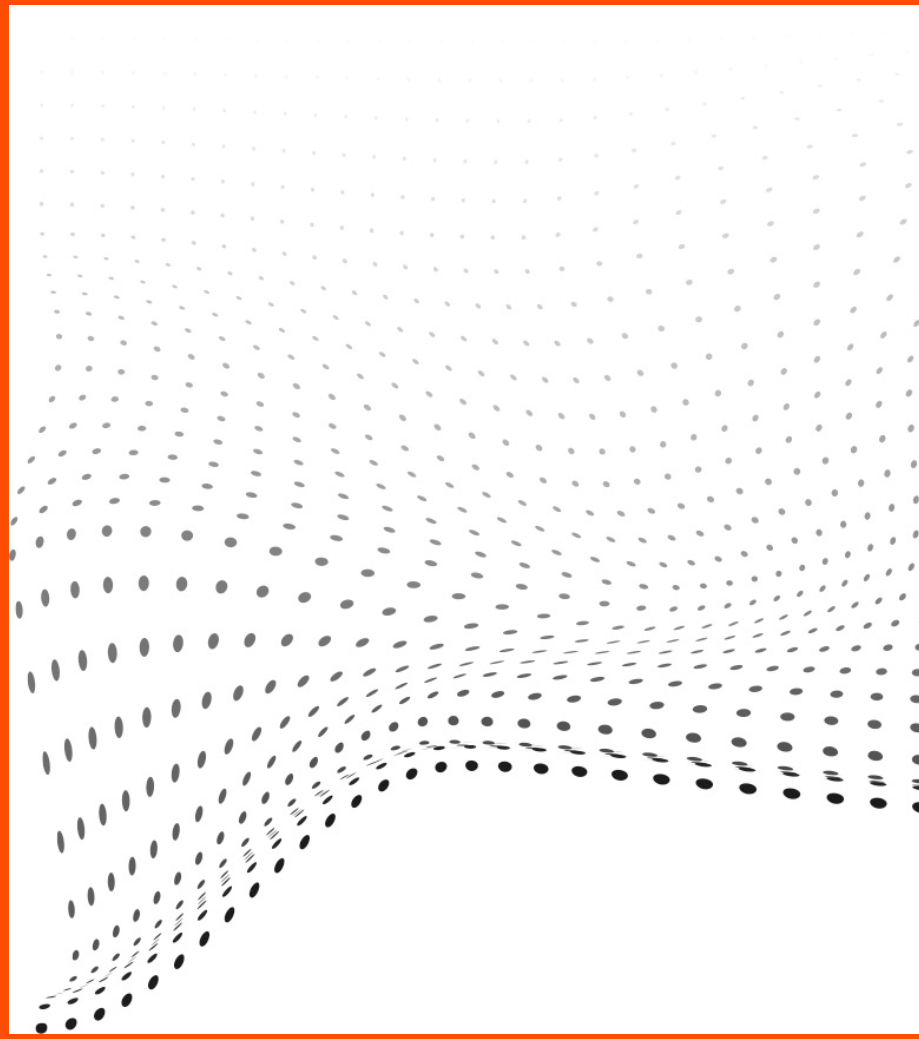
DB BITS

SOLUÇÕES
EM GERÊN
DE DADOS

Zero to Hero in 16 Hours: HADR on SQL Server

Module 6: AOAG

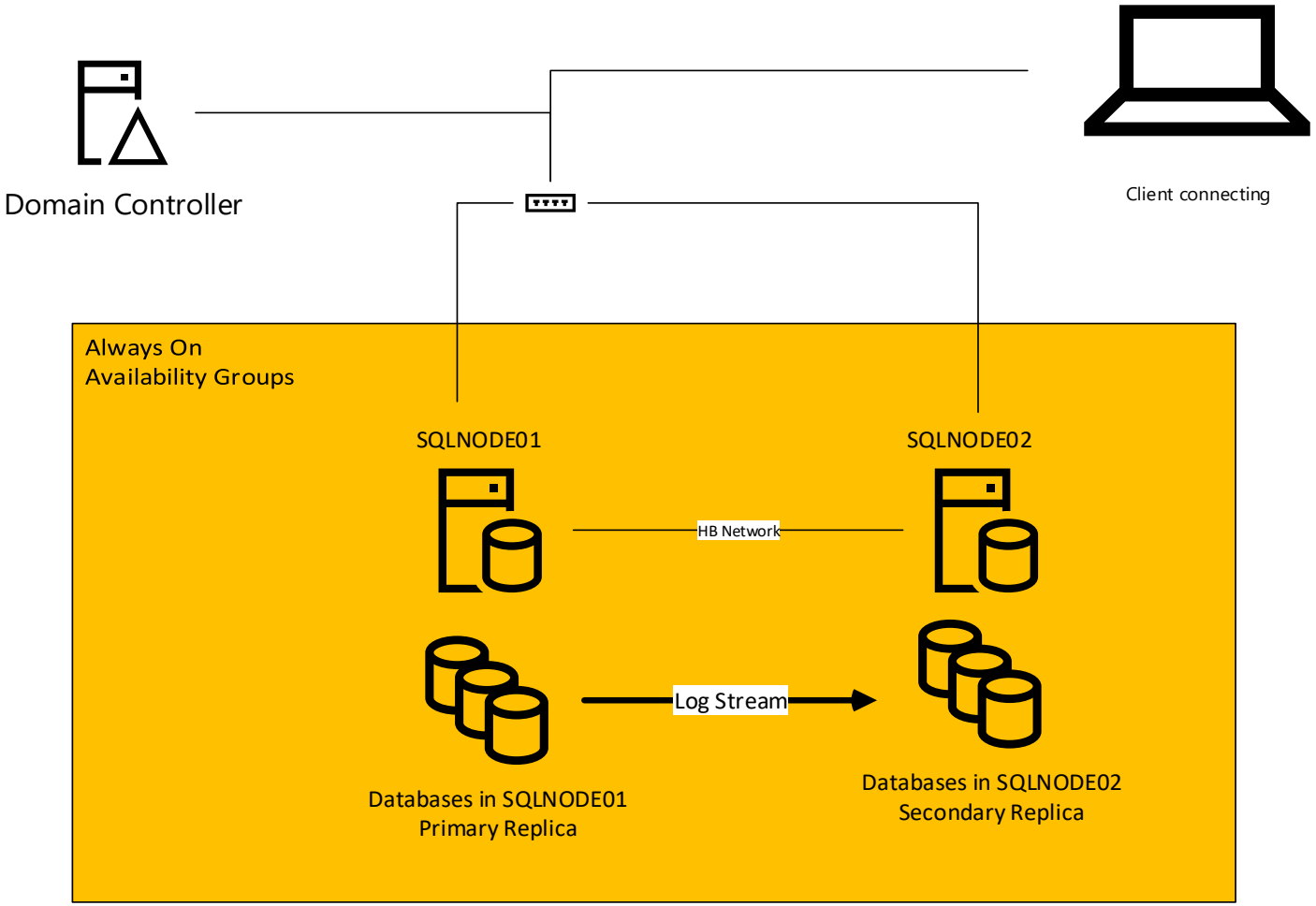
Always On Availability Groups – the cherry on top of the cake!



