2025	January 8, 2030

SQL Azure – Géo réPLICATION

DEMO

Microsoft Azure

Search resources, services, and docs (G+ /)

christophe.laporte@hotmail.com RÉPERTOIRE PAR DÉFAUT

Home > SQL servers > conseilit-fr > DemoDB (conseilit-fr/DemoDB) | Geo-Replication

DemoDB (conseilit-fr/DemoDB) | Geo-Replication

Search (Ctrl+ /)

Overview

Activity log

Tags

Diagnose and solve problems

Quick start

Query editor (preview)

Power Platform

Power BI (preview)

PowerApps (preview)

Flow (preview)

Settings

Configure

Geo-Replication

Connection strings

Sync to other databases

Add Azure Search

Properties

Locks

Export template

Integrations

Stream analytics (preview)

Security

Advanced data security

Audit logs

Select a region on the map or from the Target Regions list to create a secondary database.

You can now automatically manage replication, connectivity and failover of this database by adding it to failover group.



Server/Database	Failover policy	Status
Primary France Central conseilit-fr/DemoDB	None	Online
Secondaries Southeast Asia conseilit-sas/DemoDB		Readable
East US conseilit-eus/DemoDB		Readable
West US conseilit-wus/DemoDB		Readable

Target regions

- West US
- West US 2



SQL Azure : Failover Groups

DEMO

Home > sqlazure-demo-rg > sqlazure-demo-northeurope-sql | Failover groups > sqlazure-demo-fg

sqlazure-demo-fg
sqlazure-demo-northeurope-sql

Save Discard Add databases Edit configuration Remove databases Failover Forced Failover Delete

Configuration details Databases within group Databases selected to be added (0) Databases selected for removal (0)



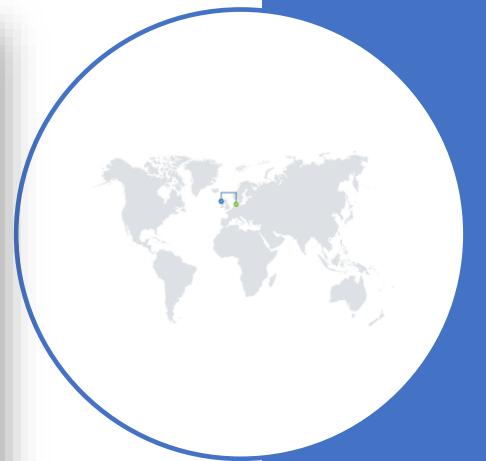
Primary server: sqlazure-demo-northeurope-sql (North Europe)
DemoDB1 Online
DemoDB2 Online

Secondary server: sqlazure-demo-westeurope-sql (West Europe)
DemoDB2 Readable
DemoDB1 Readable

Server	Role	Read/Write failover policy	Grace period
sqlazure-demo-northeurope-sql (North Europe)	Primary	Automatic	1 hours
sqlazure-demo-westeurope-sql (West Europe)	Secondary		

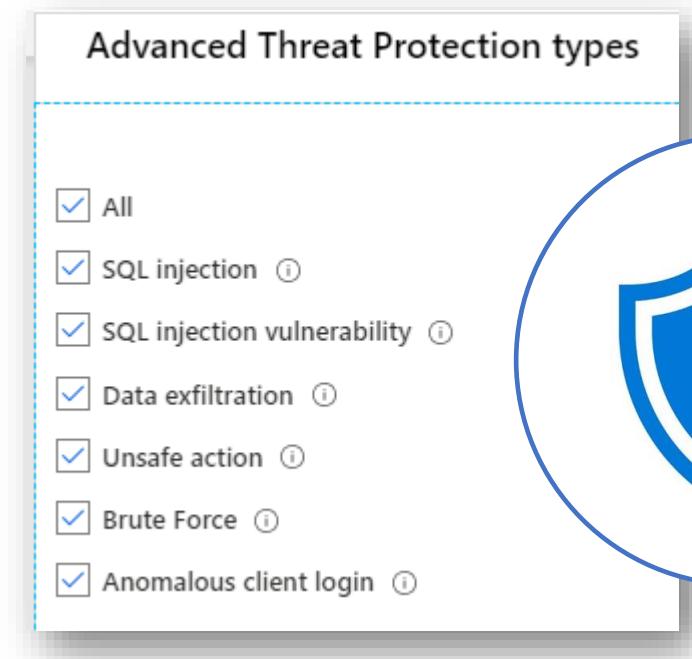
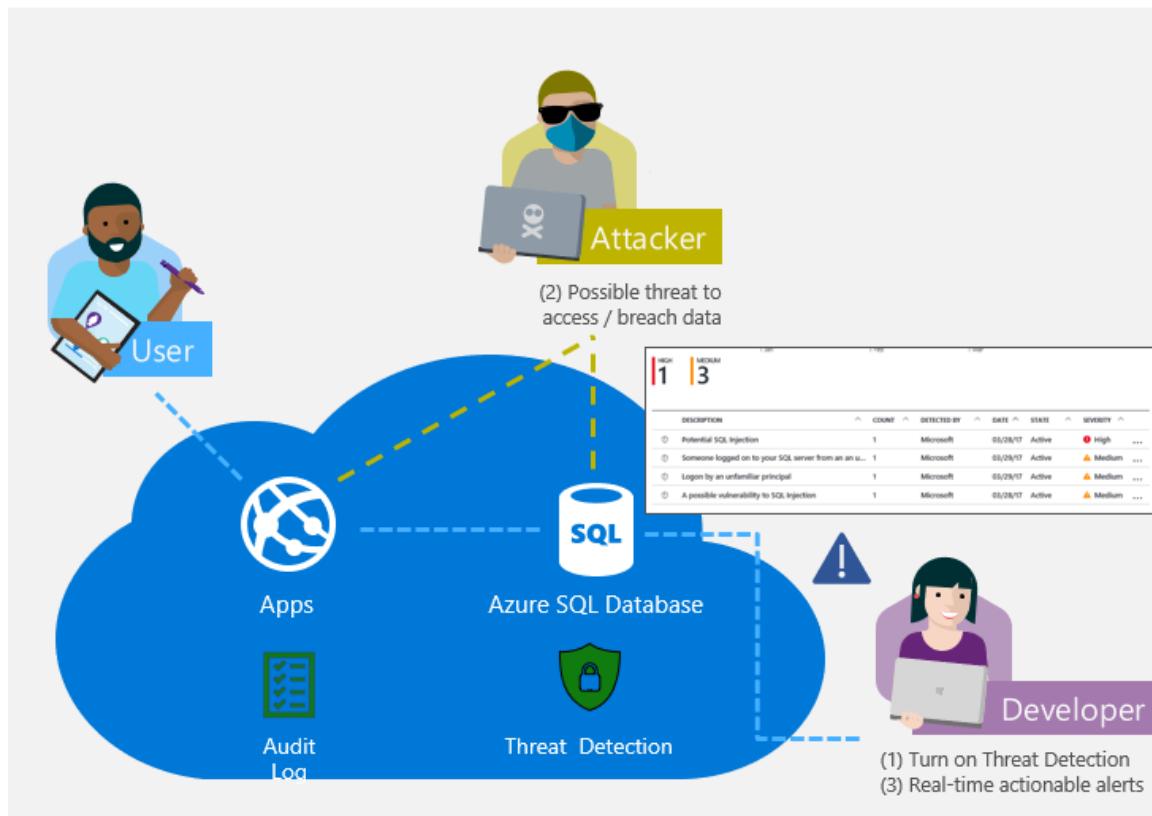
Read/write listener endpoint
sqlazure-demo-fg.database.windows.net

