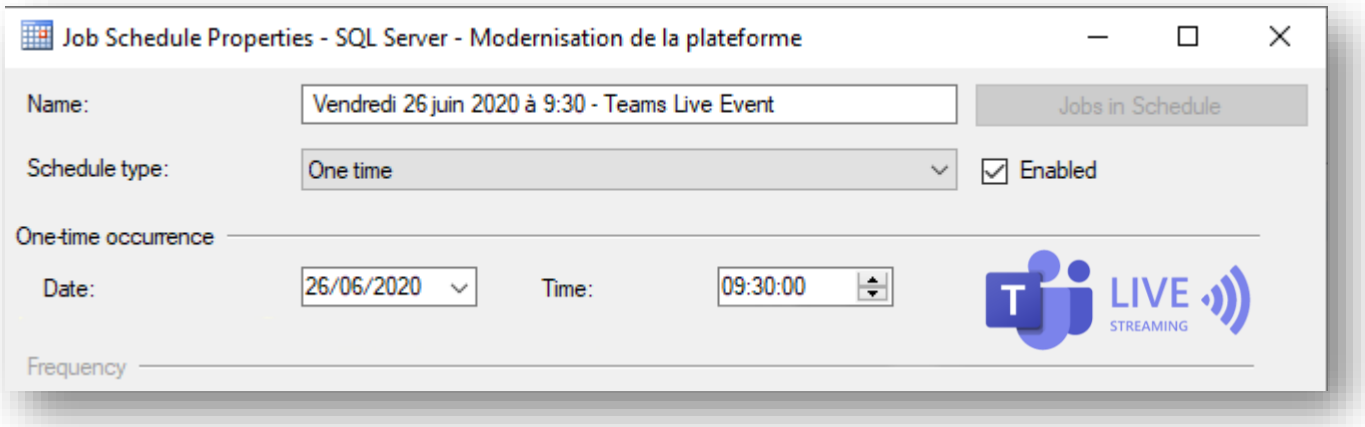
Christophe Laporte

Microsoft

Matinée SQL Server

Modernisation de la plateforme



Microsoft SQL Server

Azure

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

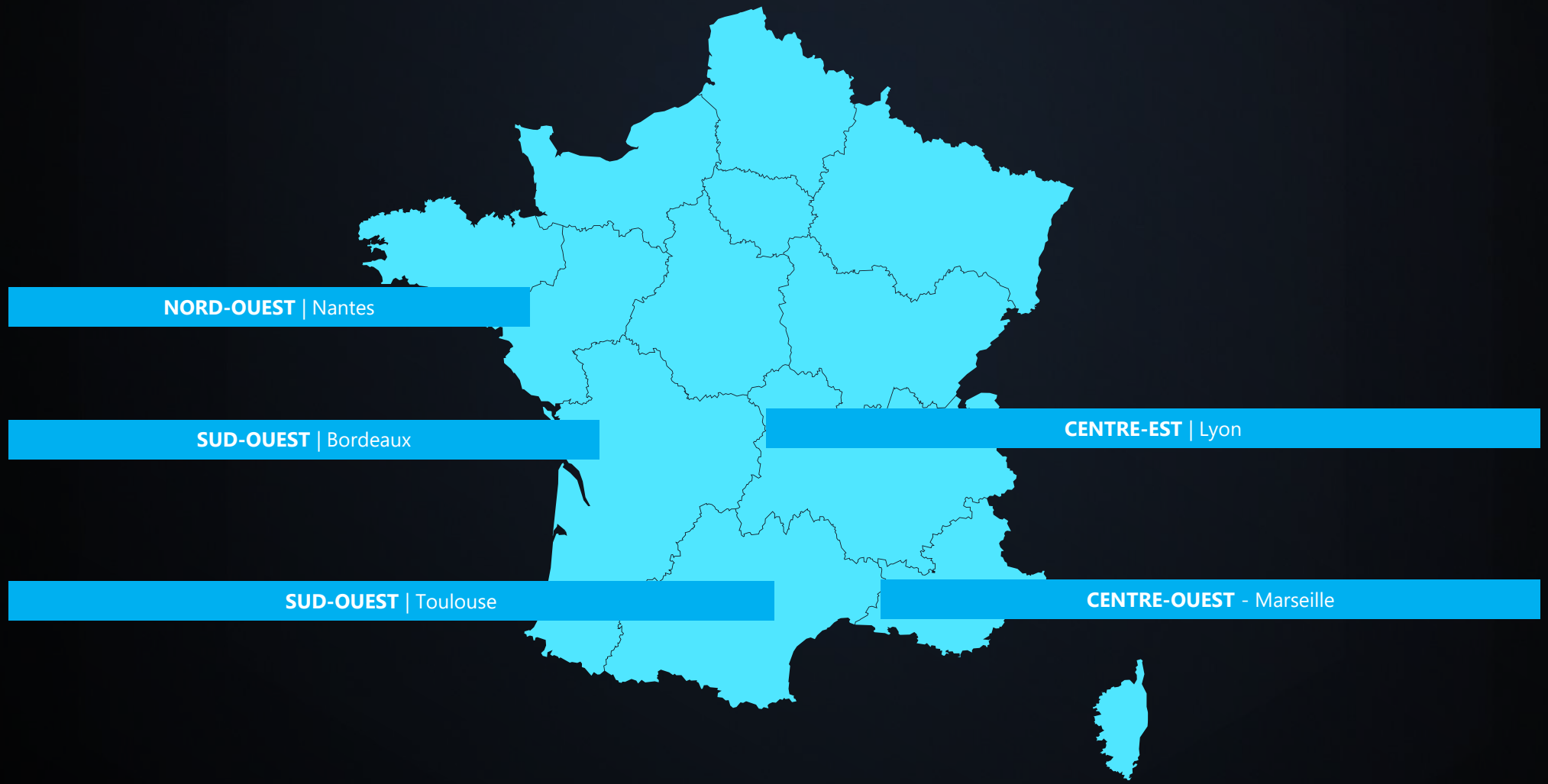
Réservation et agenda

- Réservation simple via Bookings
- Une page internet par Microsoft Experiences Lab
- Agenda publique 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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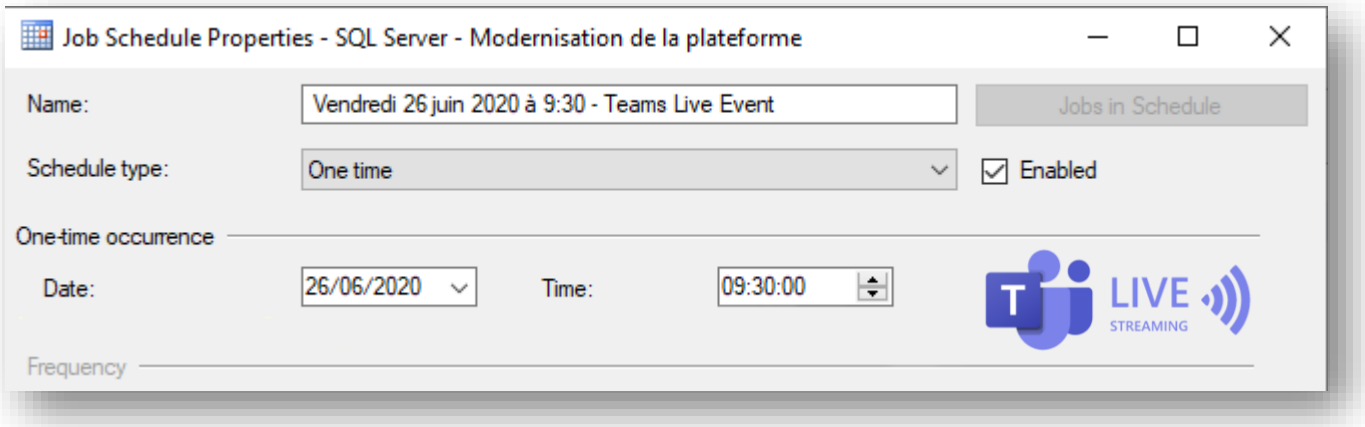
Microsoft