Read-only listener endpoint
sqlazure-demo-fg.secondary.database.windows.net



Advanced Threat Detection

- Détection d'activités inhabituelles



SQL Azure : Alertes

- Détection de dépassement de capacité
- Détection d'erreurs
- Action : Email, SMS, appel vocal, Azure Function

Screenshot of the Microsoft Azure portal showing the 'Create rule' wizard for alert configuration.

Step 1: Create rule

- RESOURCE:** carlalperin/WideWorldImporters-Standard
- HIERARCHY:** SQL Content Team
- CONDITION:** No condition defined.
- ACTIONS GROUPS (optional):** No action group selected.
- ALERT DETAILS:** Alert rule name: Percentage CPU greater than 70%, Description: Specify alert description here.
- Enable rule upon creation:** Yes

Step 2: Configure signal logic

Choose a signal below and configure the logic on the next screen to define the alert condition.

Signal type	Monitor service
All	All

Displaying 1 - 20 signals out of total 32 signals

Signal name	Signal type	Monitor service
CPU percentage	Metric	Platform
Data IO percentage	Metric	Platform
Log IO percentage	Metric	Platform
DTU percentage	Metric	Platform
Data space used	Metric	Platform
Successful Connections	Metric	Platform
Failed Connections	Metric	Platform
Blocked by Firewall	Metric	Platform
Deadlocks	Metric	Platform
Data space used percent	Metric	Platform
In-Memory OLTP storage percent	Metric	Platform
Workers percentage	Metric	Platform
Sessions percentage	Metric	Platform
DTU Limit	Metric	Platform
DTU used	Metric	Platform
SQL Server process core percent	Metric	Platform
SQL Server process memory percent	Metric	Platform
Tempdb Data File Size Kilobytes	Metric	Platform
Tempdb Log File Size Kilobytes	Metric	Platform
Tempdb Percent Log Used	Metric	Platform

Step 3: Configure signal logic

Define the logic for triggering an alert. Use the chart to view trends in the data.

CPU percentage (Platform)

Chart period: Over the last 6 hours

New Dynamic Thresholds automatically sets the thresholds for you and adapts to changes. Click the Dynamic button to explore.

Alert logic:

- Threshold:** Static (selected), Dynamic
- Operator:** Greater than
- Aggregation type:** Average
- Threshold value:** 0.01%

Condition preview: Whenever the cpu percentage is greaterthan <logic undefined> %

Evaluated based on:

- Aggregation granularity (Period):** 5 minutes
- Frequency of evaluation:** Every 1 Minute

Done

Screenshot of the Microsoft Azure portal showing the 'Configure signal logic' step for alert configuration.

Configure signal logic

Choose a signal below and configure the logic on the next screen to define the alert condition.

Signal type	Monitor service
All	All

Displaying 1 - 20 signals out of total 32 signals

Signal name	Signal type	Monitor service
CPU percentage	Metric	Platform
Data IO percentage	Metric	Platform
Log IO percentage	Metric	Platform
DTU percentage	Metric	Platform
Data space used	Metric	Platform
Successful Connections	Metric	Platform
Failed Connections	Metric	Platform
Blocked by Firewall	Metric	Platform
Deadlocks	Metric	Platform
Data space used percent	Metric	Platform
In-Memory OLTP storage percent	Metric	Platform
Workers percentage	Metric	Platform
Sessions percentage	Metric	Platform
DTU Limit	Metric	Platform
DTU used	Metric	Platform
SQL Server process core percent	Metric	Platform
SQL Server process memory percent	Metric	Platform
Tempdb Data File Size Kilobytes	Metric	Platform
Tempdb Log File Size Kilobytes	Metric	Platform
Tempdb Percent Log Used	Metric	Platform

Configure signal logic

Define the logic for triggering an alert. Use the chart to view trends in the data.

CPU percentage (Platform)

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Condition preview: Whenever the cpu percentage is greaterthan <logic undefined> %

Evaluated based on:

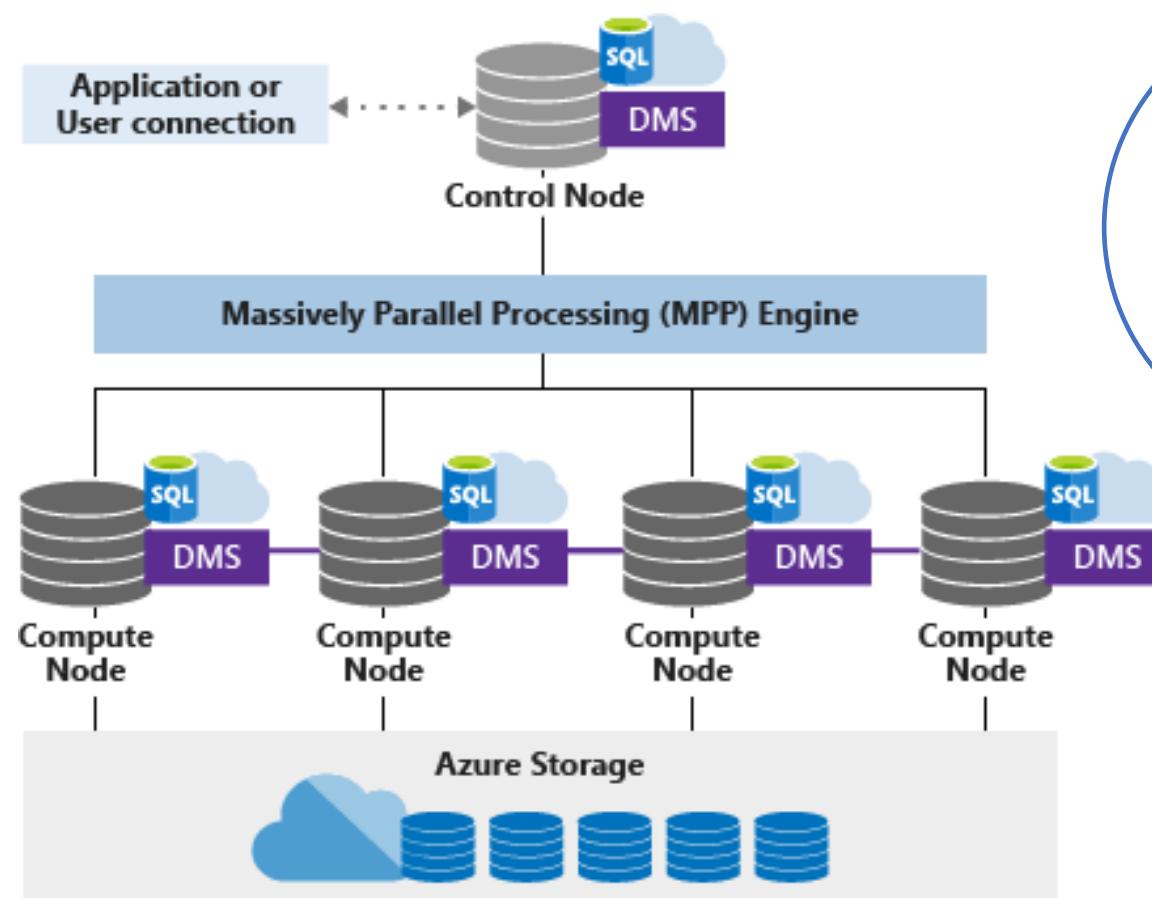
- Aggregation granularity (Period):** 5 minutes
- Frequency of evaluation:** Every 1 Minute

Done



Azure Synapse analytics (SQL DW)

- Massive Parallel Processing





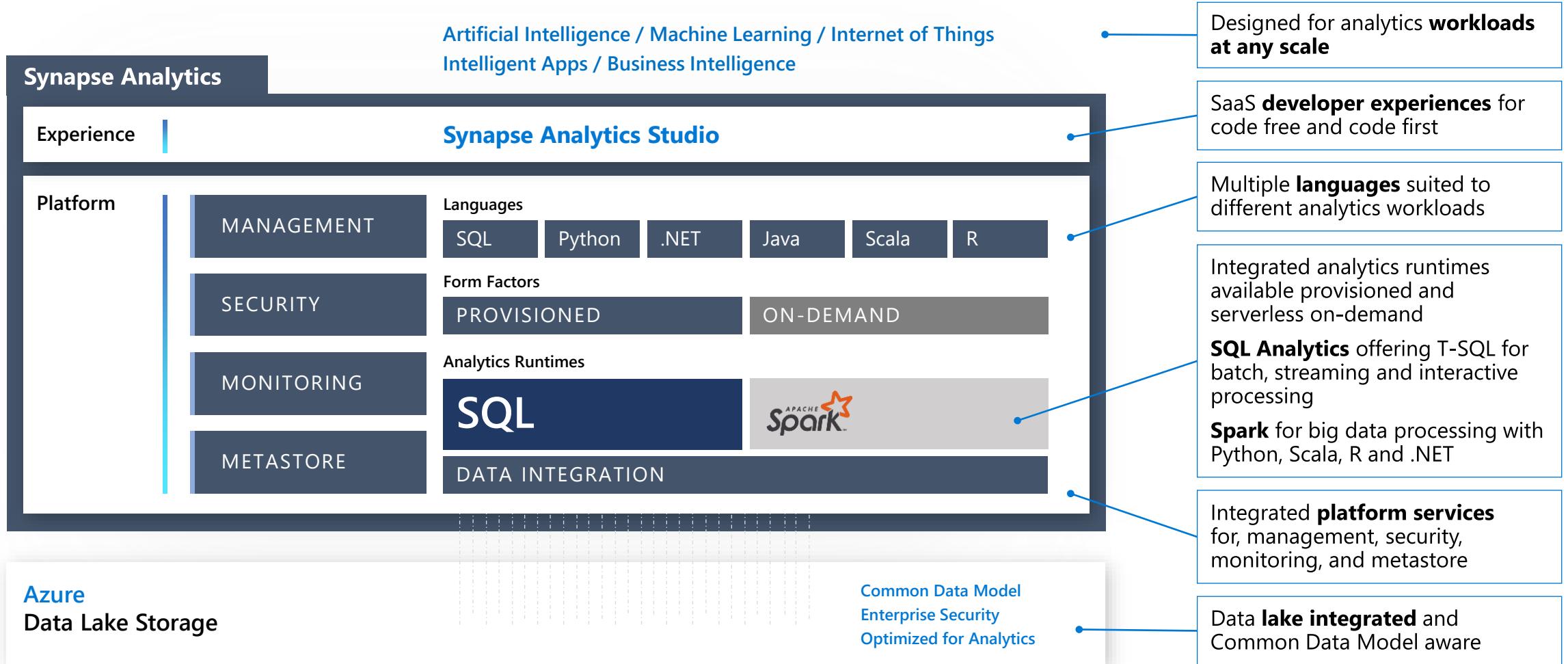
Azure Synapse Analytics 20 Min Introduction & Demo