Matinée SQL Server

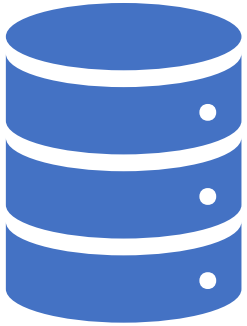
Modernisation de la plateforme



Microsoft SQL Server

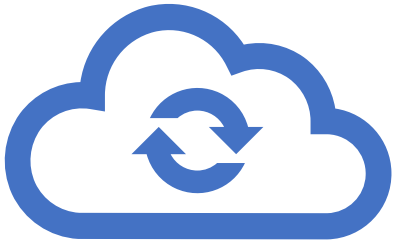
Azure

Agenda



SQL Server plateforme de choix

et choix de plateforme



SQL Server sur Azure

Christophe Laporte

Audit
Conseil
Formation
Remote DBA

/conseilit

@conseilit

/christophelaporte

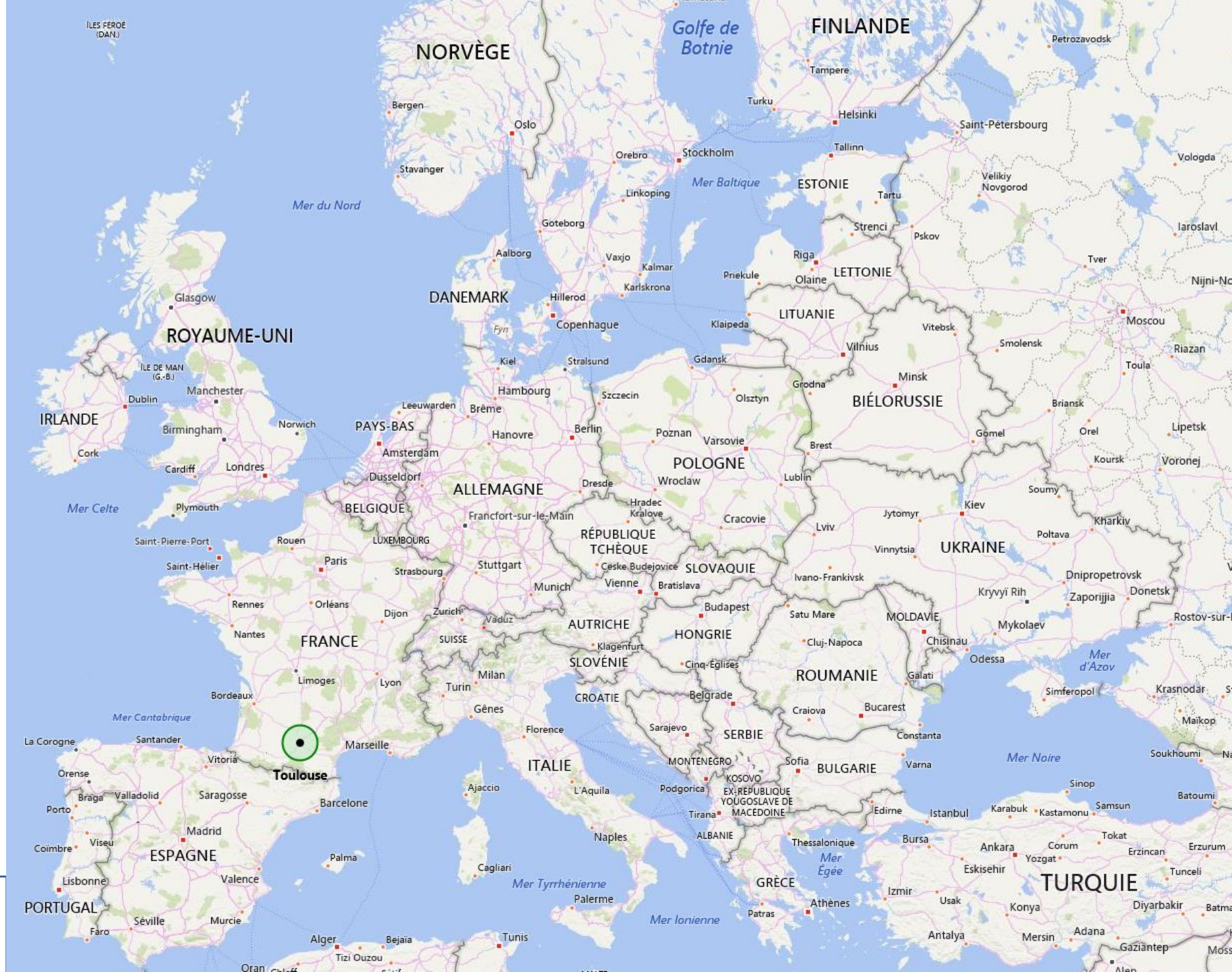
conseilit@outlook.com

Microsoft Most Valuable Professional

Microsoft Certified Master

Microsoft Certified Trainer

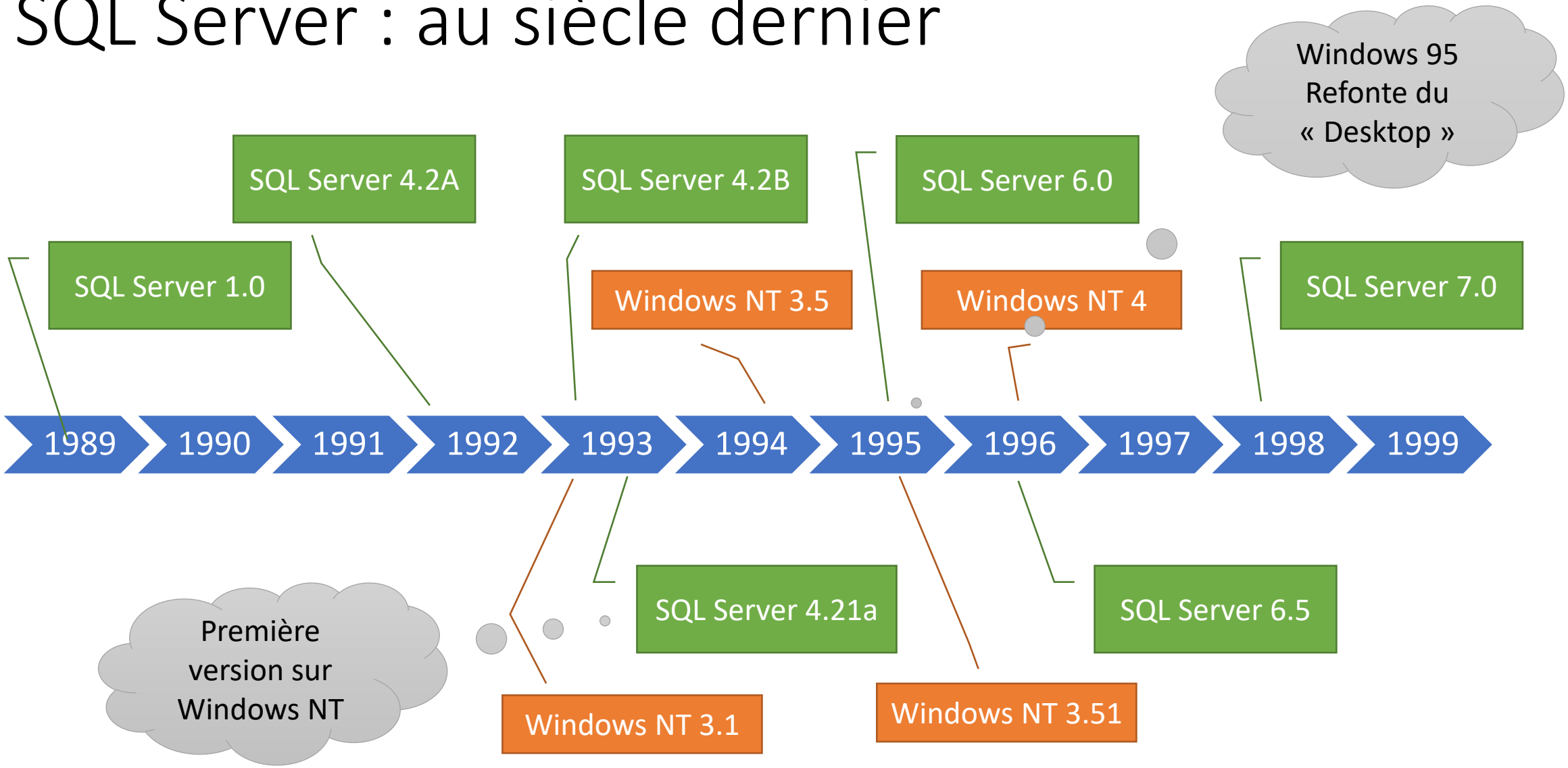
~ since 1997 : SQL 6.5 / WinNT4



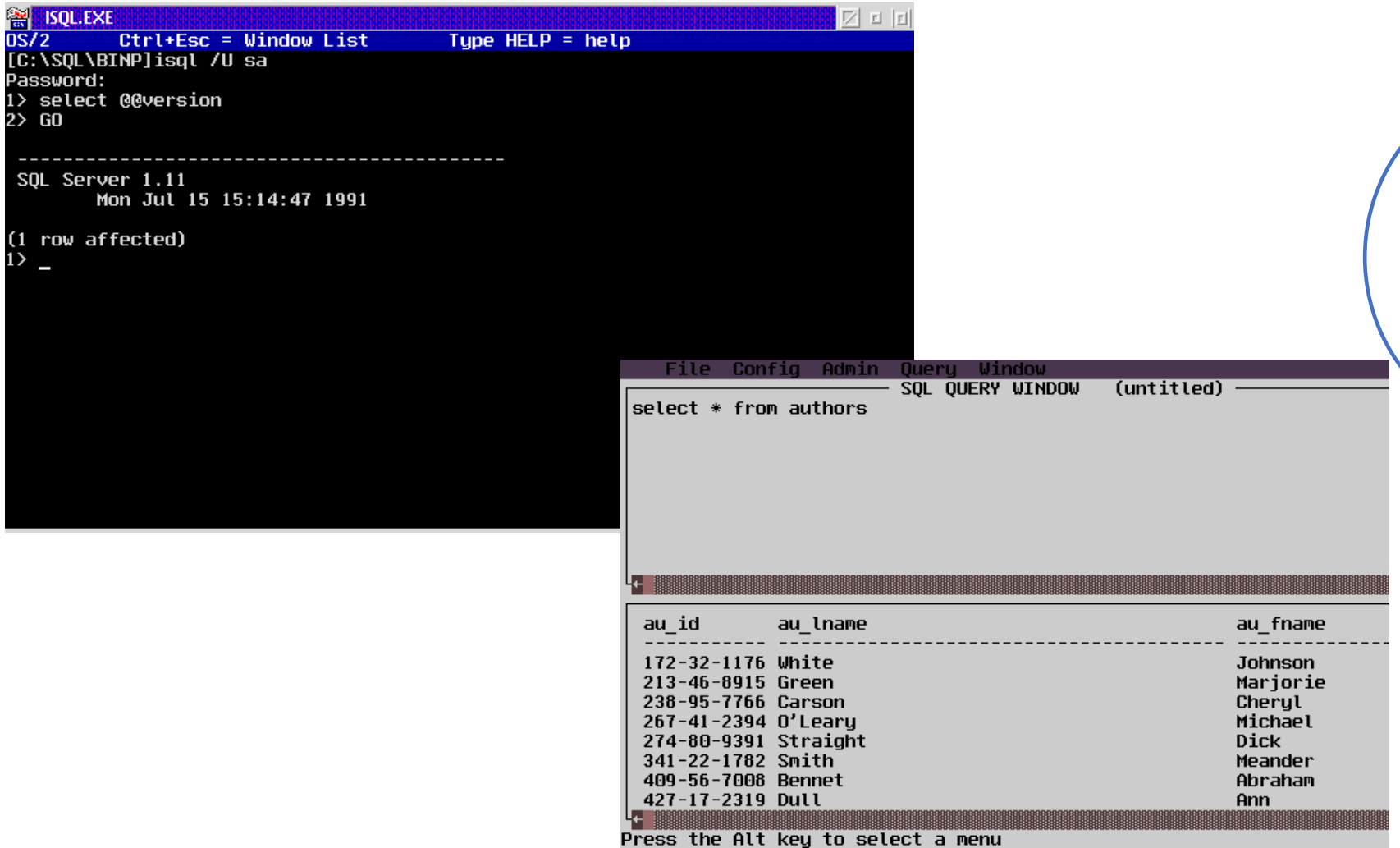
SQL Server au siècle dernier

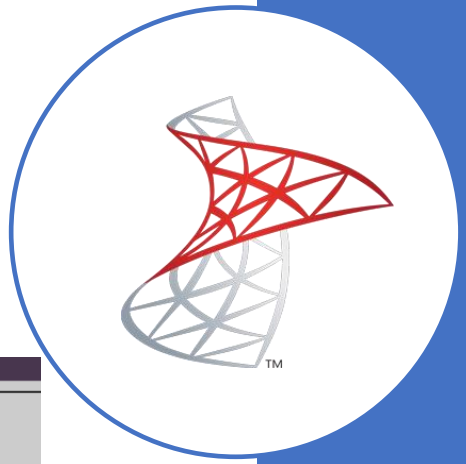
La genèse

SQL Server : au siècle dernier

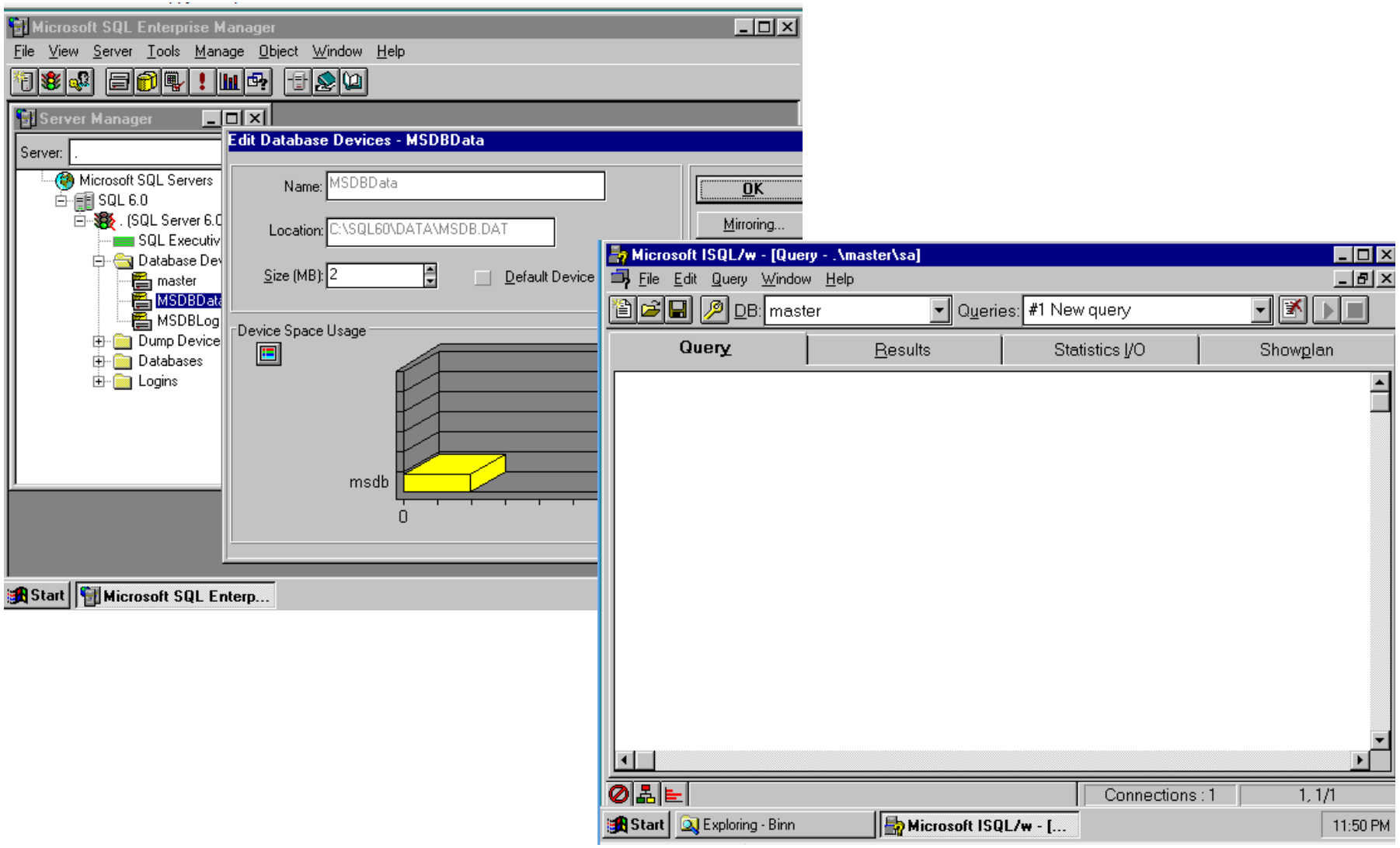


SQL Server : au siècle dernier





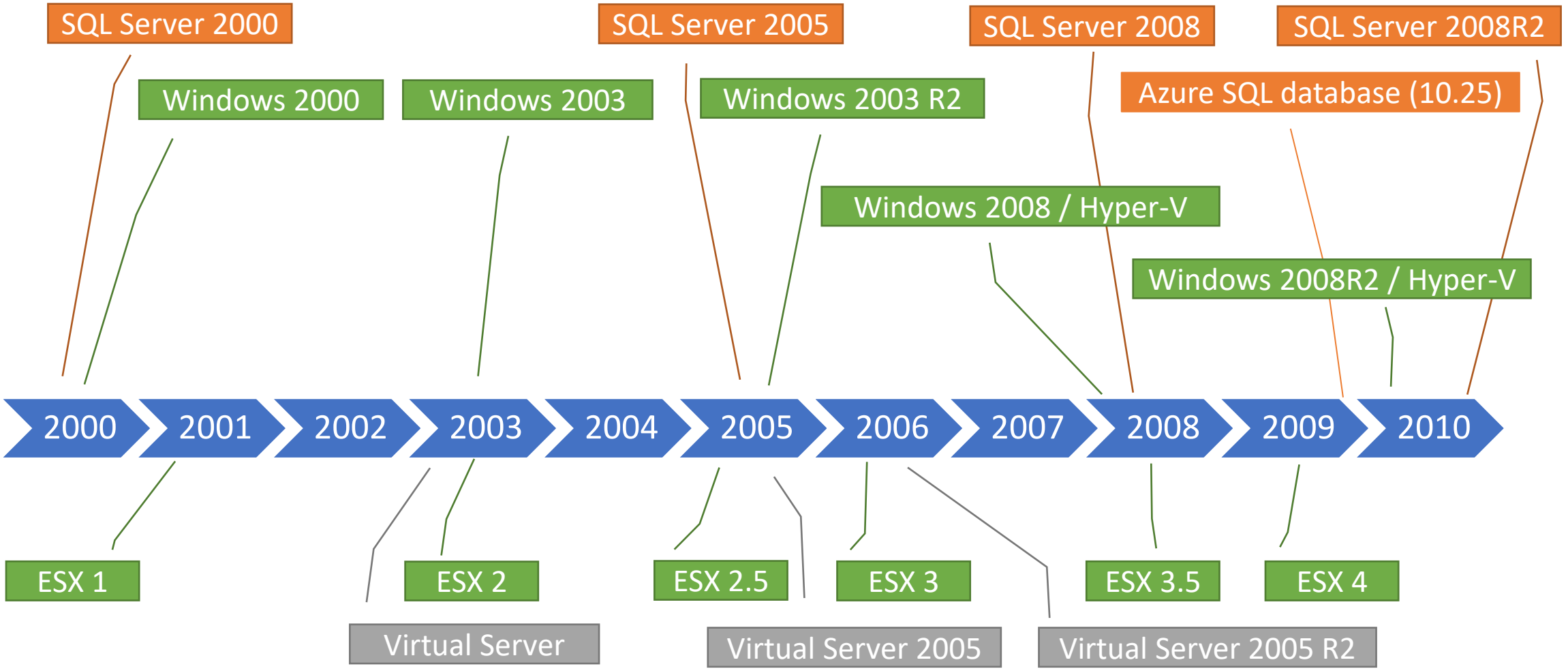
SQL Server : au siècle dernier



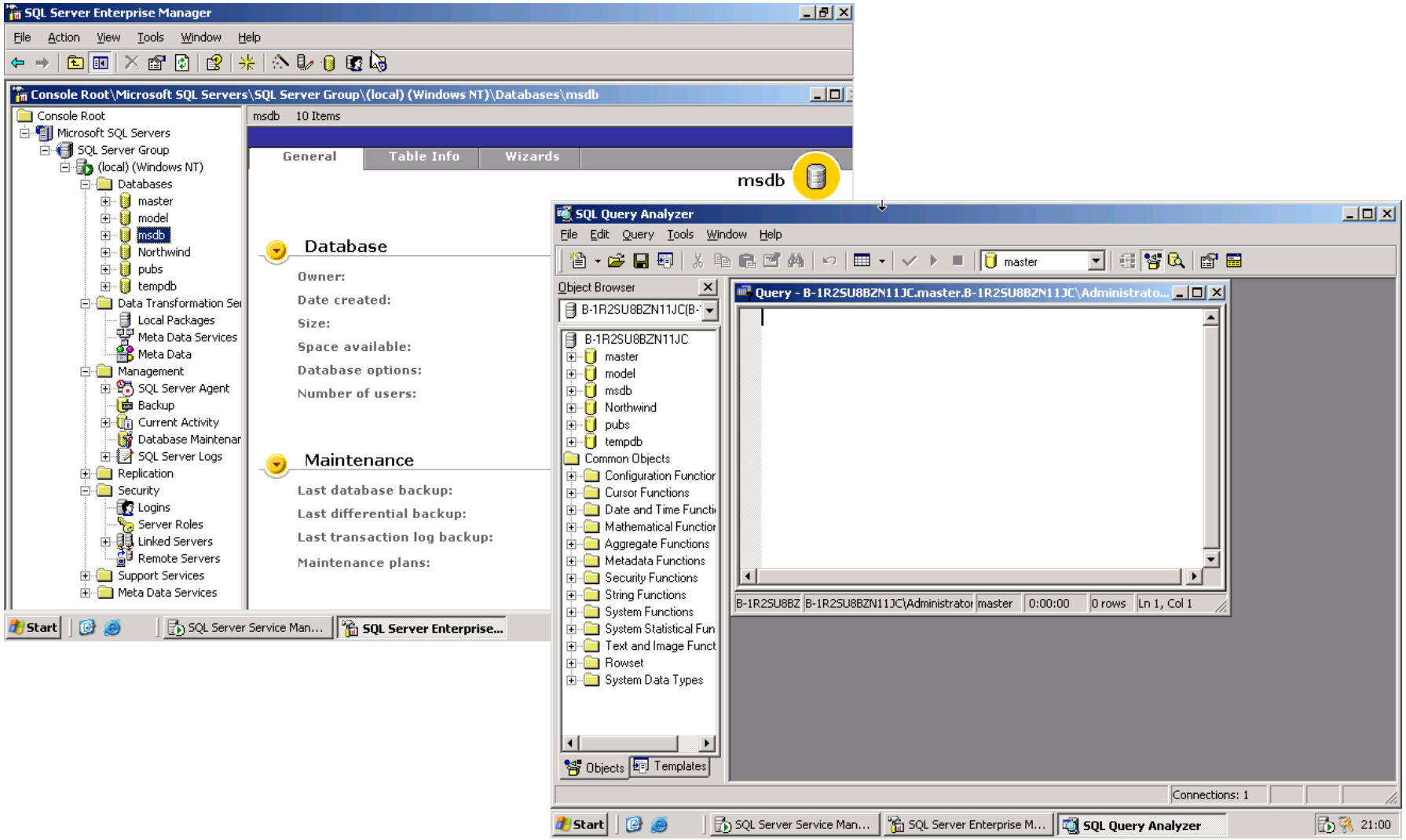
SQL Server
les années 2000

La renaissance de SQL Server

SQL Server : Les années 2000

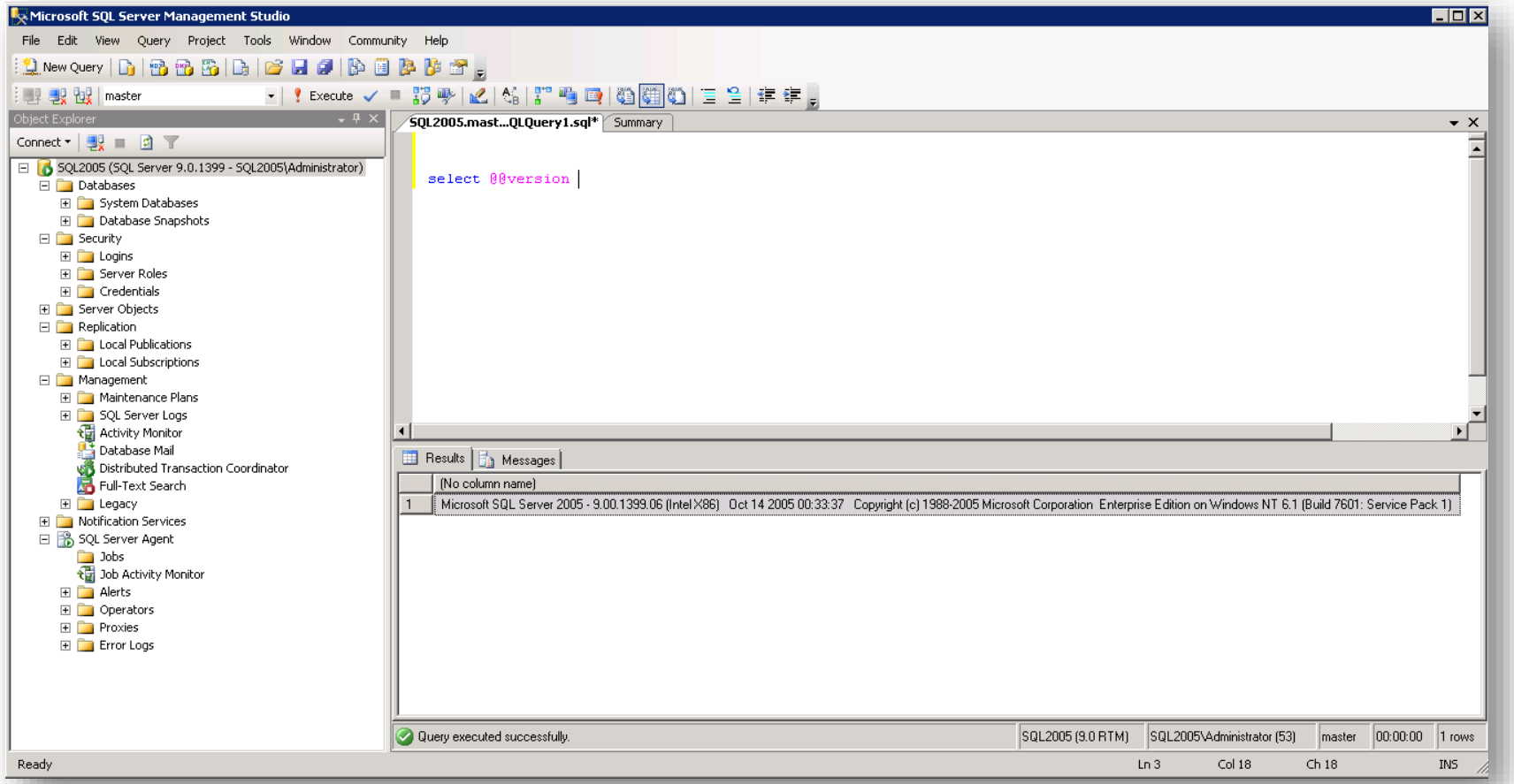


SQL Server : les années 2000



SQL Server : les années 2000

- SQL Server 2005 : Une nouvelle IHM



What’s new …

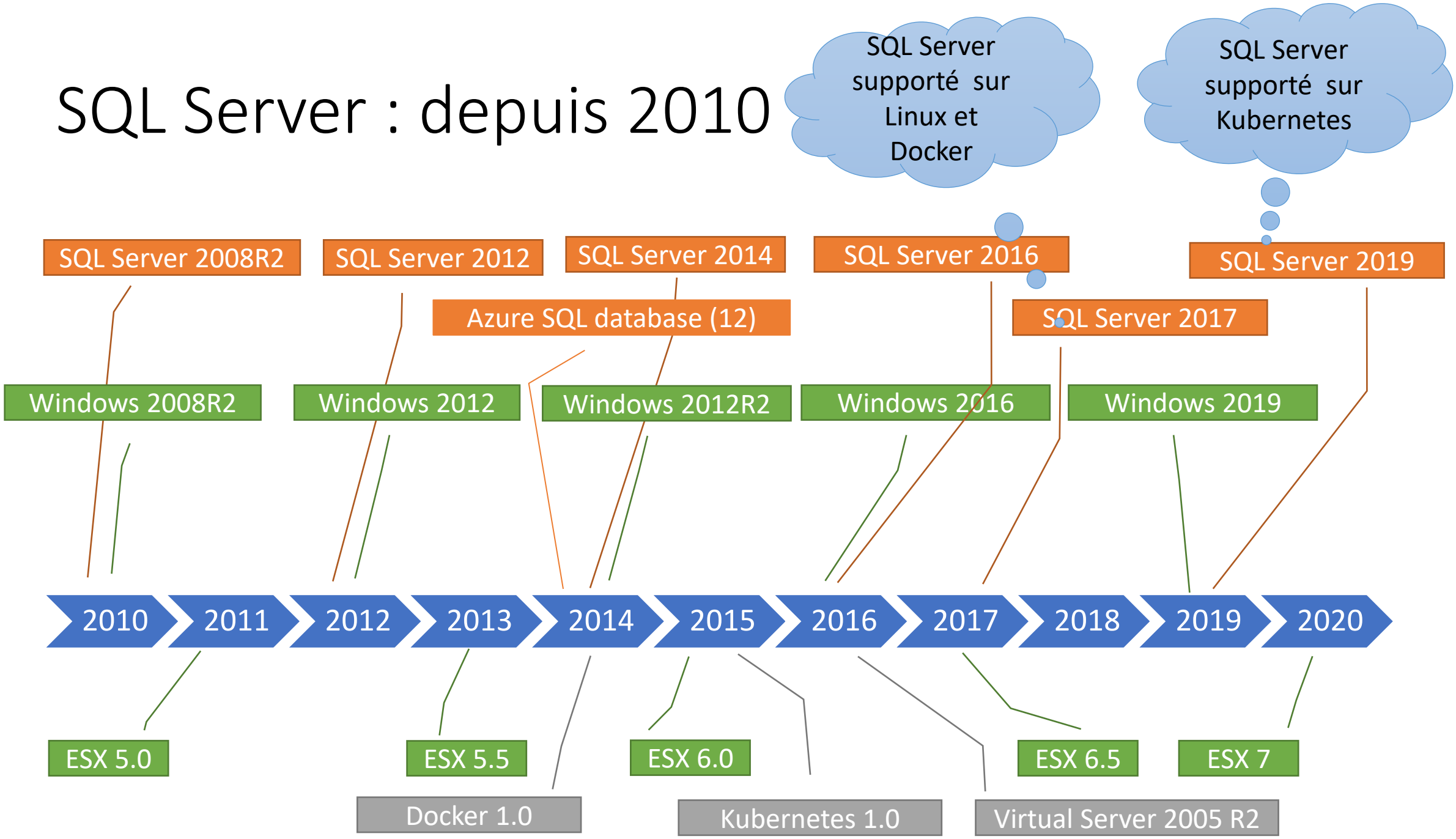
- Niveau d’isolation snapshot
- Database mirroring
- Vues indexées
- Vues partitionnes
- Tables partitionnées
- Types Bigint, XML, Date, Time, Datetime2, HierarchyID, Geometry, Geography
- Gestion des erreurs Try/Catch

- 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

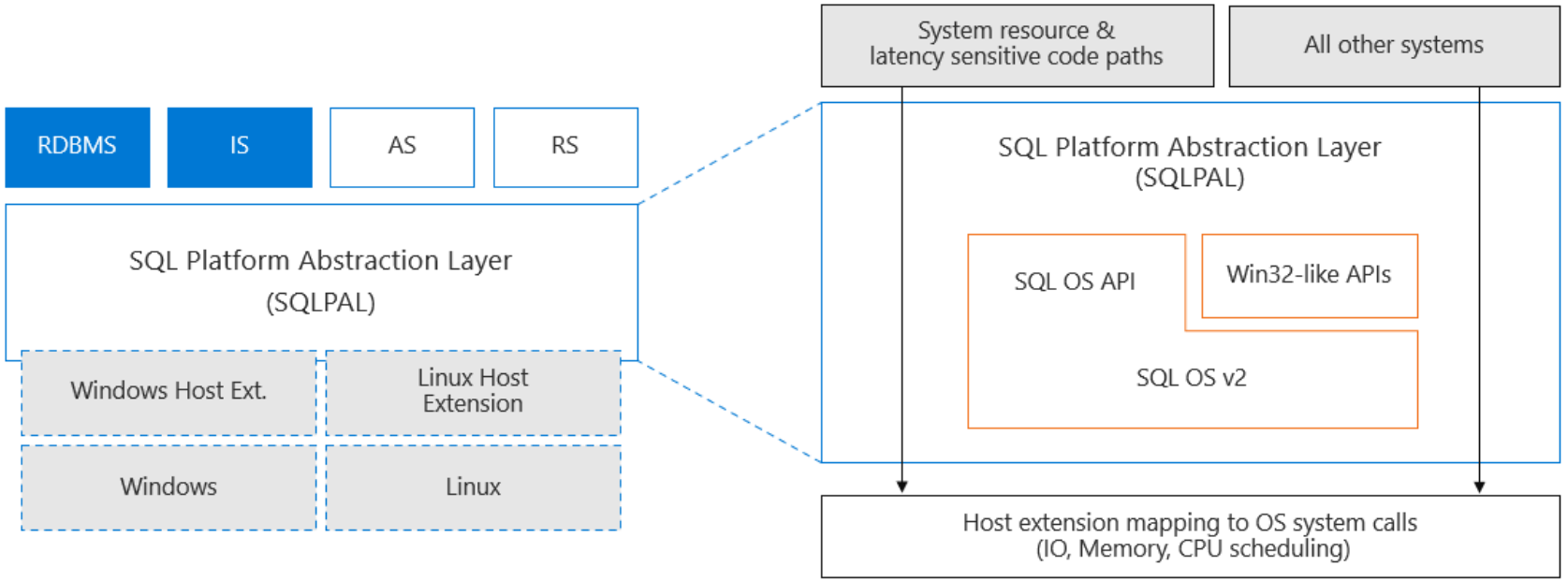
SQL Server sur Linux

- Une demande de la part des ISVs

SQL Server sur Linux

Remember, SQL Server / Sybase

- 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

- Installation simple
- Configuration du service

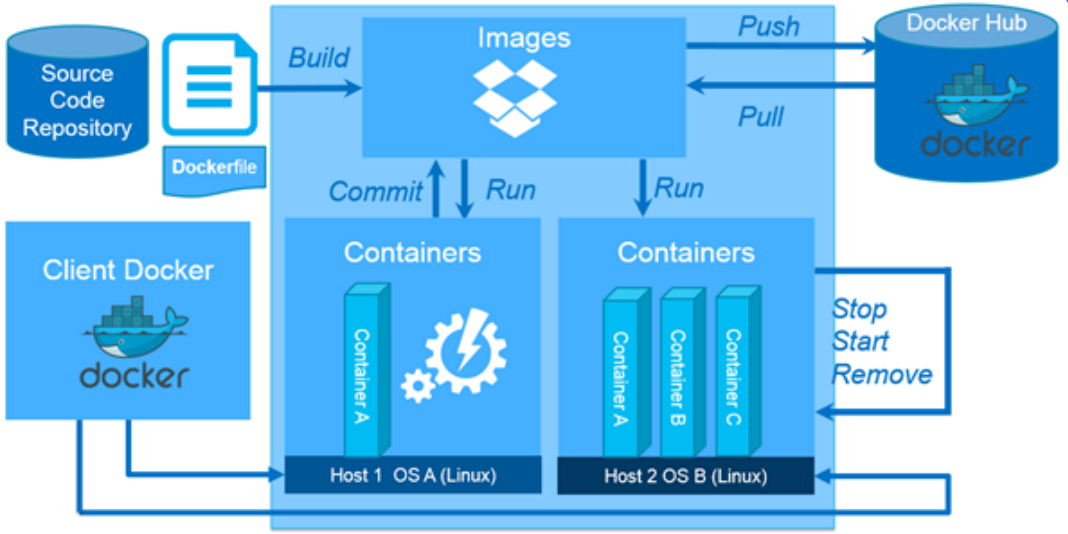

```
# ubuntu
wget -qO- https://packages
sudo add-apt-repository "$
sudo apt-get update
sudo apt-get install -y ms
sudo /opt/mssql/bin/mssql-

# RedHat
sudo curl -o /etc/yum.repo
sudo yum install -y mssql-
sudo /opt/mssql/bin/mssql-


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

```
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 packag
Preparing to unpack .../9-mssql-server