Stephane PAPAIX – Cloud Solution Architect

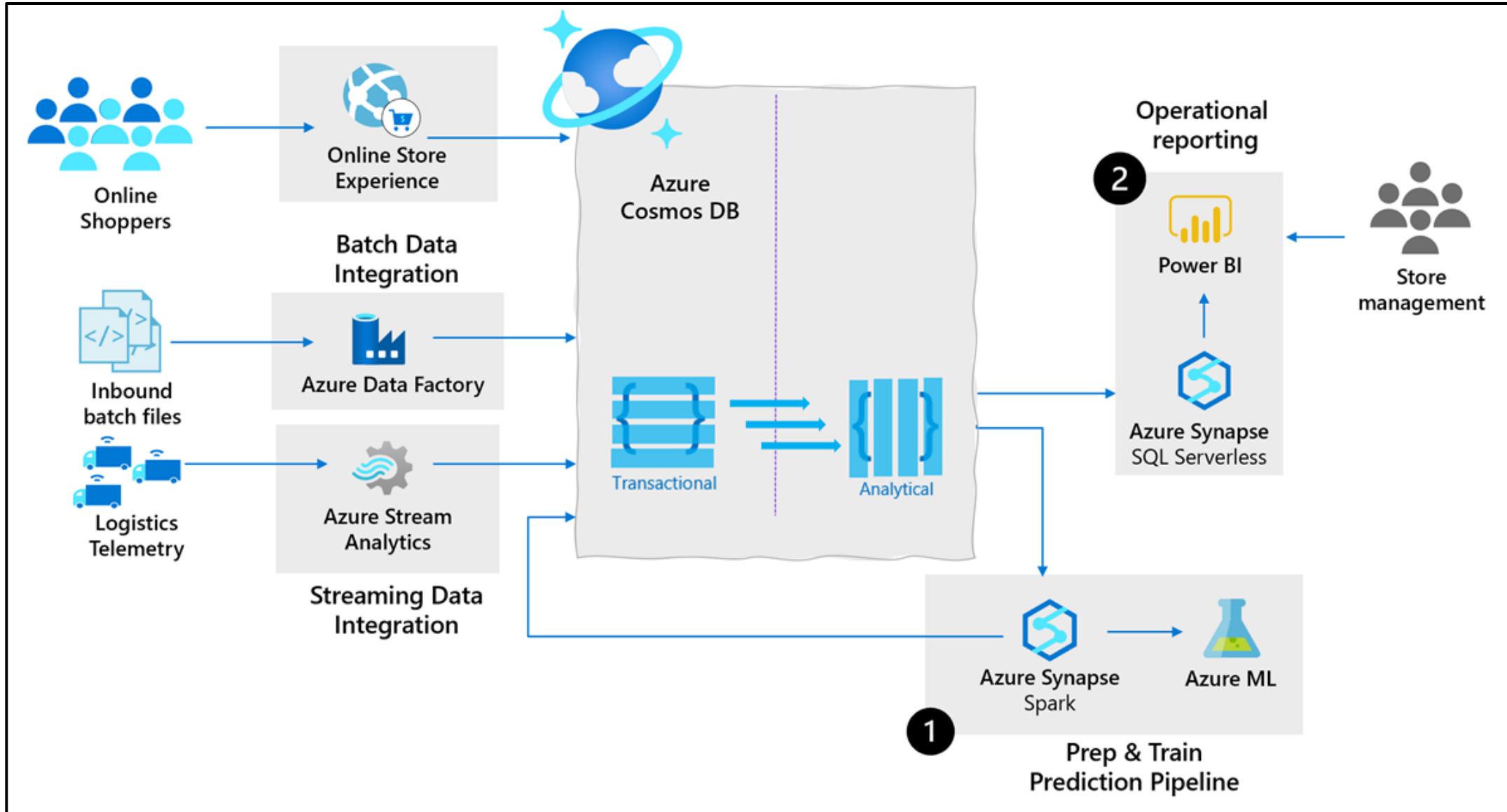
stpapaix@microsoft.com

Azure Synapse Analytics

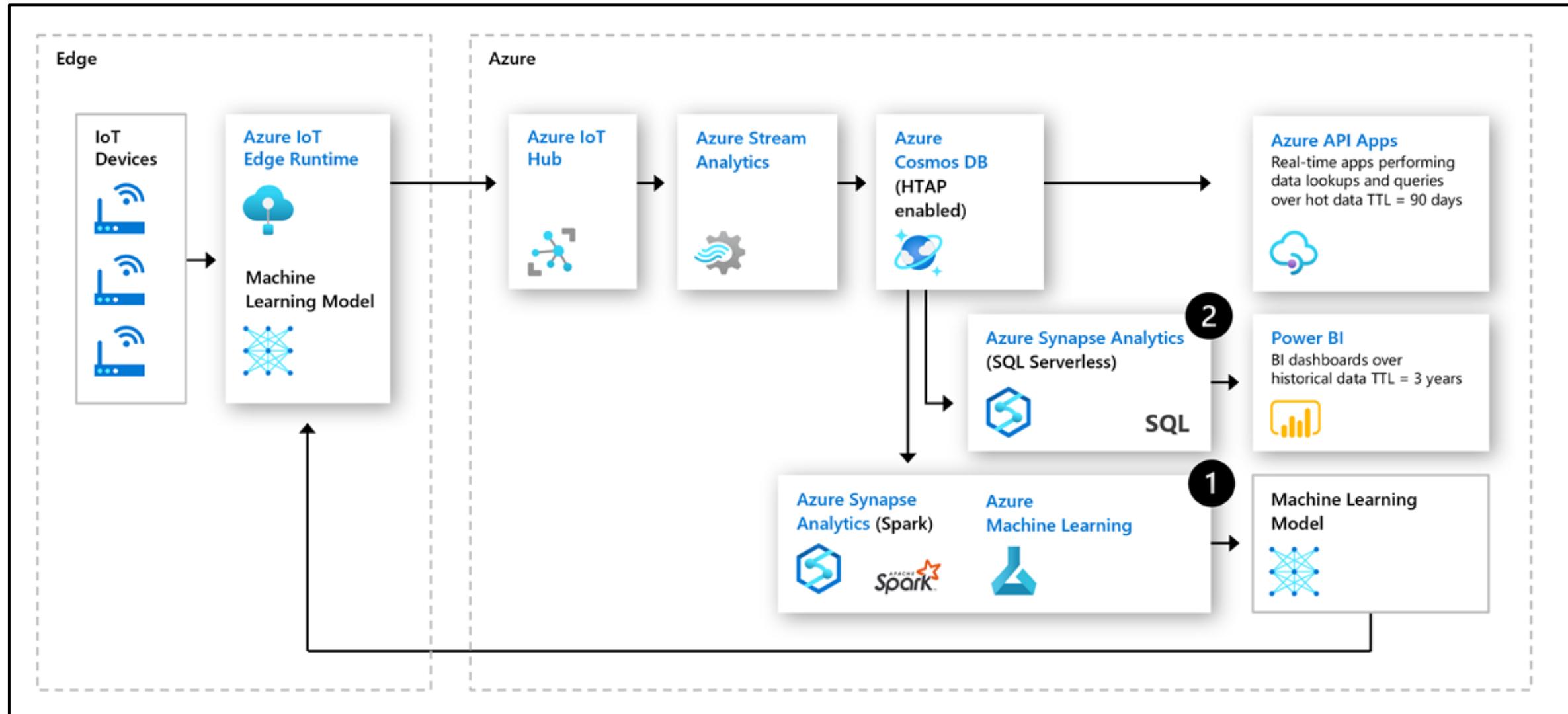
Integrated data platform for BI, AI and continuous intelligence



Supply chain analytics, forecasting & reporting



IOT predictive maintenance





Azure

Synapse Demo

SQL OnDemand – View creation on .parquet files

The screenshot displays three separate SQL OnDemand query windows, each with its own toolbar and connection settings.

- Top Window:** Connect to "SQL on-demand" | Use database "master".

```
1 -- Drop database if it exists
2 DROP DATABASE IF EXISTS Demo
3 GO
4
5 -- Create new database
6 CREATE DATABASE [Demo];
7 GO
```
- Middle Window:** Connect to "SQL on-demand" | Use database "Demo". A red circle highlights the "Use database" dropdown.

```
1 -- There is no credential in data source. We are using public storage account which doesn't need a secret.
2 CREATE EXTERNAL DATA SOURCE AzureOpenData
3 WITH ( LOCATION = 'https://azureopendatastorage.blob.core.windows.net/' )
```
- Bottom Window:** Connect to "SQL on-demand" | Use database "Demo". A red circle highlights the "Use database" dropdown.

```
1 DROP VIEW IF EXISTS usPopulationView;
2 GO
3
4 CREATE VIEW usPopulationView AS
5 SELECT
6 *
7 FROM
8 OPENROWSET(