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 libsasl2-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-
to complete the setup of Microsoft SQL
+----------------------------------

Processing triggers for libc-bin (2.27
Processing triggers for man-db (2.8.3-
Christophe@lxSQL-vm:~$
```

```
Christophe@lxSQL-vm:~$ sudo /opt/mssql/bin/mssql-conf setup
usermod: no changes
Choose an edition of SQL Server:
  1) Evaluation (free, no production use rights, 180-day limit)
  2) Developer (free, no production use rights)
  3) Express (free)
  4) Web (PAID)
  5) Standard (PAID)
  6) Enterprise (PAID) - CPU Core utilization restricted to 20 physical/40 hyperthreaded
  7) Enterprise Core (PAID) - CPU Core utilization up to Operating System Maximum
  8) I bought a license through a retail sales channel and have a product key to enter.

Details about editions can be found at
https://go.microsoft.com/fwlink/?LinkId=2109348&clcid=0x409

Use of PAID editions of this software requires separate licensing through a
Microsoft Volume Licensing program.
By choosing a PAID edition, you are verifying that you have the appropriate
number of licenses in place to install and run this software.

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:~$
```

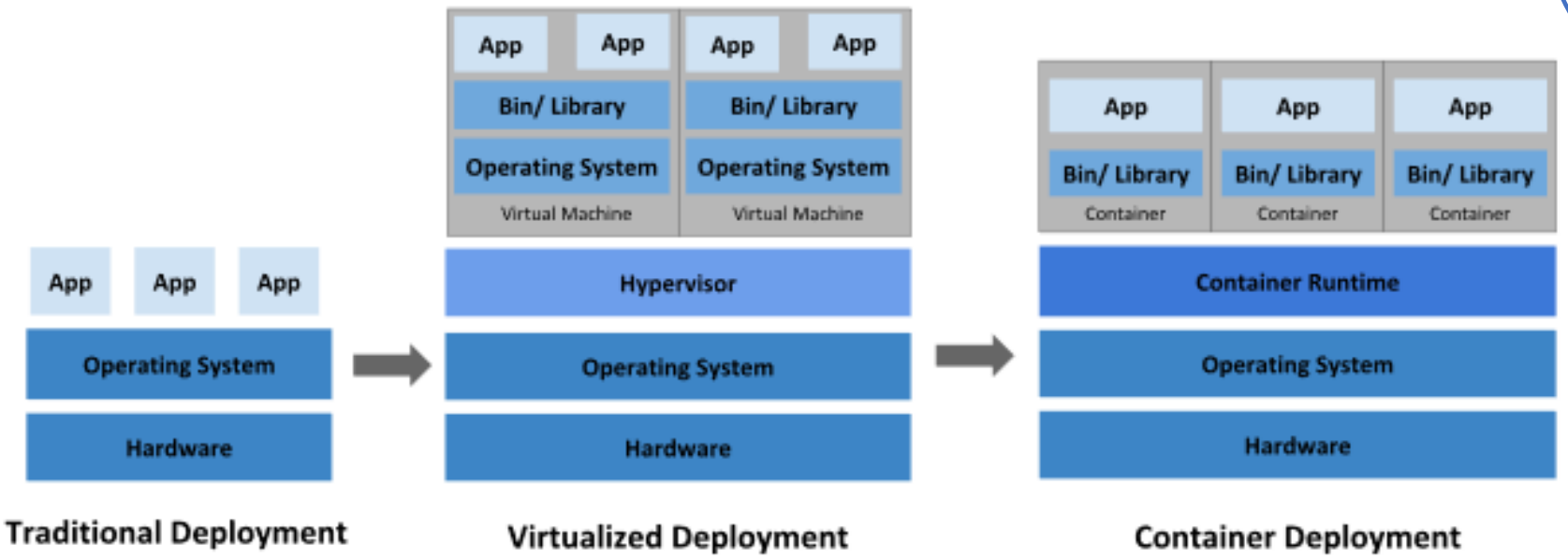
Introduction aux conteneurs

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

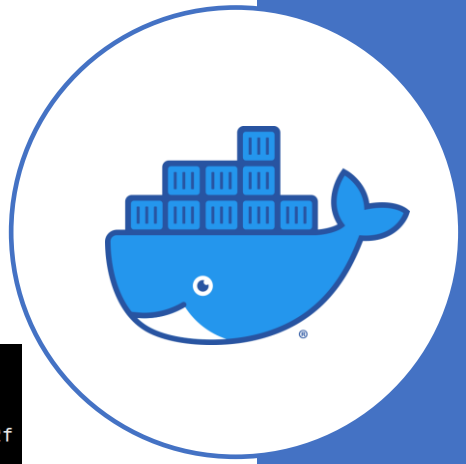


Introduction aux conteneurs

- 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 persistent
  - 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

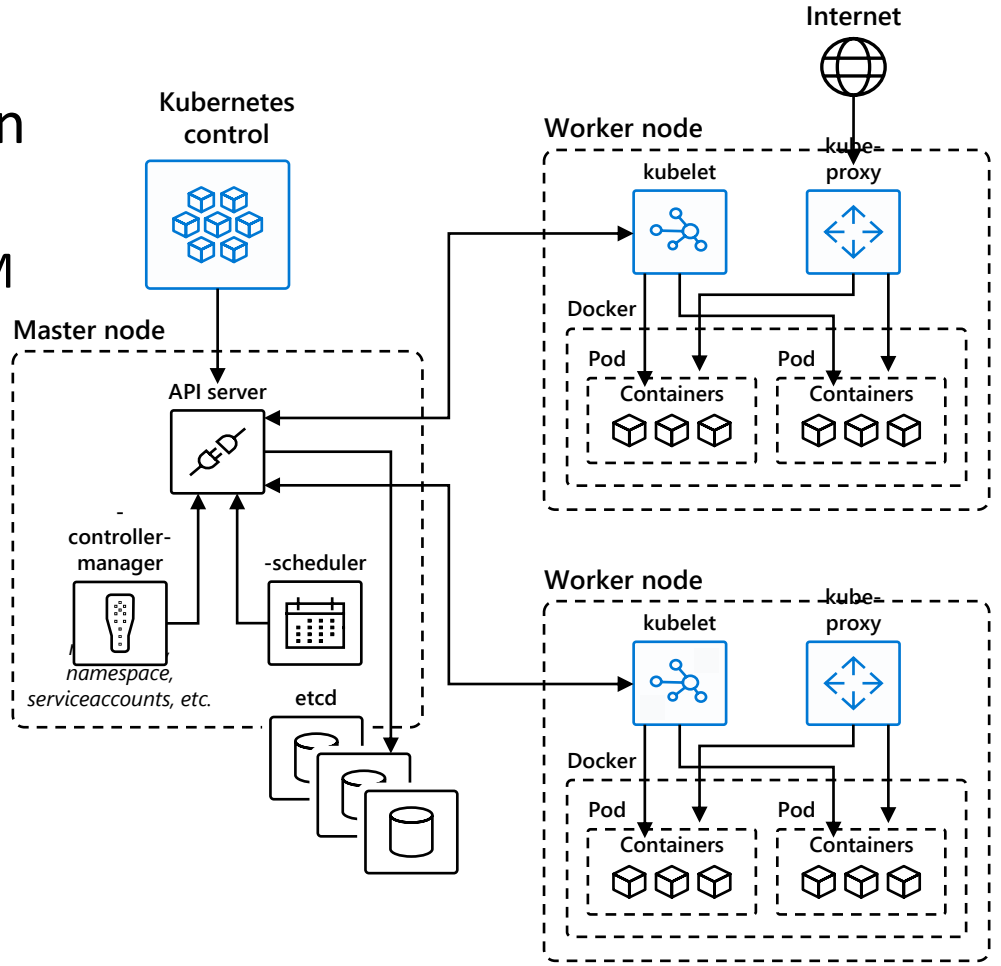

```
# Run (Pull+Create+Start) the container in detach mode
docker run  --detach \
            --name sqldocker \
            --hostname sqldocker \
            --env 'MSSQL_PID=developer' \
            --env 'SA_PASSWORD=Password1!' \
            --env 'ACCEPT_EULA=Y' \
            --volume /mssql:/var/opt/mssql/data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

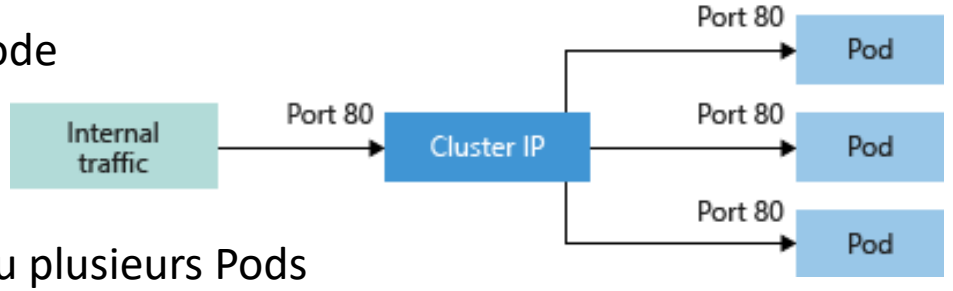
Kubernetes : les bases

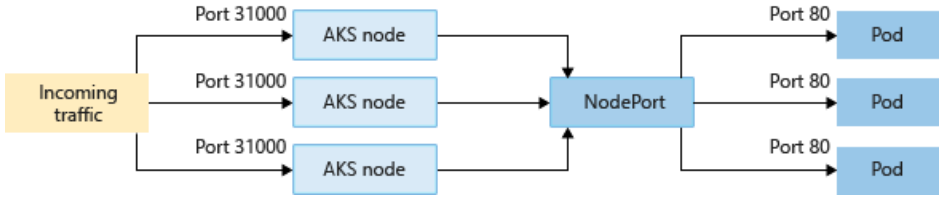
- Besoin d'orchestration
  - Stockage, réseau
  - Ressources CPU, RAM
  - Planification
- Terminologie
  - Container
  - Pod
  - Master node
  - Worker node
- Haute disponibilité
  - « par défaut »

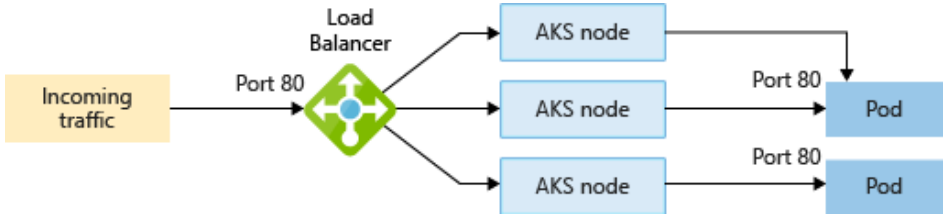


Kubernetes : les bases

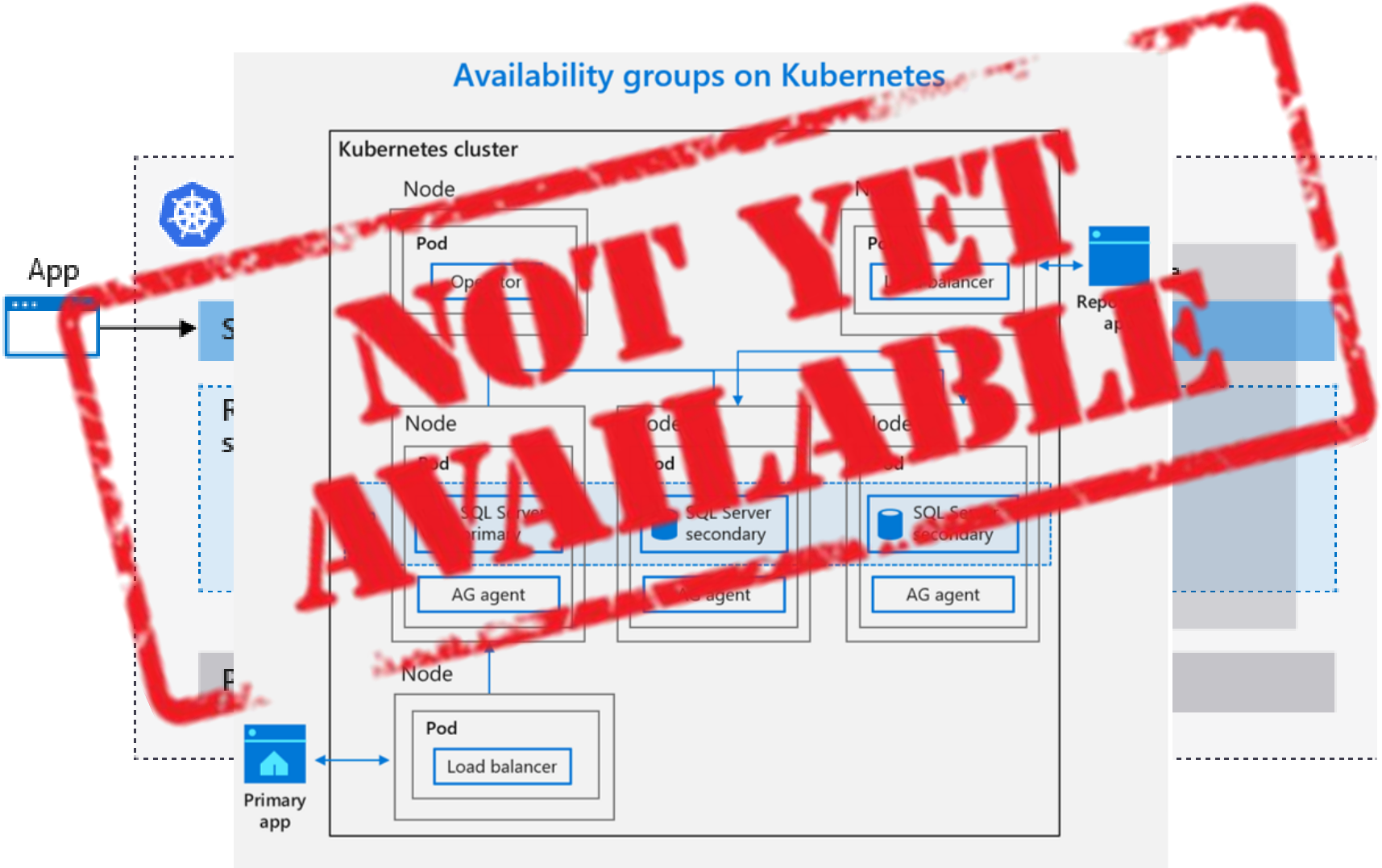
- Les connections passent par le kube-proxy
  - Routage et translation de port ver le Pod
  - Quel que soit de worker node
- Services
  - Exposent des applications
  - Abstraction logique d'un ou plusieurs Pods
- Différent types de services
  - ClusterIP
  - Node Port
  - Load Balancer





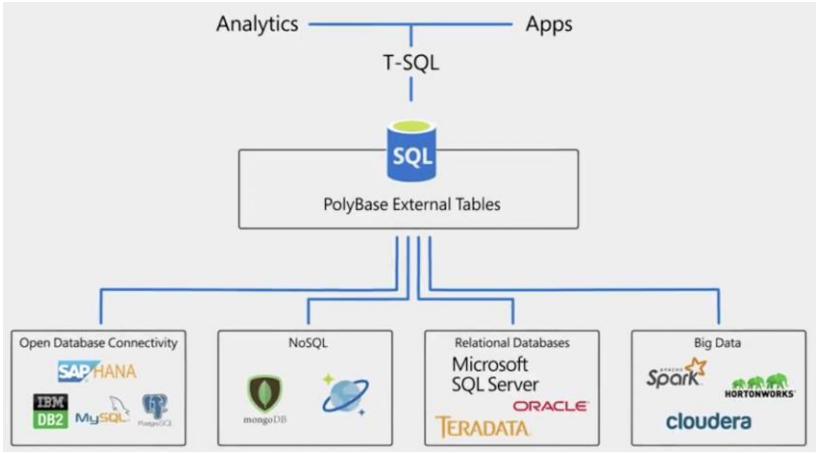


SQL Server dans Kubernetes

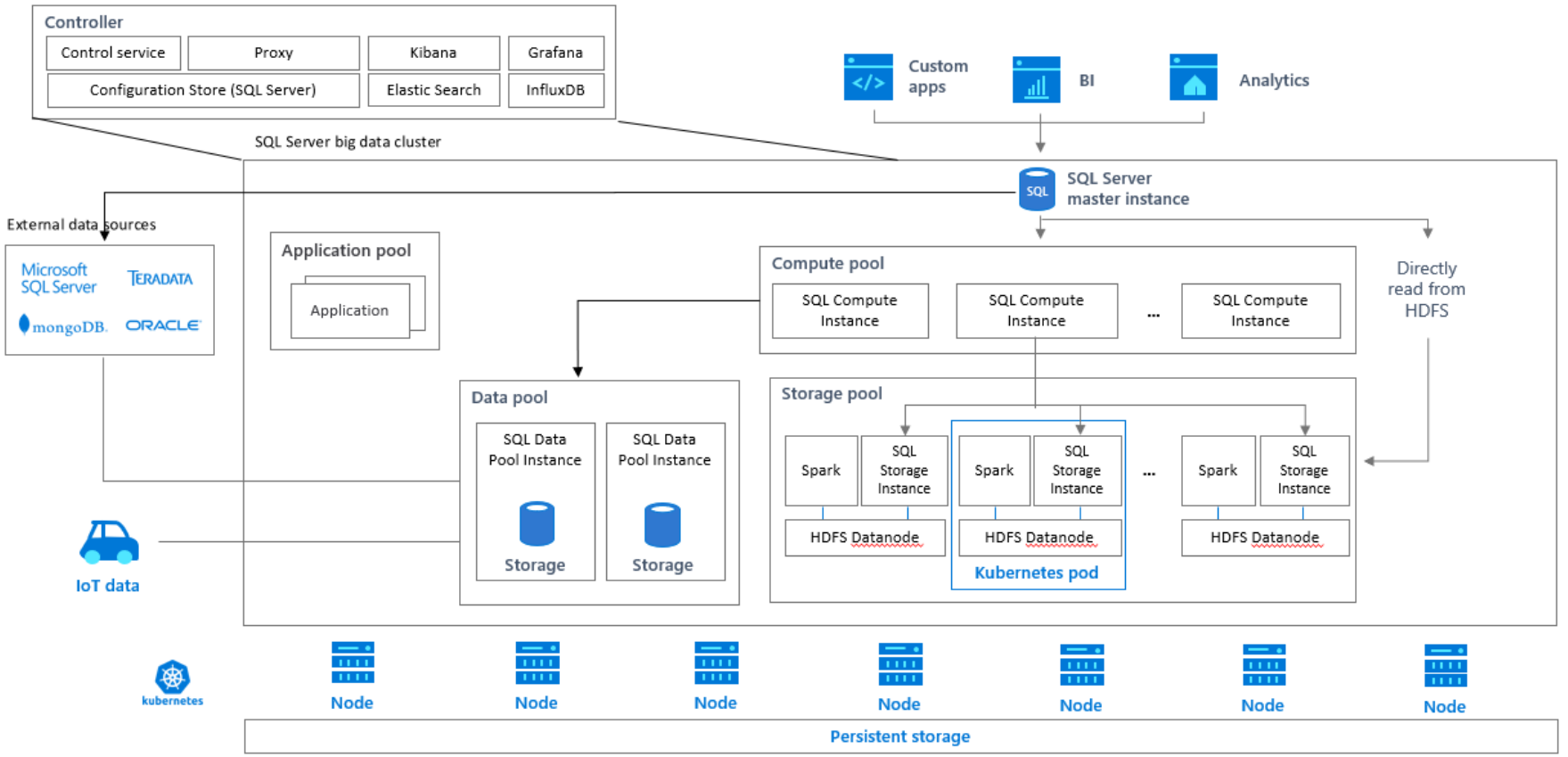


Minute papillon …

- 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

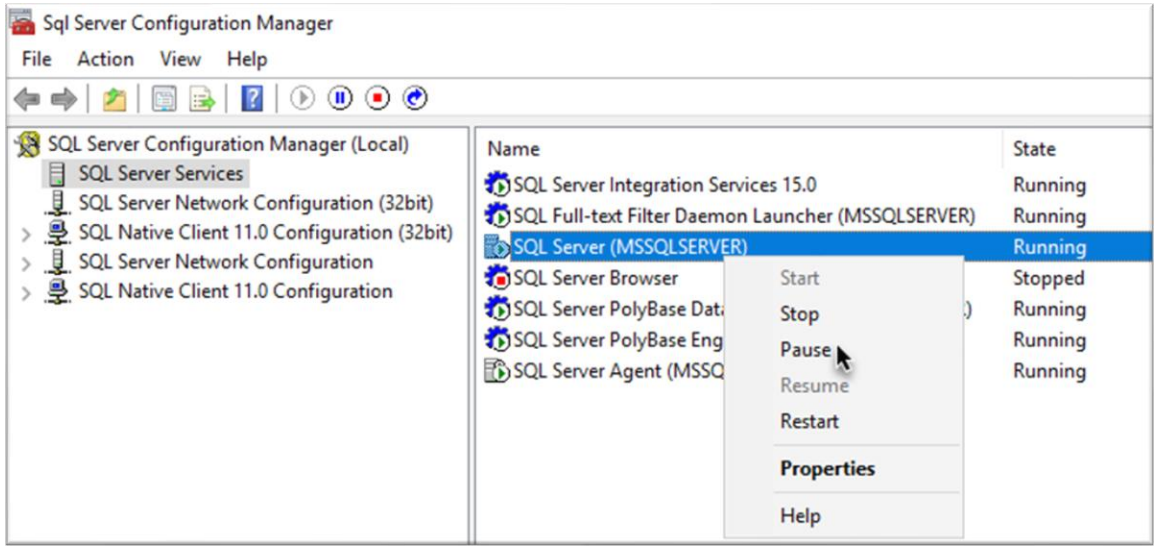


Microsoft® SQL Server®

Plateforme de choix
et
Choix de plateforme

Jamais une offre de SGBDR n’aura été aussi complète


15 min


Sql Server Configuration Manager
File
Action
View
Help
SQL Server Configuration Manager (Local)
SQL Server Services
SQL Server Network Configuration (32bit)
SQL Native Client 11.0 Configuration (32bit)
SQL Server Network Configuration
SQL Native Client 11.0 Configuration
Name
State
SQL Server Integration Services 15.0
Running
SQL Full-text Filter Daemon Launcher (MSSQLSERVER)
Running
SQL Server (MSSQLSERVER)
Running
SQL Server Browser
Stopped
SQL Server PolyBase Data
Running
SQL Server PolyBase Eng
Running
SQL Server Agent (MSSQ
Running
Start
Stop
Pause
Resume
Restart
Properties
Help


1. SELECT <show columns>
2. FROM <table>
3. JOIN <more tables>
4. WHERE <filter rows>
5. GROUP BY <categorize>
6. HAVING <filter cat's>
7. ORDER BY <sort col's>

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

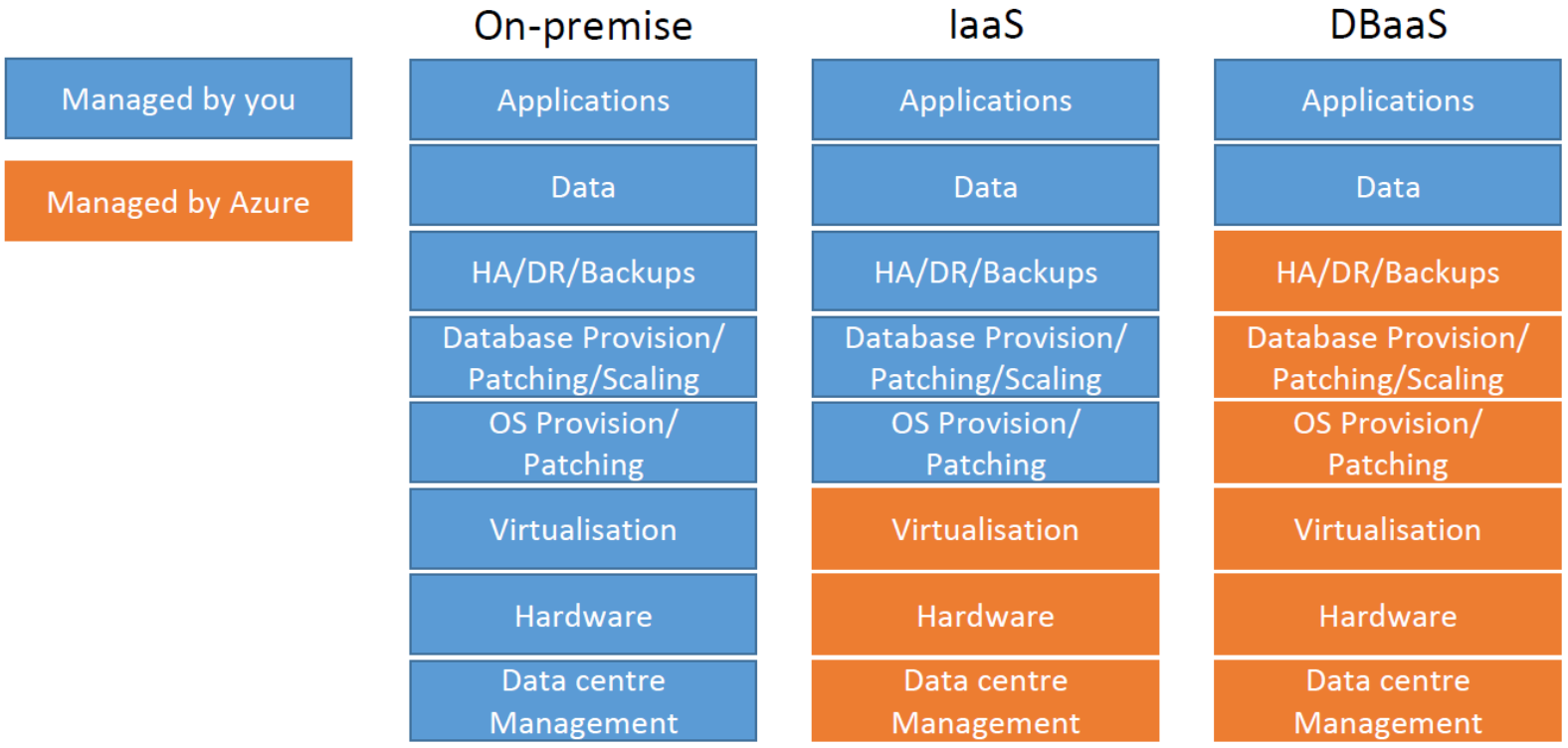
Microsoft Cloud Services Vision Becomes Reality With Launch of Windows Azure Platform