9     BULK 'censusdatacontainer/release/us_population_county/year=20*/*.parquet',
10    DATA_SOURCE = 'AzureOpenData',
11    FORMAT='PARQUET'
12 ) AS uspv;
```

Get Data from PBI to Synapse SQL OnDemand

The screenshot illustrates the process of connecting Power BI to a Synapse SQL OnDemand workspace. In the 'Get Data' dialog, the 'Azure' category is selected. A red arrow points to the 'Azure SQL database' option. The 'Navigator' pane shows a connection named 'mystpasynapseworkspace-on-demand.sql.azure...' with a 'Demo [1]' folder containing a checked item 'usPopulationView'. Another red arrow points to this checked item. The 'usPopulationView' table is displayed in the main pane, showing data for Autauga County, Alabama, across various years and population categories. Handwritten red text 'Synapse SQL OnDemand' is written above the 'usPopulationView' table.

Get Data

Search

Azure

- Azure SQL database
- Azure SQL Data Warehouse
- Azure Analysis Services database
- Azure Database for PostgreSQL
- Azure Blob Storage
- Azure Table Storage
- Azure Cosmos DB
- Azure Data Lake Storage Gen2
- Azure Data Lake Storage Gen1
- Azure HDInsight (HDFS)
- Azure HDInsight Spark
- HDInsight Interactive Query
- Azure Data Explorer (Kusto)
- Azure Cost Management
- Azure Time Series Insights (Beta)