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

Azure Premium FileShare
Azure Shared Disks

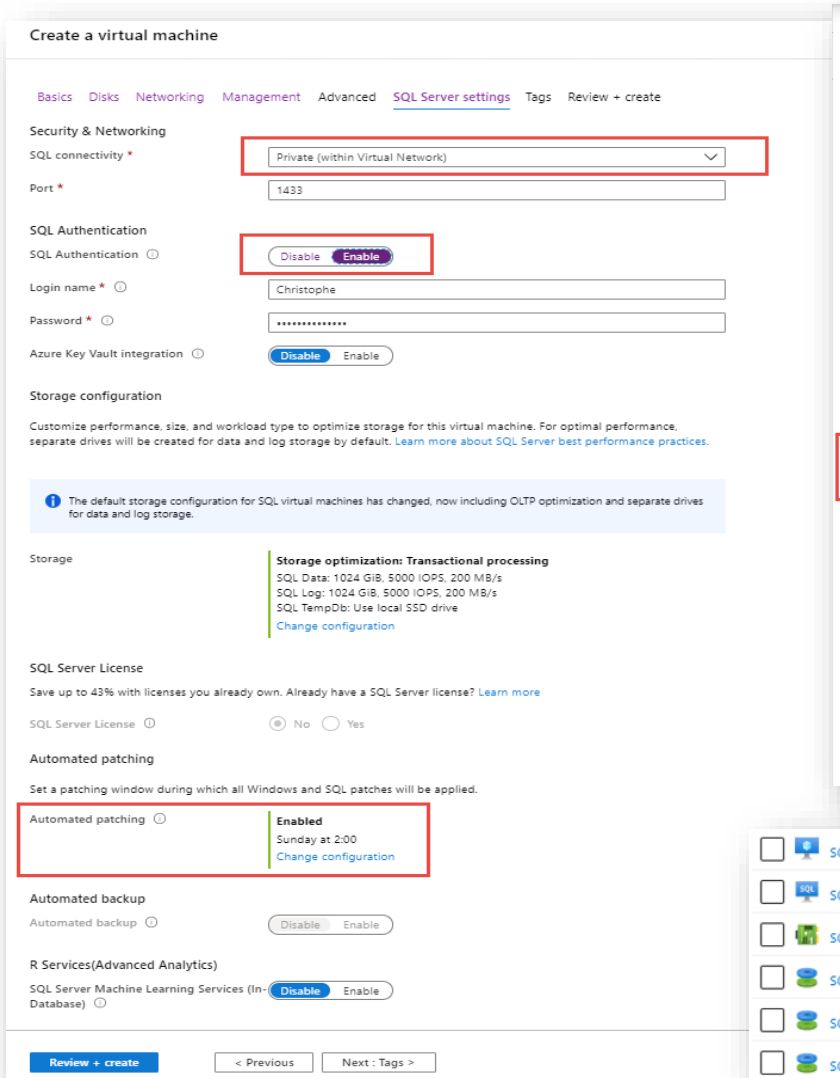
- Pas une simple VM
  - Images préconfigurées
  - Options spécifiques dans le portail Azure
- Backup automatisé
- Haute disponibilité
  - Failover Cluster Instances
  - AlwaysOn Availability Groups
- Performance
- Case d'usage
  - modernisation des bases de données
  - Accès au système d'exploitation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

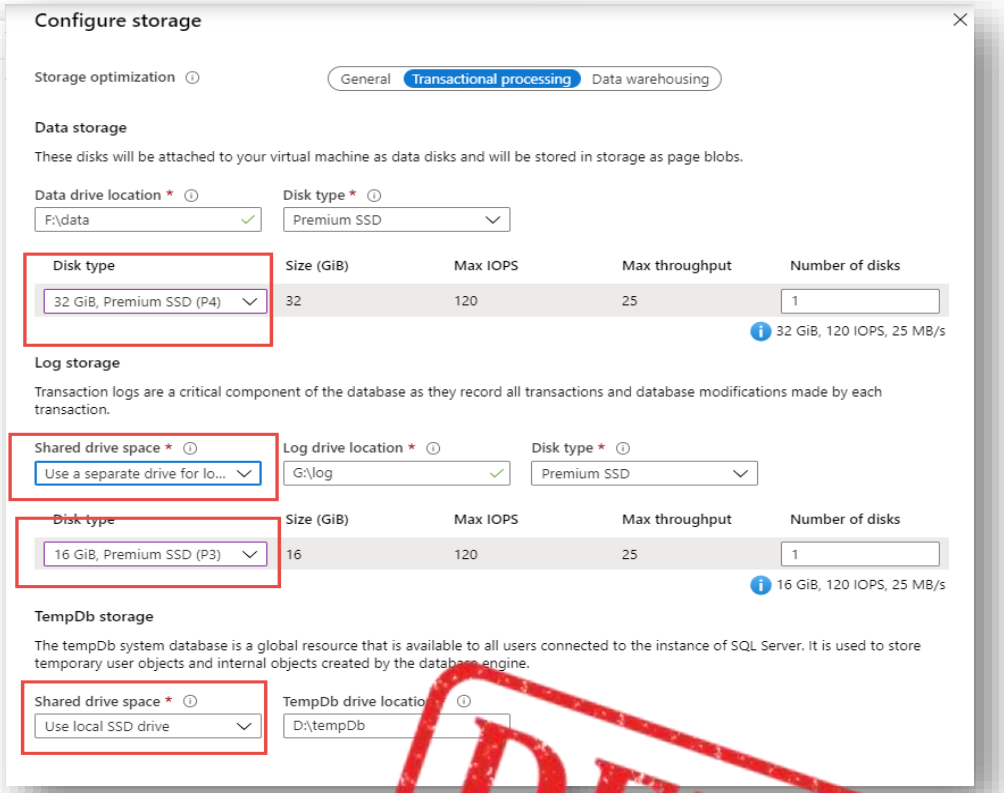
VM type D, E ou M
Disk burst
Azure NetApp Files

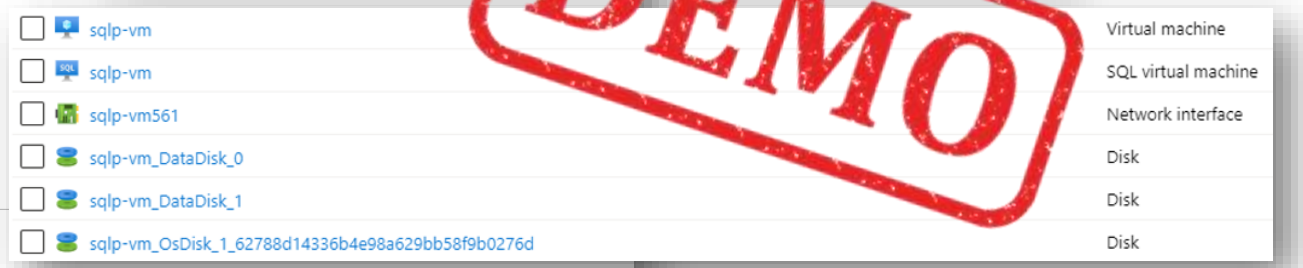
Azure SQL Server VM sur Linux

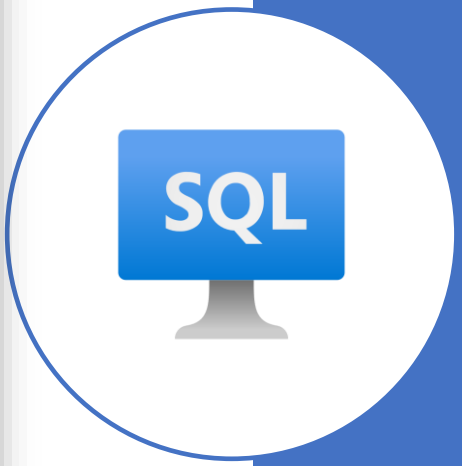
```powershell
#Define the VM marketplace image details.
$azureVmPublisherName = "MicrosoftSQLServer"
$azureVmOffer = "sql2019-ubuntu1804"
$azureVmSkus = "sqldev"

#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









Azure : SQL Server in containers

- Consistance des images
- Isolation des conteneurs
- Mise en place de pipeline CI/CD

- ACI : Azure Container Instance
- Case 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;"
```

Azure : SQL Server on Kubernetes

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

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

```yaml
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="MyC0m9l&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
```

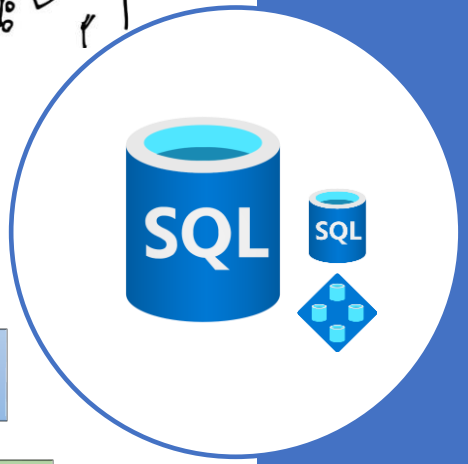
Azure : Azure SQL Databases

- Service totalement géré
- Haute disponibilité et réplicas 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

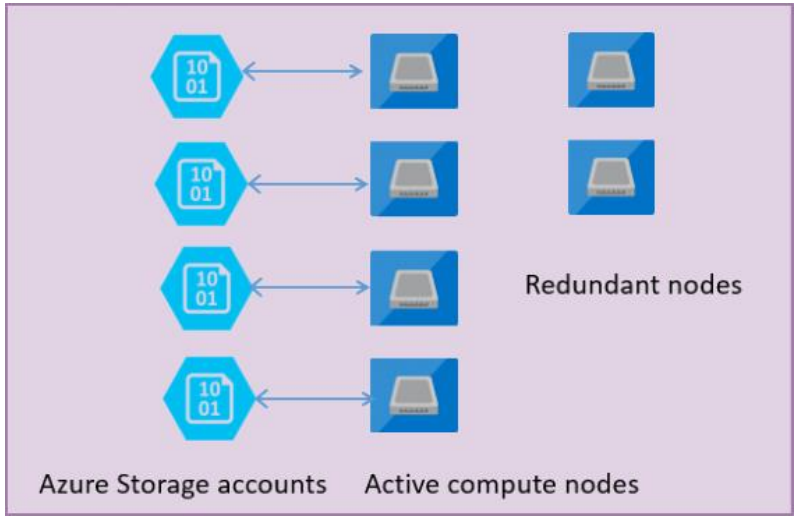
Azure : Azure SQL Databases



- Single Database
  - DTU
    - Basic
    - Standard
    - Premium
  - vCore
    - General Purpose
      - Provisionned
        - Gen4
        - Gen5
        - Fsv2
      - Serverless
        - Gen5
    - Business Critical
      - Gen4
      - Gen5
      - M-series
    - Hyperscale
      - Gen4
      - Gen5
- ElasticPool
  - DTU
    - Basic
    - Standard
    - Premium
  - vCore
    - General Purpose
      - Gen4
      - Gen5
      - Fsv2
    - Business Critical
      - Gen4
      - Gen5
      - M-series

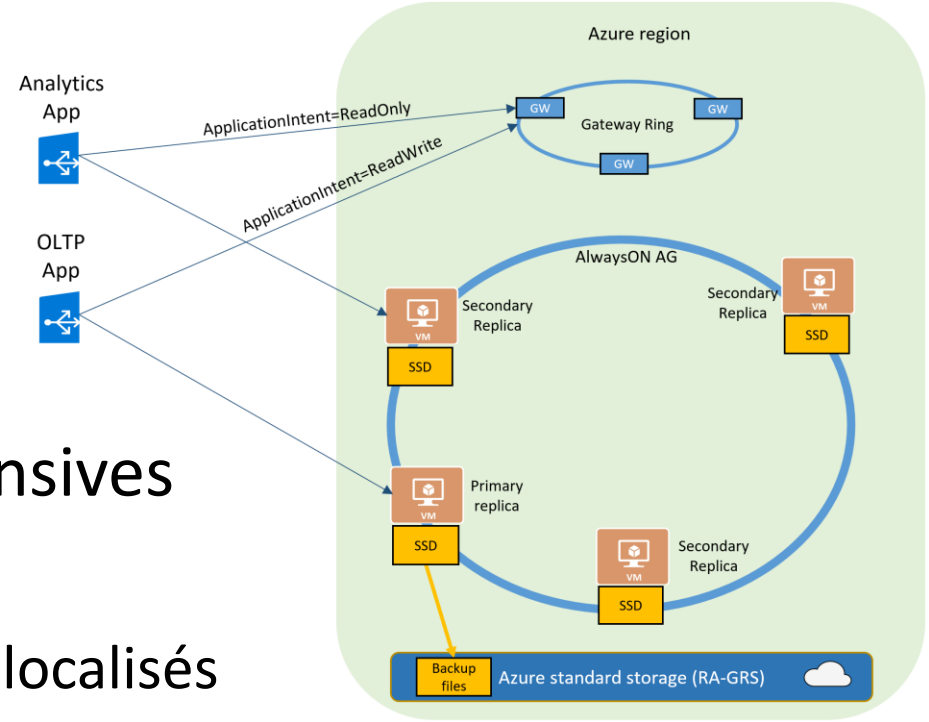
Azure : Azure SQL – General Purpose

- 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')
```

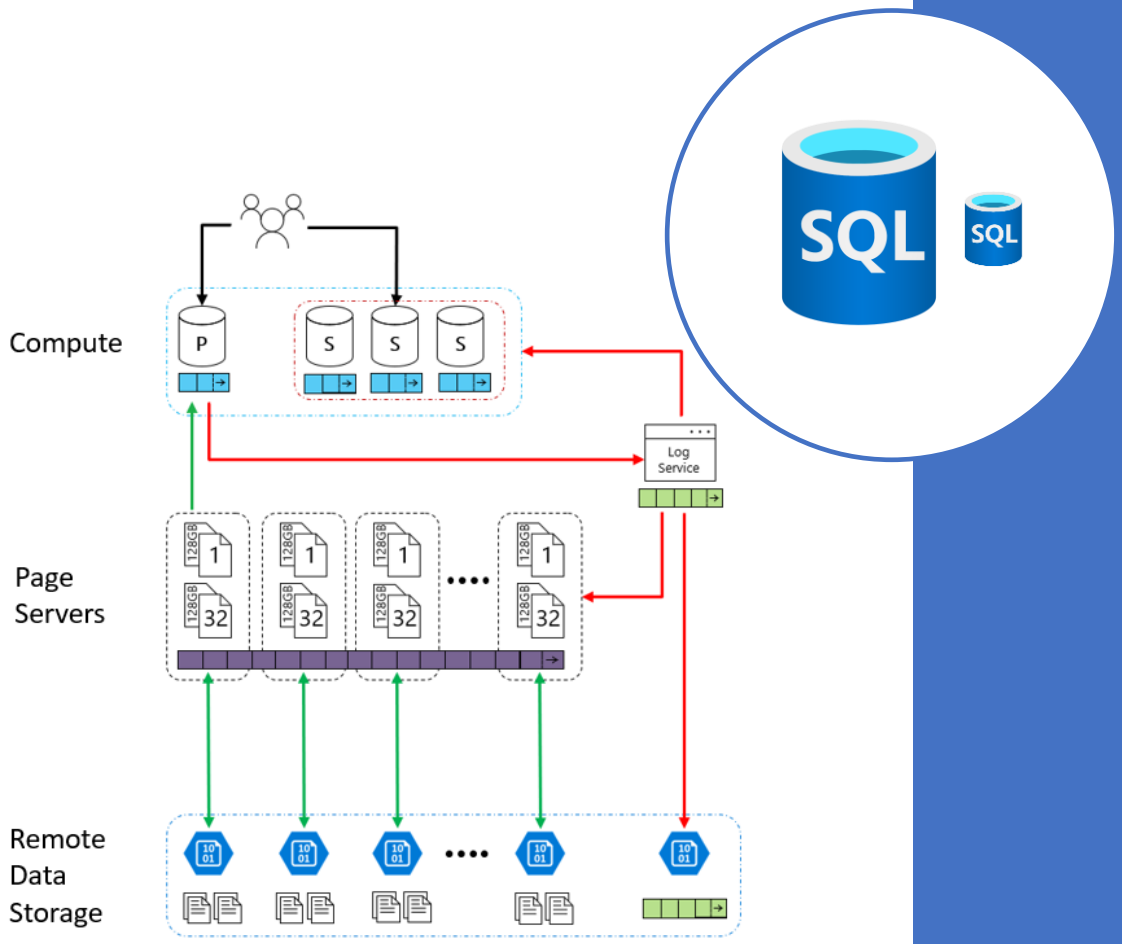
Azure : Azure SQL – Business Critical



- 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)

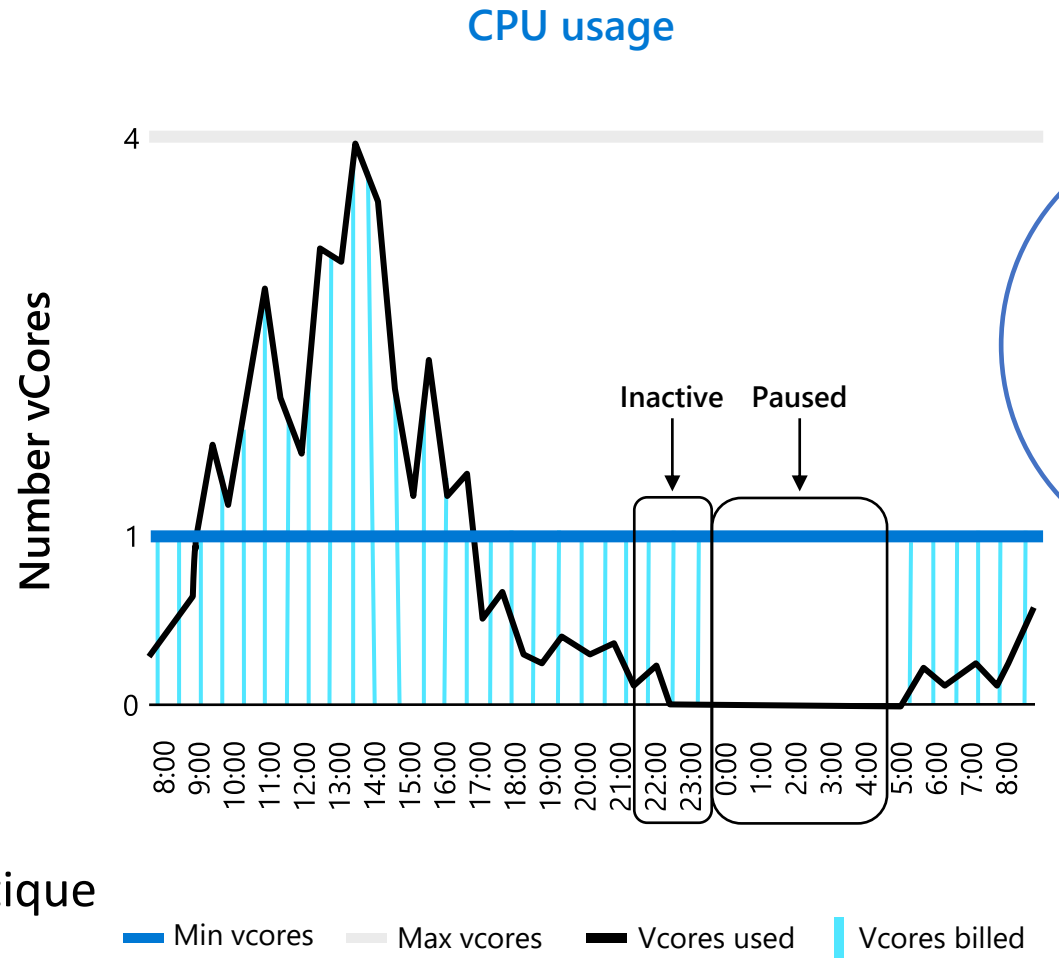
Azure : Azure SQL Database Hyperscale

- 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

```powershell
$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
```


```powershell
$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

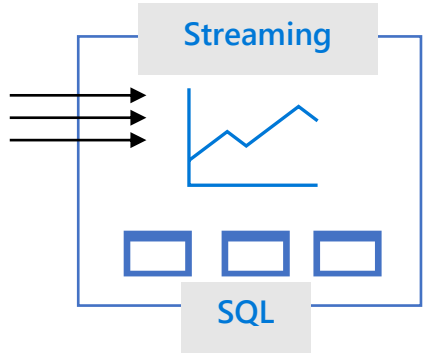
- Service tiers / Hardware generation
  - General Purpose (single node, remote SSD, 8TB)
  - Business Critical (HA -> Ags, local SSD, 4TB, 1 read-only replica)
  - Gen4 (7GB RAM/core, up to 24 cores)
  - Gen5 (5,1GB RAM/core, up to 80 cores)
- Déploiement
  - Single instance
  - Instance pools
- Surface 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)

Service managé

- Service Fabric

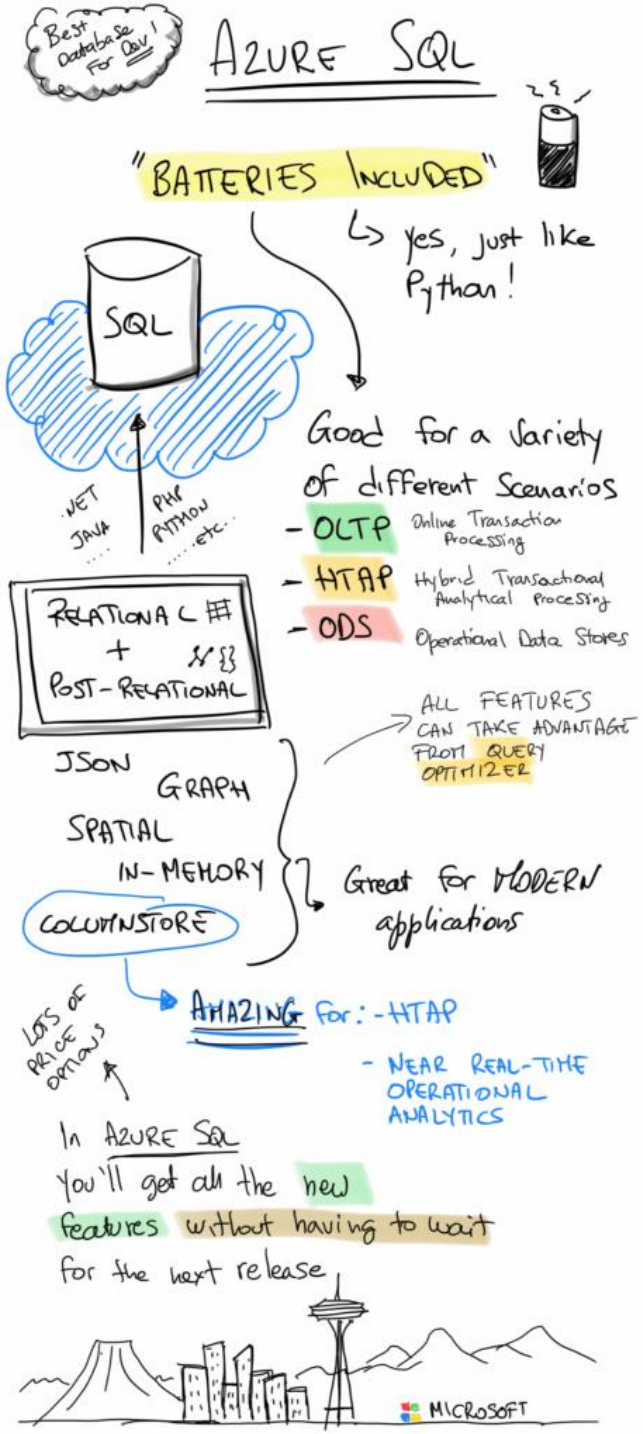
Hybrid : Azure SQL Database Edge

- 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 …

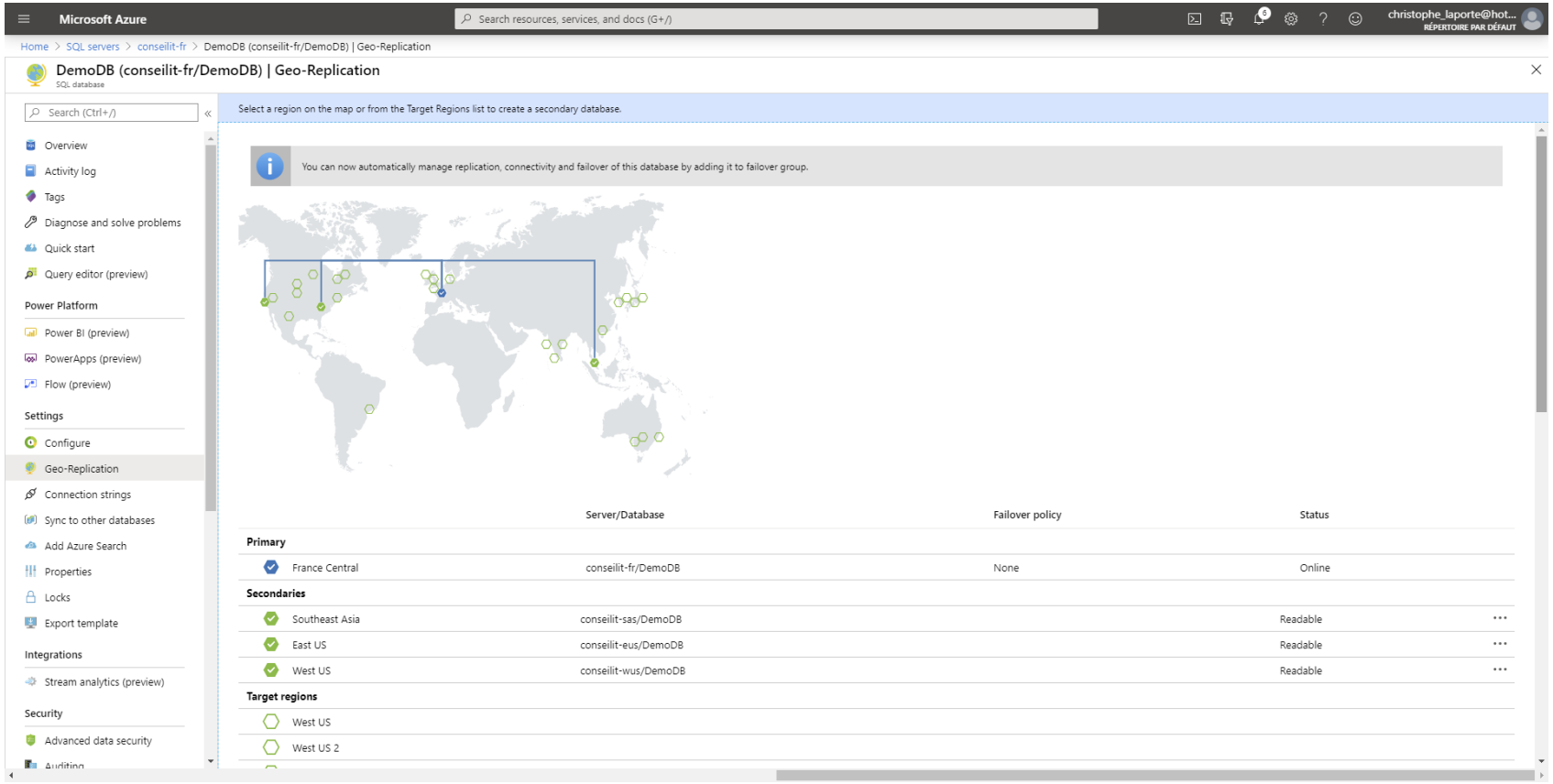


Service PaaS

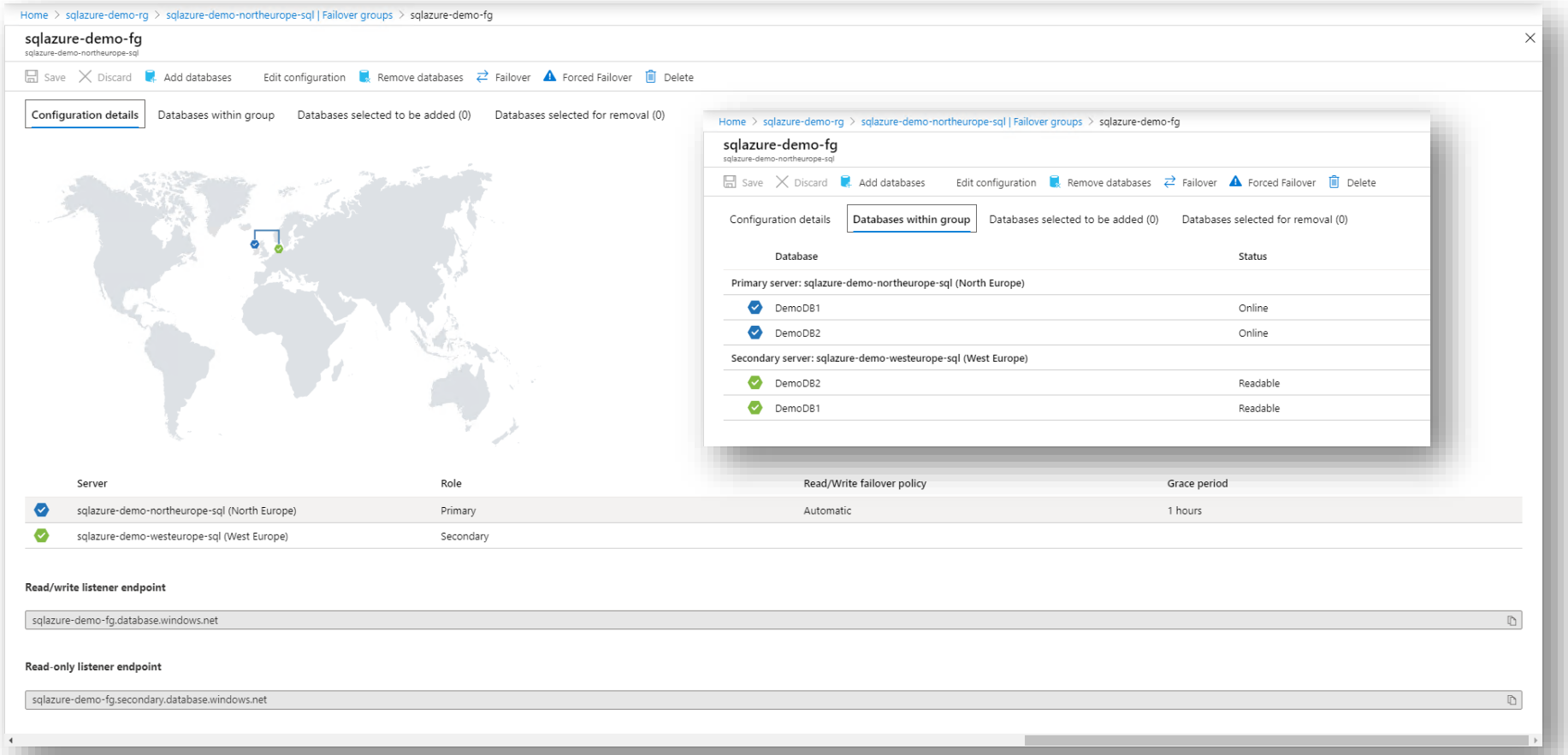
- Service managé
  - update, backup, monitoring
- Nouvelles fonctionnalités
  - Accessibles d'abord sur Azure SQL
- Pas de fin de support
  - Pas de migration !

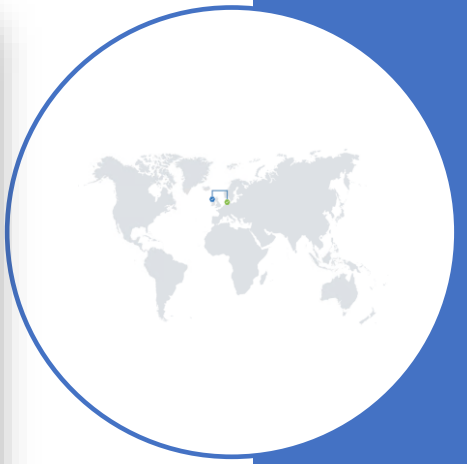
SQL Server Version	Mainstream Support	Extended Support
SQL Server 2005	April 12, 2011	April 12, 2016
SQL Server 2008 and 2008 R2	July 8, 2014	July 9, 2019
SQL Server 2012	July 11, 2017	July 12, 2022
SQL Server 2014	July 9, 2019	July 9, 2024
SQL Server 2016	July 13, 2021	July 14, 2026
SQL Server 2017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