Certified Connectors

Connect Cancel

Navigator

Display Options

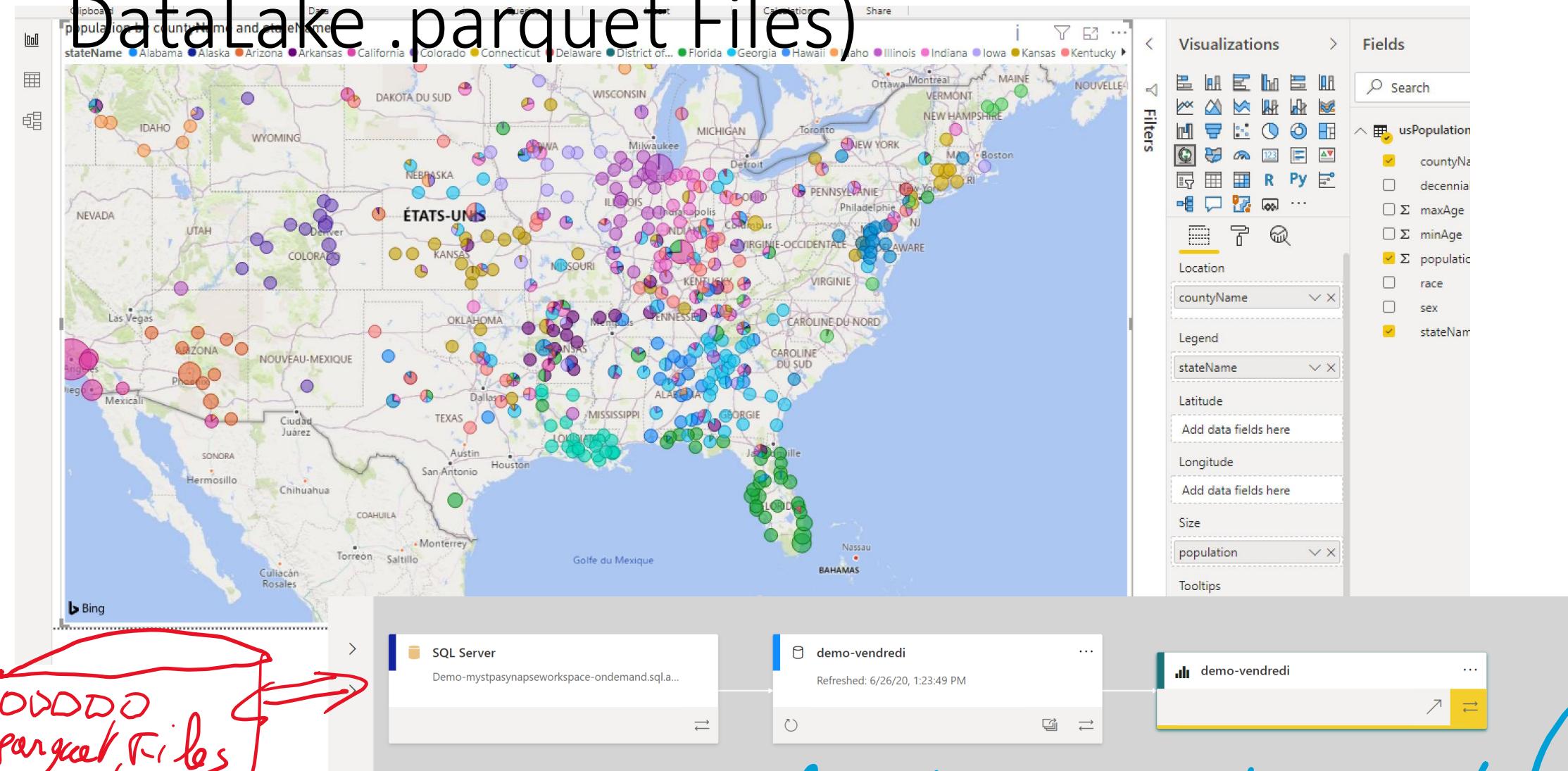
- mystpasynapseworkspace-on-demand.sql.azure...
- default
- Demo [1]
- usPopulationView

usPopulationView

decennialTime	stateName	countyName	population	race
2000	Alabama	Autauga County	7473	BLACK OR AFRICAN AMERICAN
2000	Alabama	Autauga County	7	SOME OTHER RACE
2000	Alabama	Autauga County	452	WHITE ALONE
2000	Alabama	Autauga County	2	ASIAN ALONE
2000	Alabama	Autauga County	9	AMERICAN INDIAN AND ALASKA NATIVE
2000	Alabama	Autauga County	0	ASIAN ALONE
2000	Alabama	Autauga County	1	ASIAN ALONE
2000	Alabama	Autauga County	10	TWO OR MORE RACES
2000	Alabama	Autauga County	781	WHITE ALONE
2000	Alabama	Autauga County	2	TWO OR MORE RACES
2000	Alabama	Autauga County	697	
2000	Alabama	Autauga County	0	SOME OTHER RACE
2000	Alabama	Autauga County	241	
2000	Alabama	Autauga County	689	
2000	Alabama	Autauga County	144	WHITE ALONE
2000	Alabama	Autauga County	6	SOME OTHER RACE
2000	Alabama	Autauga County	271	BLACK OR AFRICAN AMERICAN
2000	Alabama	Autauga County	22	TWO OR MORE RACES
2000	Alabama	Autauga County	1124	WHITE ALONE
2000	Alabama	Autauga County	473	
2000	Alabama	Autauga County	341	
2000	Alabama	Autauga County	1745	
2000	Alabama	Autauga County	5	AMERICAN INDIAN AND ALASKA NATIVE

Select Related Tables Load Transform Data Cancel

Power BI Report (on data coming from DataLake .parquet Files)



ODDODD
parquet files
ADLS storage

you pay SQL Server only when your request



SQL Server / SQL Azure DB

SQL Server

Jean Glaudon – Microsoft

Data & AI Sales Specialist

+33 6 64 40 52 61 – jean.glaudon@microsoft.com

Editions SQL Server 2019

Toujours les 4 éditions



Enterprise

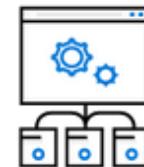
Access mission-critical capabilities to achieve unparalleled scale, security, high availability, and leading performance



Standard*

Find rich programming capabilities, security innovations, and fast performance for mid-tier applications and data marts

**both per core and Server/CAL*



Express

Build small, data-driven web and mobile applications up to 10 GB in size with this entry-level database.
Available for free.



Developer

Build, test, and demonstrate applications in a non-production environment with this full-featured edition of SQL Server.