SQL Azure – Géo réplication



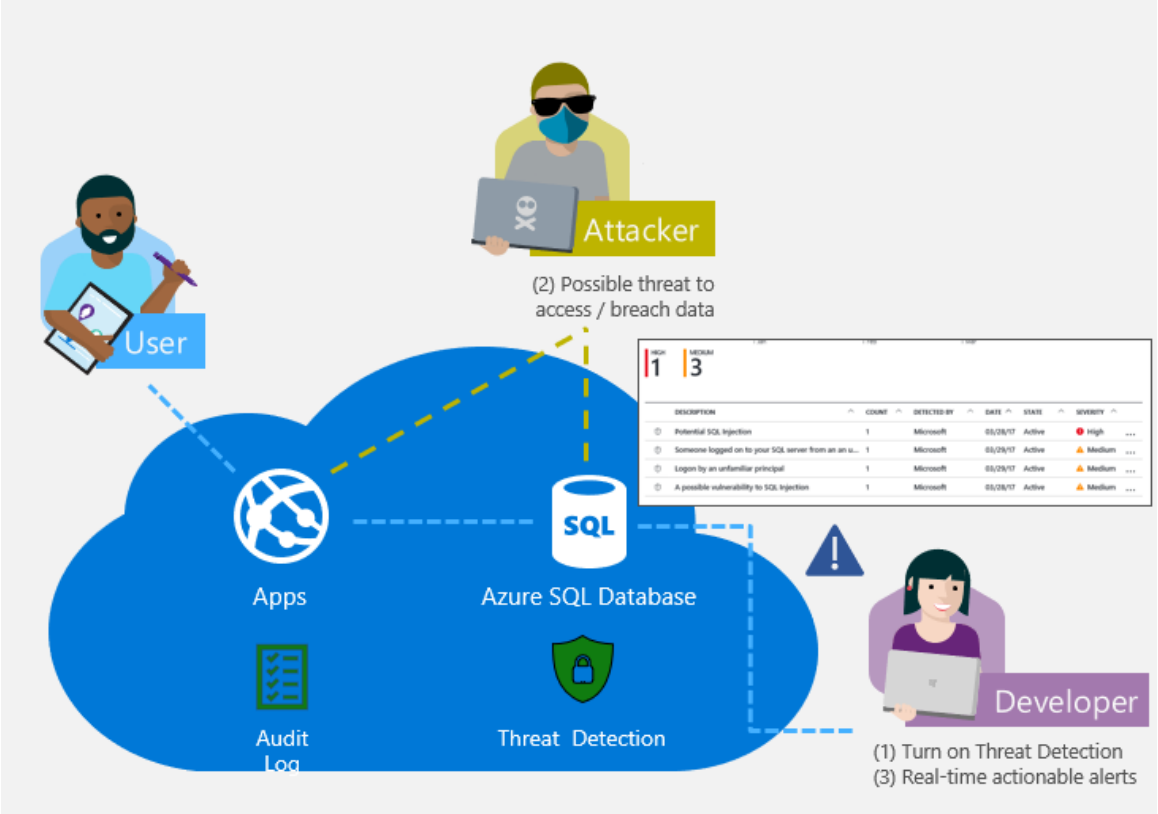
SQL Azure : Failover Groups





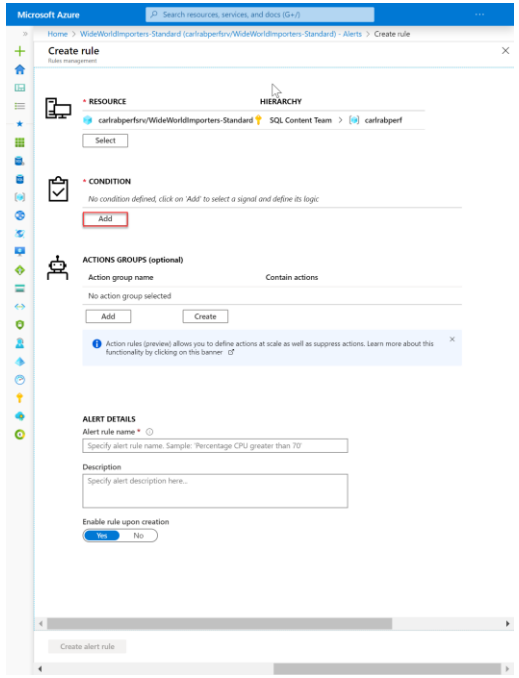
Advanced Threat Detection

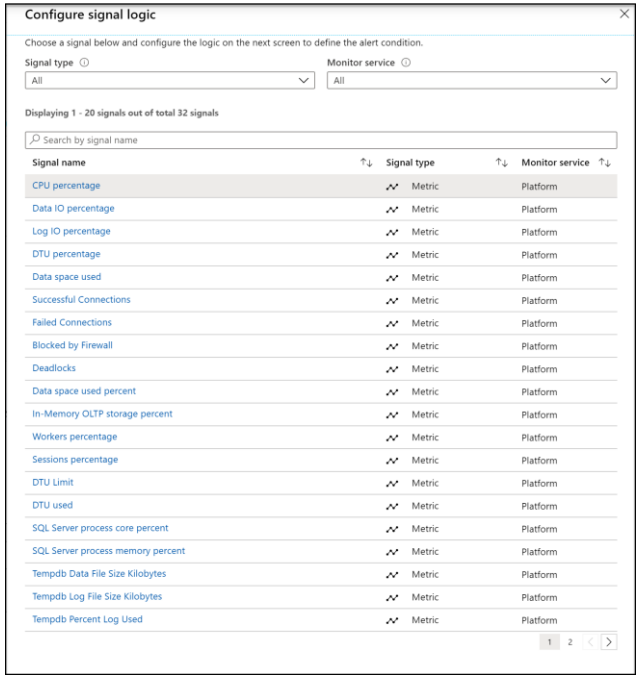
- Détection d'activités inhabituelles

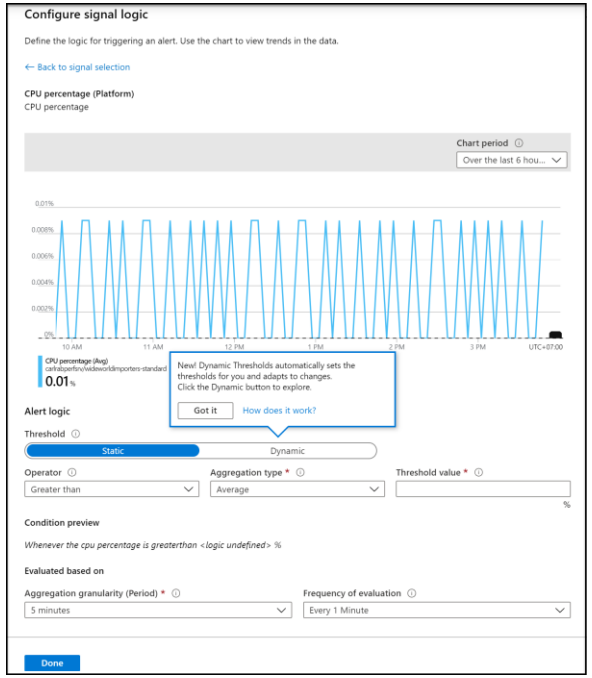


SQL Azure : Alertes

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

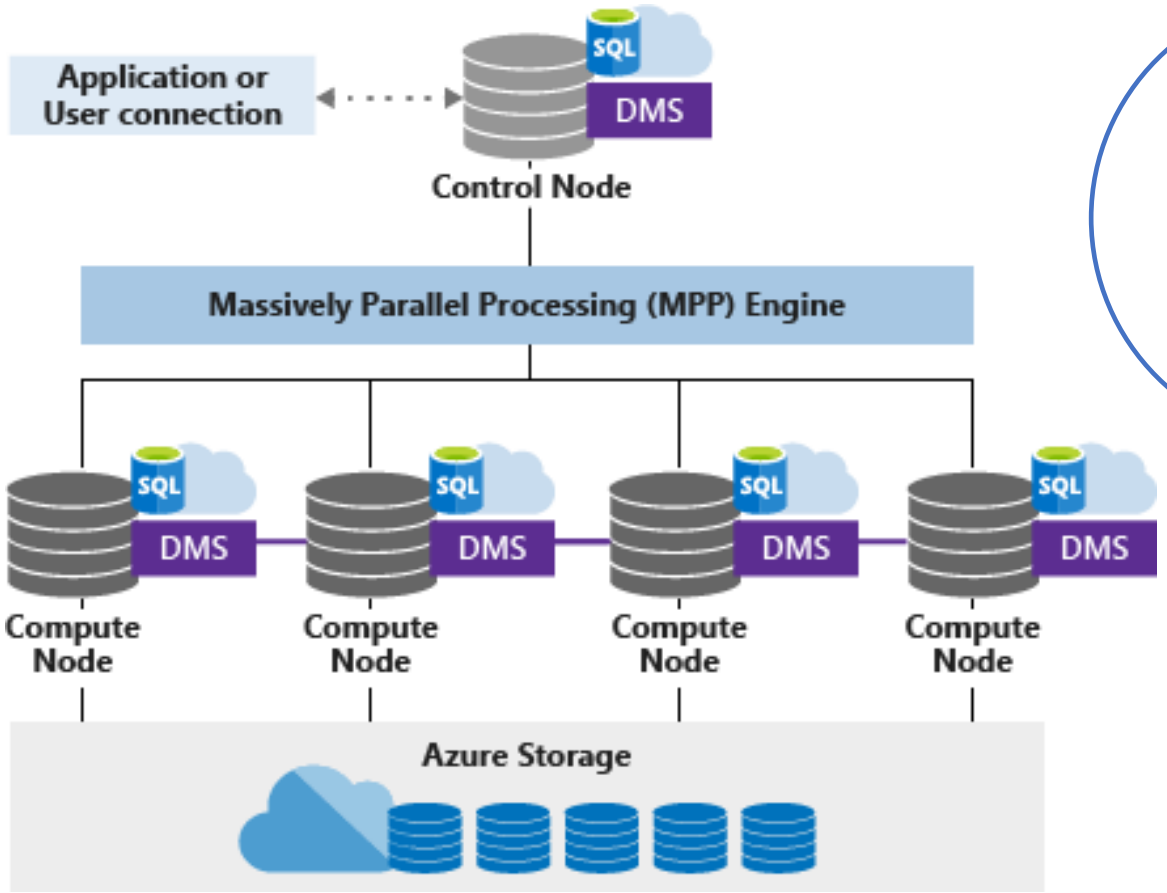






Azure Synapse analytics (SQL DW)

- Massive Parallel Processing



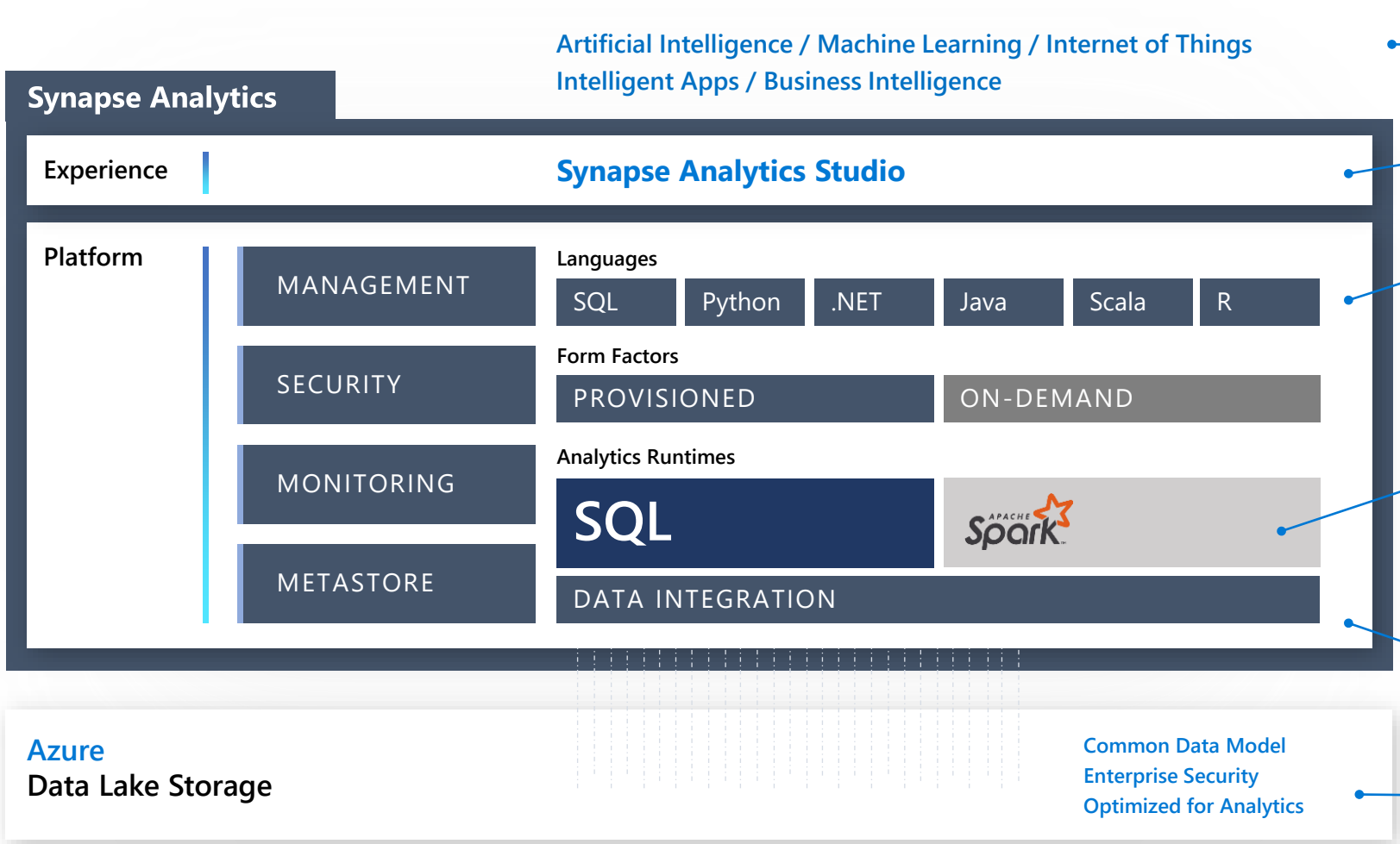
Microsoft

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



Designed for analytics **workloads at any scale**

SaaS **developer experiences** for code free and code first

Multiple **languages** suited to different analytics workloads

Integrated analytics runtimes available provisioned and serverless on-demand

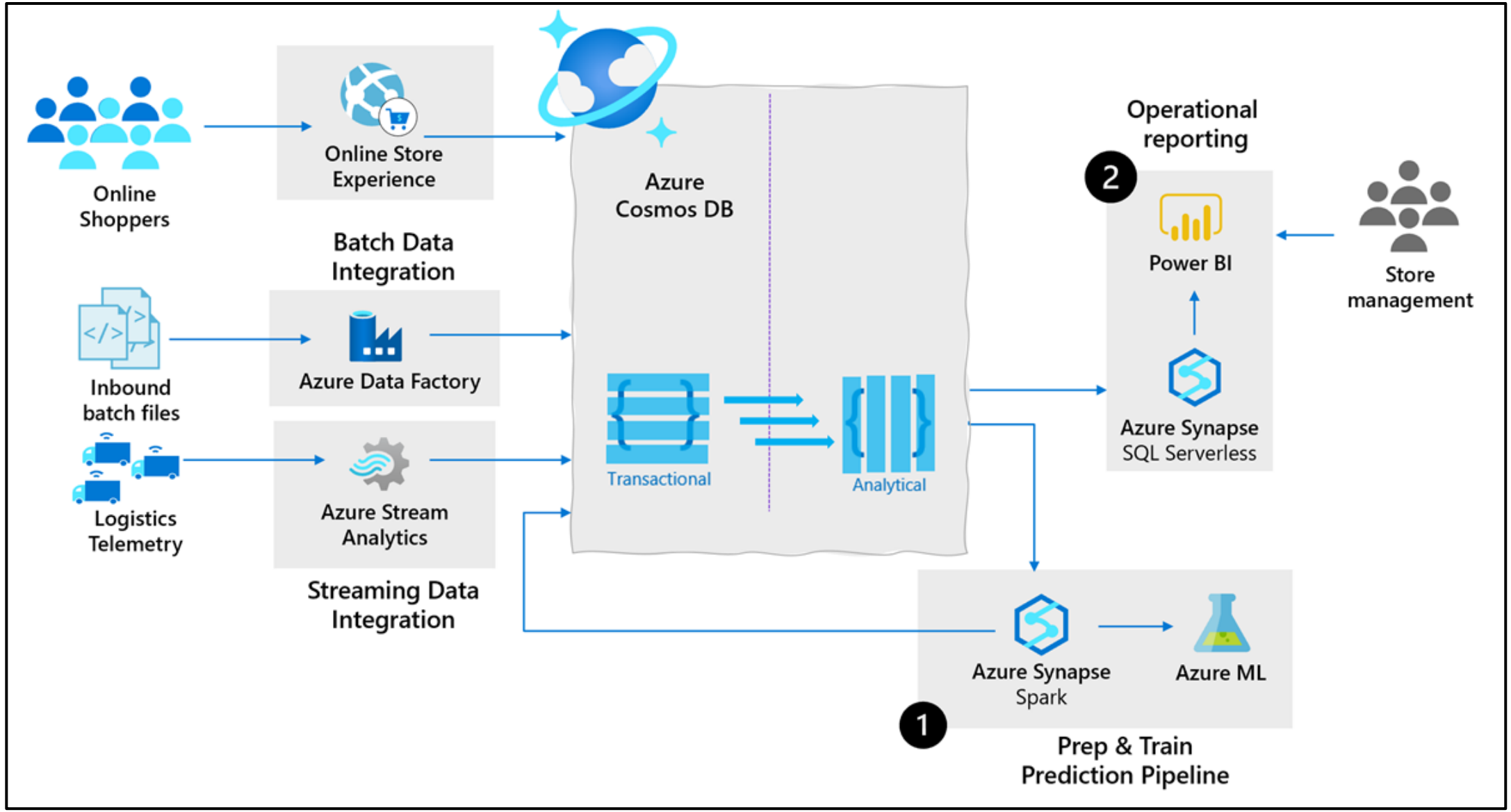
SQL Analytics offering T-SQL for batch, streaming and interactive processing

Spark for big data processing with Python, Scala, R and .NET

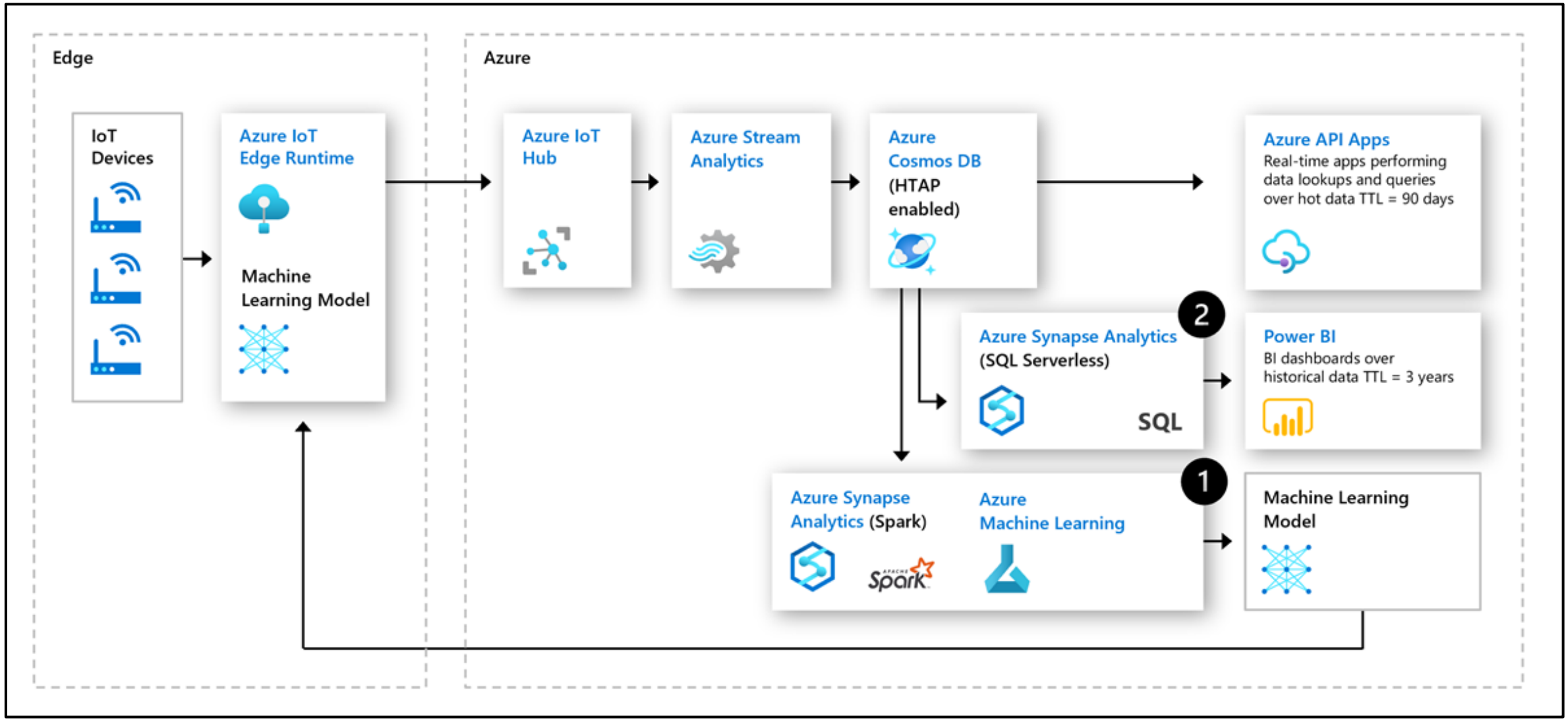
Integrated **platform services** for, management, security, monitoring, and metastore

Data **lake integrated** and Common Data Model aware

Supply chain analytics, forecasting & reporting



IOT predictive maintenance



Synapse Demo

SQL OnDemand – View creation on .parquet files

Run | Undo | Publish | Query plan | 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
```

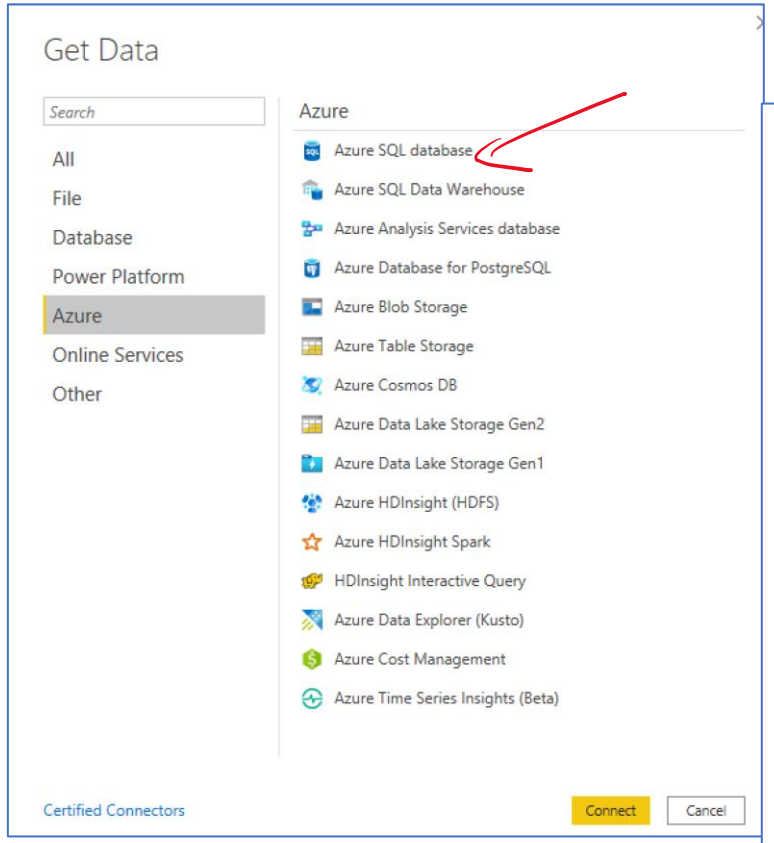
Run | Undo | Publish | Query plan | Connect to: SQL on-demand | Use database: Demo

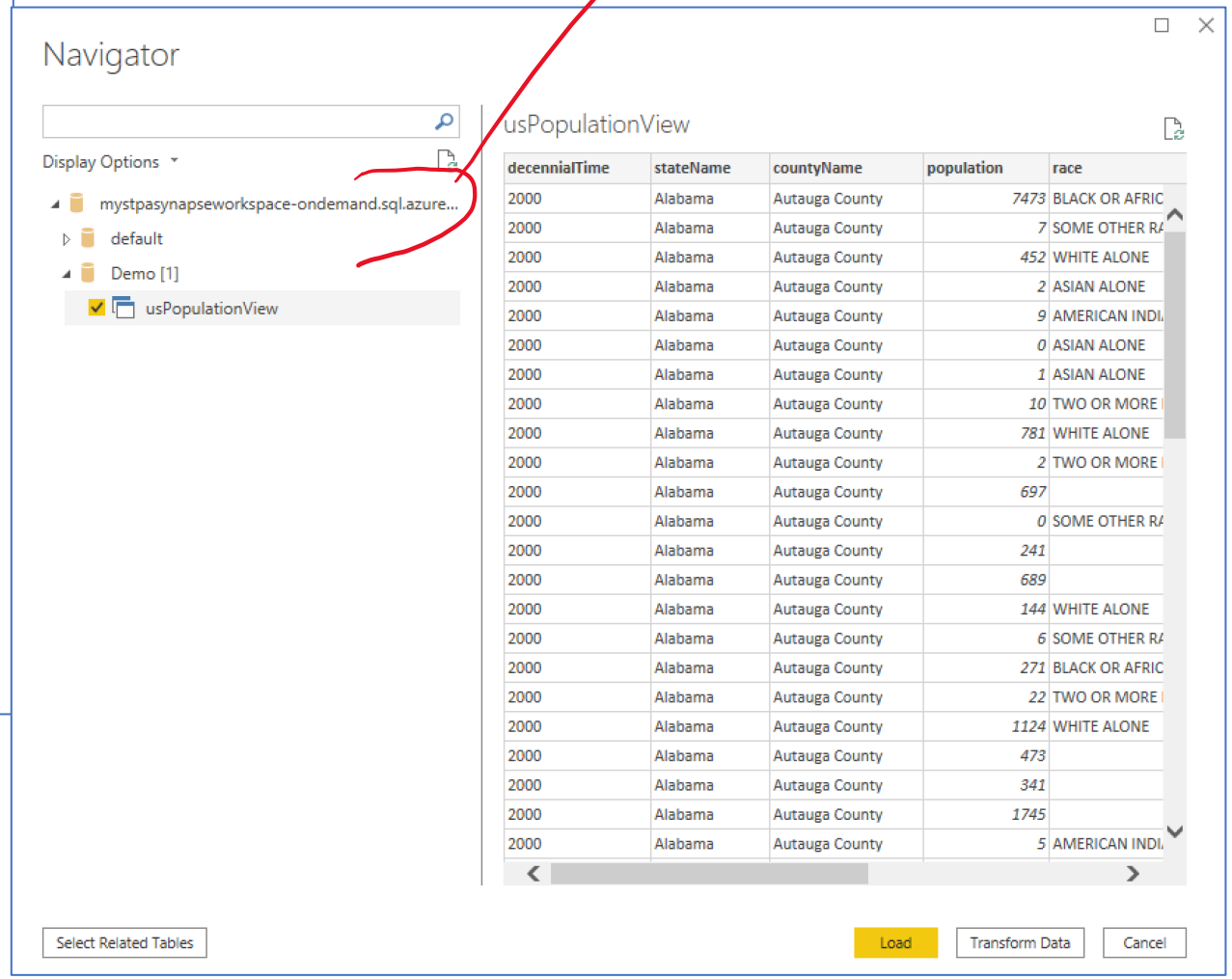
```
1  -- There is no credential in data surce. We are using public storage account which doesn't need a secret.
2  CREATE EXTERNAL DATA SOURCE AzureOpenData
3  WITH ( LOCATION = 'https://azureopendatastorage.blob.core.windows.net/')
```

Run | Undo | Publish | Query plan | Connect to: SQL on-demand | Use database: Demo

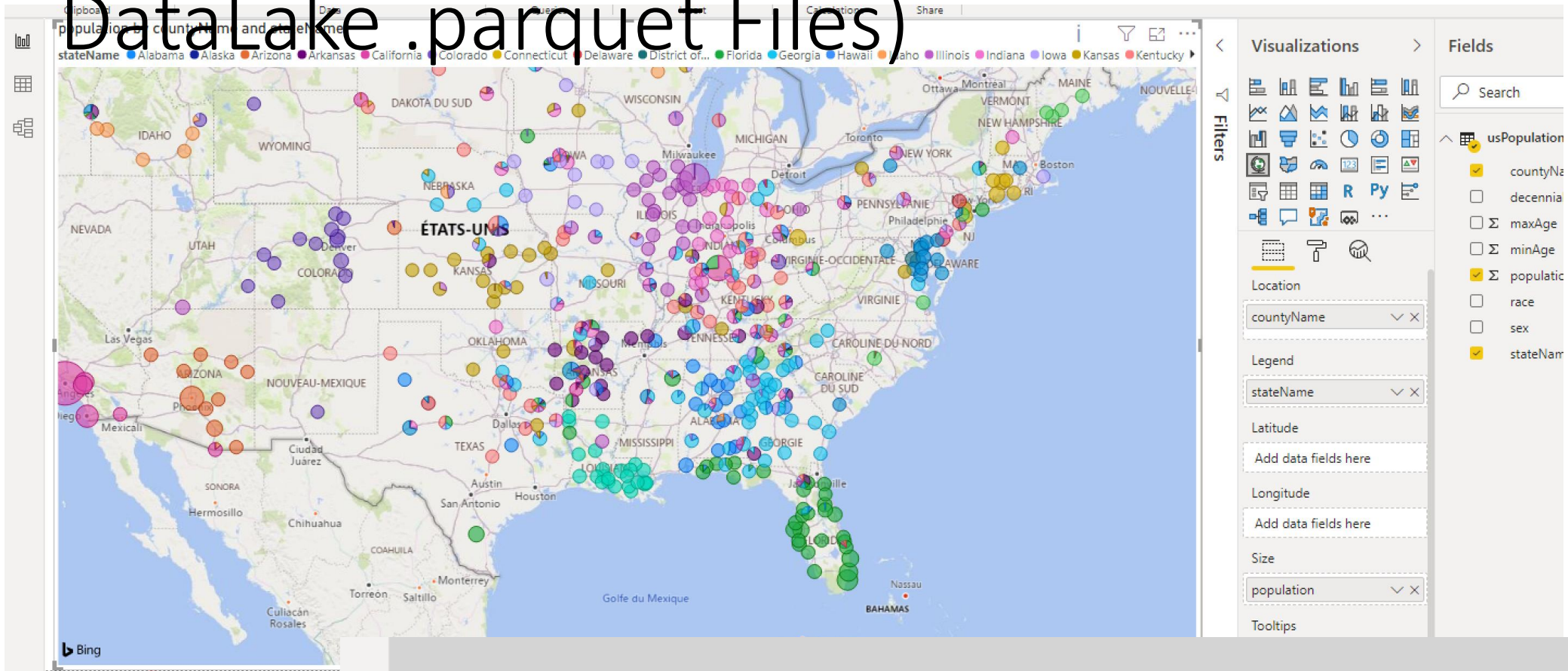
```
1  DROP VIEW IF EXISTS usPopulationView;
2  GO
3
4  CREATE VIEW usPopulationView AS
5  SELECT
6      *
7  FROM
8      OPENROWSET(
9          BULK 'censusdatacontainer/release/us_population_county/year=20*/*.parquet',
10         DATA_SOURCE = 'AzureOpenData',
11         FORMAT='PARQUET'
12     ) AS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

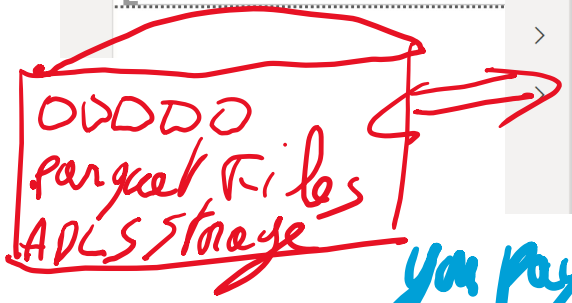
Get Data from PBI to Synaspe SQL OnDemand





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





you pay SQL server only when you request

Microsoft Azure

SQL Server / SQL Azure DB

SQL Server

Jean Glaudon – Microsoft

Data & AI Sales Specialist

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Editions SQL Server 2019

Toujours les 4 éditions

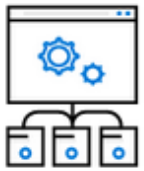
Enterprise

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

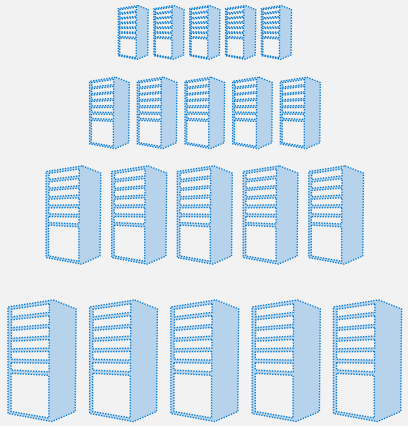
Avec plus de fonctionnalités et plus de bénéfices liés à la Software Assurance

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



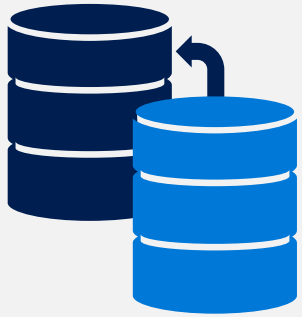
License mobility to SQL Server IaaS

Modernize to the cloud with existing licenses*

*Also available with Standard Edition plus SA

Fail-over servers for high availability

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



*Also available with Standard Edition plus SA

Advanced analytics updates

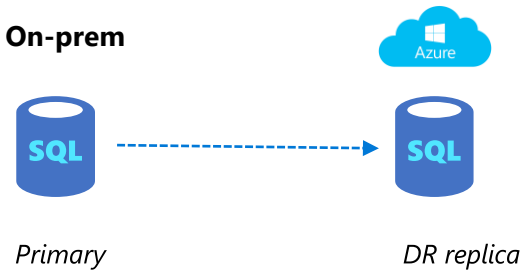
Get access to quarterly updates to the advanced analytics stack

Mobile BI and interactive reports

Generate data visualizations on premises with Power BI Report Server

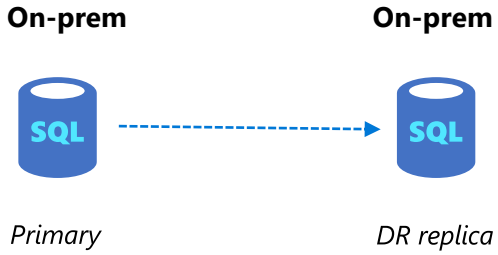
SQL Server 2019 : Nouveaux bénéfices de la SA

Free Hybrid DR only on Azure



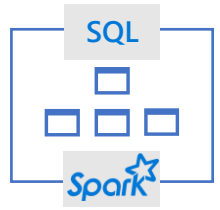
One async replica for each primary SQL Server Instance on-prem for backup in Azure

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

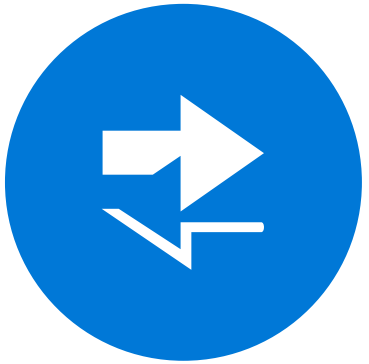
Optimisation des coûts dans Azure

Reserved Instance / Reserved Capacity

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

Economies importantes

Anticipation Budgétaire

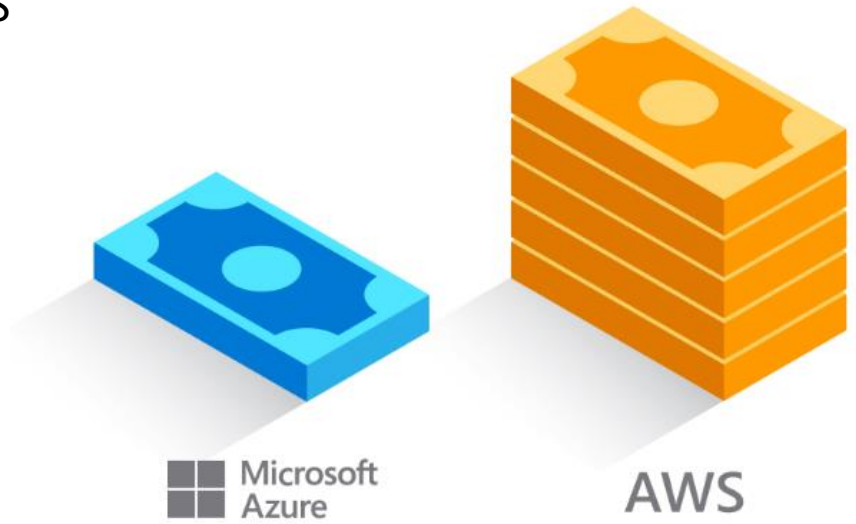


Fléxibilité
Simplicité

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

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	

PaaS

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

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	

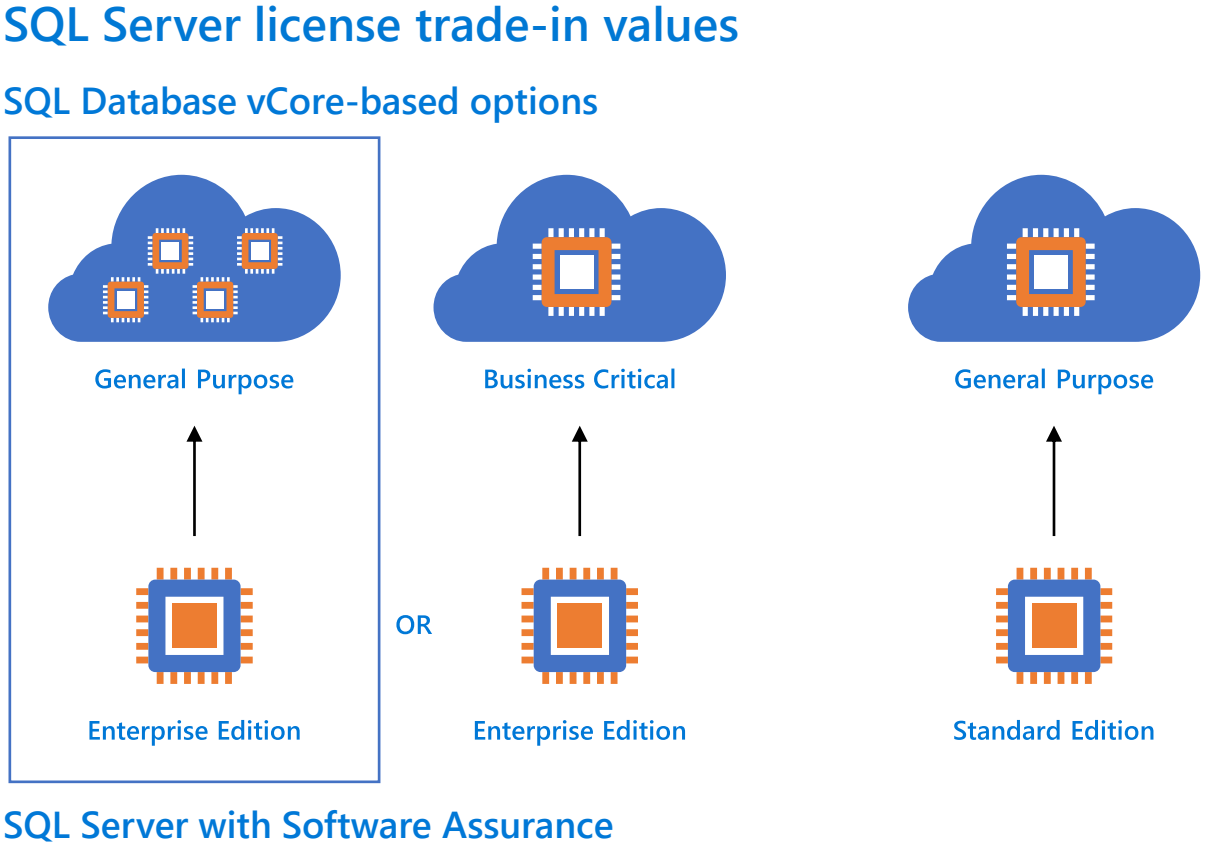
Bénéfice unique pour les environnements hautement virtualisés dans des scénarii PaaS SQL Azure Database

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)



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

Conclusion

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