Tarification SQL Server 2019

Aucun changement à la tarification de SQL Server ou de
la Software Assurance

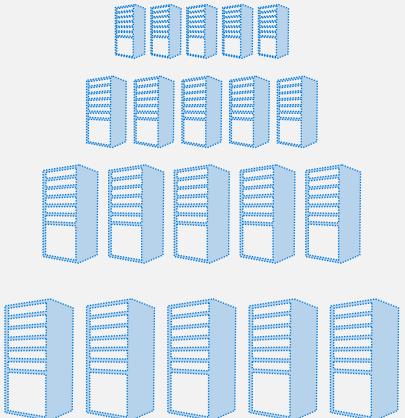
Avec plus de fonctionnalités et plus de bénéfices liés à la Software Assurance

SQL Server Enterprise Edition avec Software Assurance

La SA apporte le meilleur à l'édition Entreprise

Unlimited virtualization

License all physical cores on the server and enable unlimited virtual machine deployments



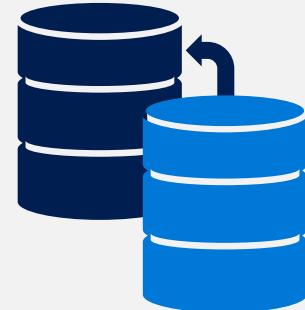
License mobility to SQL Server IaaS

Modernize to the cloud with existing licenses*



Fail-over servers for high availability

Take advantage of one passive secondary server for no additional licensing cost*



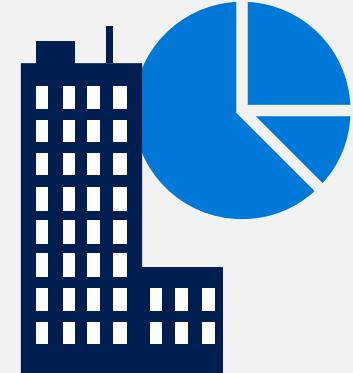
Advanced analytics updates

Get access to quarterly updates to the advanced analytics stack



Mobile BI and interactive reports

Generate data visualizations on premises with Power BI Report Server

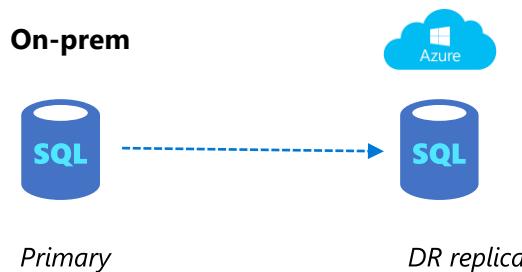


*Also available with Standard Edition plus SA

*Also available with Standard Edition plus SA

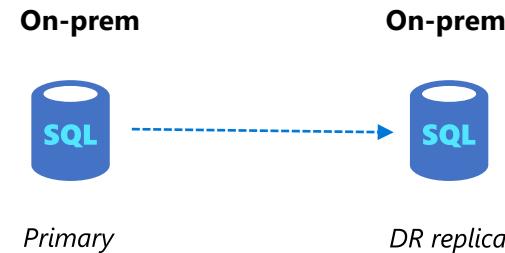
SQL Server 2019 : Nouveaux bénéfices de la SA

Free Hybrid DR only on Azure



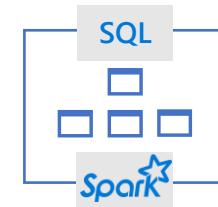
One async replica for each primary SQL Server Instance on-prem for backup in Azure

Reduced DR costs on-prem



Simplified backup licensing with free replica for DR in addition to existing replica for HA and replica for DR

SA entitlement for free Big Data Node cores



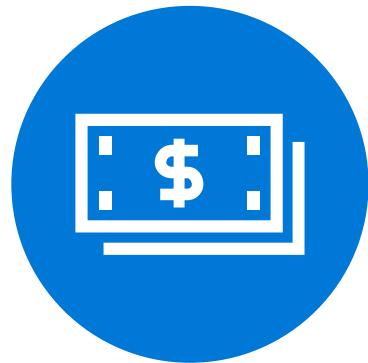
For each core of SQL Server license used in the BDC master node, SA customers get free big data node cores:

- 8 free big data node core for each SQL Server EE core in master node
- 1 free big data node core for each SQL Server SE core in master node

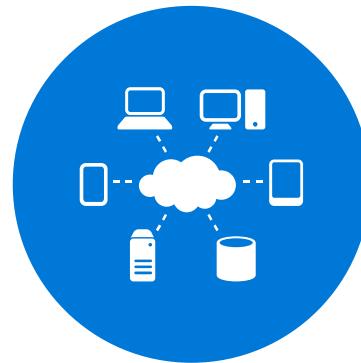
Optimisation des coûts dans Azure

Reserved Instance / Reserved Capacity

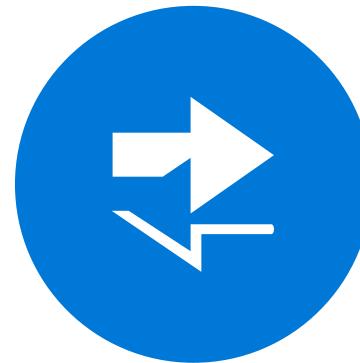
- Réservation d'instances ou de capacités à l'avance
- Choix entre 1 an ou 3 ans de réservation avec des économies importantes



Economies
importantes



Anticipation
Budgétaire

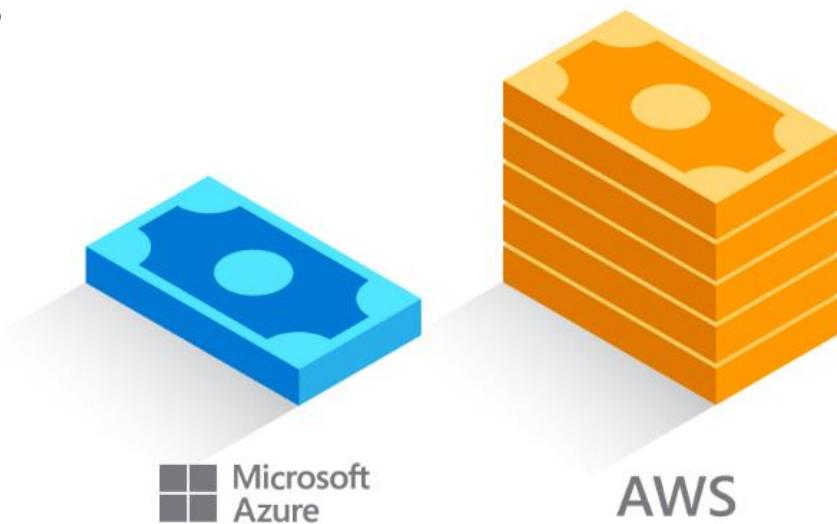


Fléxibilité
Simplicité

Azure Hybrid Benefits pour SQL Server

Azure only benefit for customers with active SA or subscriptions on SQL cores

-  Significantly reduce the costs of running SQL IaaS and PaaS in Azure
-  Pay only the 'base rate' in Azure on SQL IaaS, SQL DB PaaS, and ADF v2 SSIS
-  Available for SQL Server core licenses only
-  Customers can use their cores on premise, **OR** as vCores in Azure
-  However, cores can be used on premise and in Azure simultaneously for up to 180 days, to allow for migration



AWS is 5x more expensive than Azure
[Azure vs. AWS homepage](#)
[5x substantiation page](#)

Reserved Capacity & Azure Hybrid Benefits - Example

IaaS

Services disponibles				
Machines	Cœurs	RAM	OS	SQL Server
M208s V2	208	2850 Go	Windows / Linux	BYOL / PAYG

PaaS

Services disponibles				
Machines	Cœurs	RAM	OS	SQL Server
SQL Azure DB Managed Instance Business Critical	80	N/A	N/A	BYOL / PAYG

Machine Virtuelle	€ HT / Mensuel	Commentaires
Tarif nominal M208s V2	71 763	Licences Windows / SQL intégré
Azure Hybrid Benefits	17 855	Vous utilisez vos licences Windows Server et SQL Server
Réservation 3 ans	5 013	

Service	€ HT / Mensuel	Commentaires
SQL Azure DB MI BC	34 961	SQL intégré
Azure Hybrid Benefits	16493	Vous utilisez vos licences SQL Server
Réservation 3 ans	7 421	

Bénéfice unique pour les environnements hautement virtualisés dans des scénarios PaaS SQL Azure Database

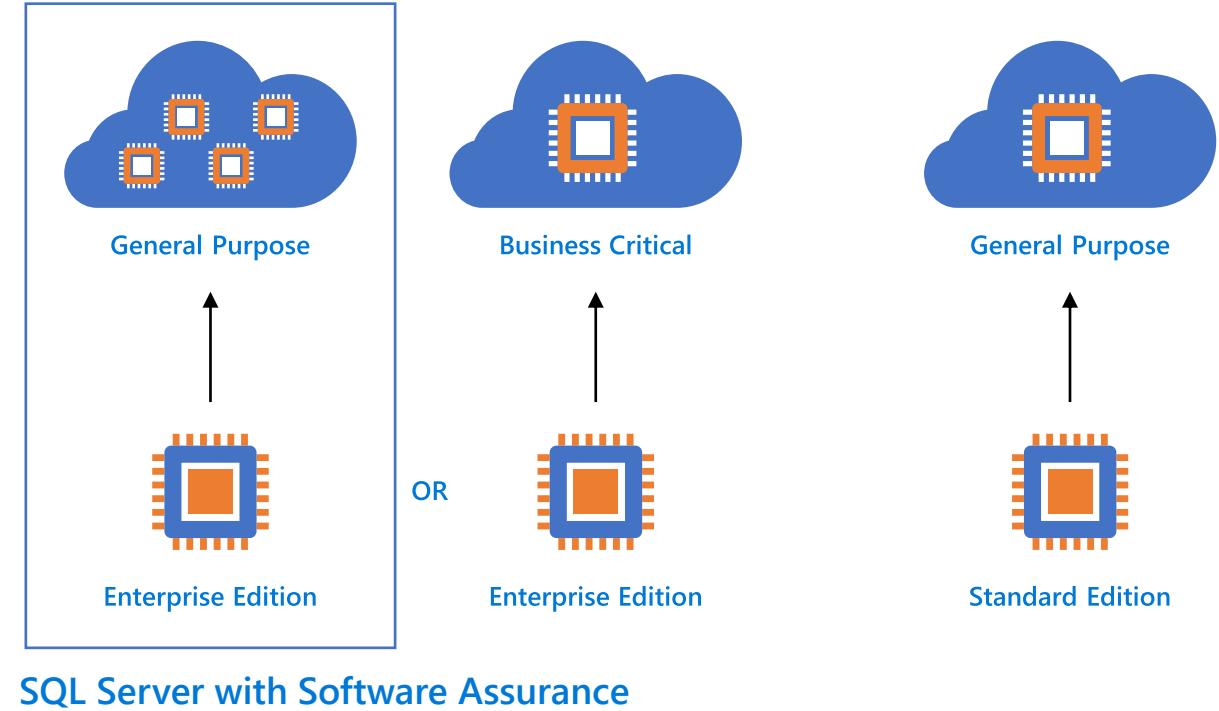
Azure Hybrid Benefit for SQL Server provides a unique benefit for highly virtualized workloads

Convert on-premises cores to vCores to maximize value of investments

1 Enterprise license core = 4 General Purpose cores
(virtualization benefit)

SQL Server license trade-in values

SQL Database vCore-based options



Conclusion

- Le métier de DBA évolue
 - Volume de données en forte expansion
 - Type de données en pleine évolution
 - Responsabilité élargie
 - Choix de plateforme
 - Respect des couts
- Jamais l'offre a été aussi importante et variée
 - On-Premise / Cloud
 - Multi OS : Windows / Linux / MacOS
 - Plateforme : machine physique, machine virtuelle, conteneur, managée



NEVER STOP
LEARNING



Conclusion



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