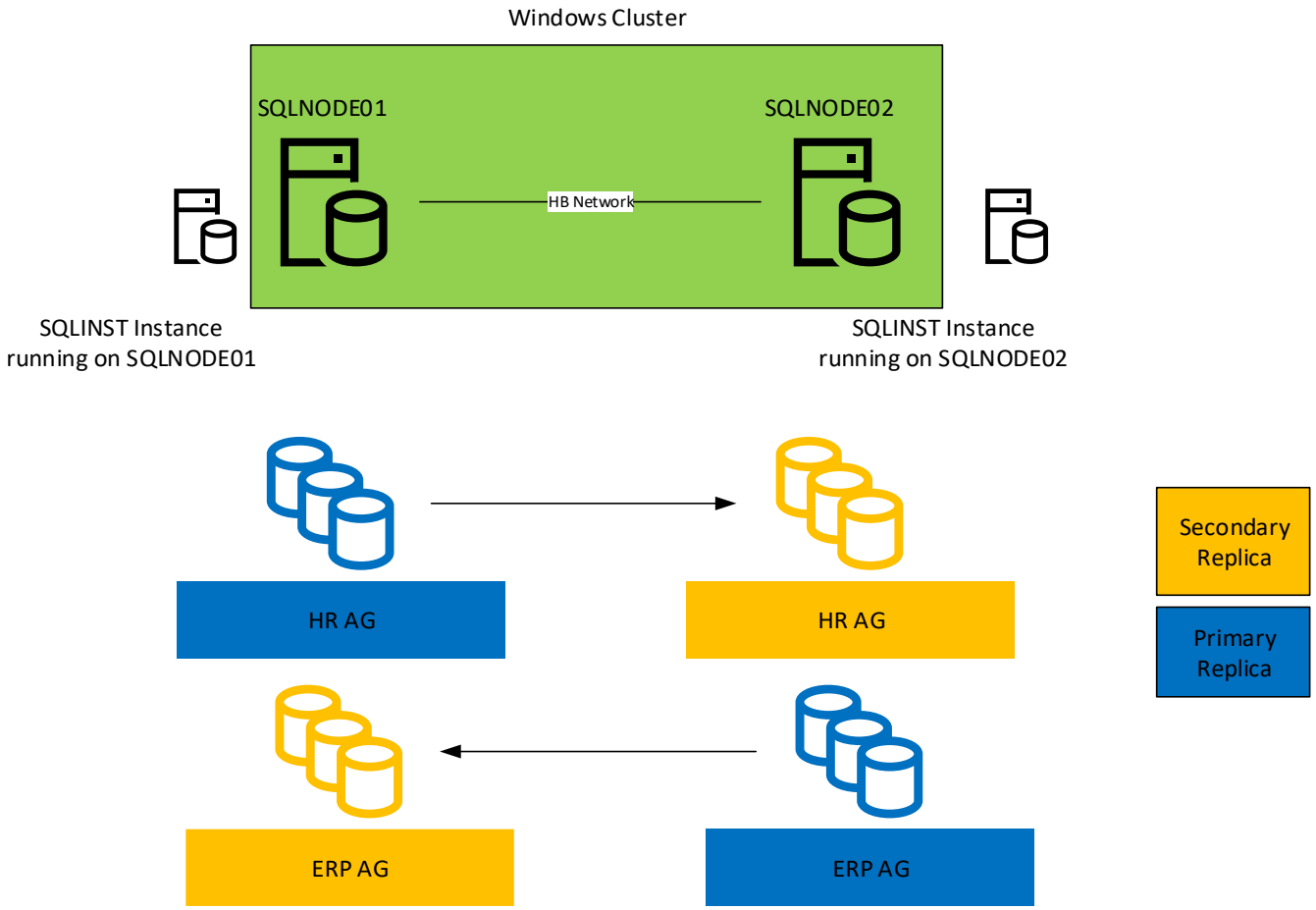
Goals

- Overview
- Considerations for newer SQL SERVER versions
- Deploying steps
- Options and Parameters
- Tools for administering and monitoring
- Backup considerations

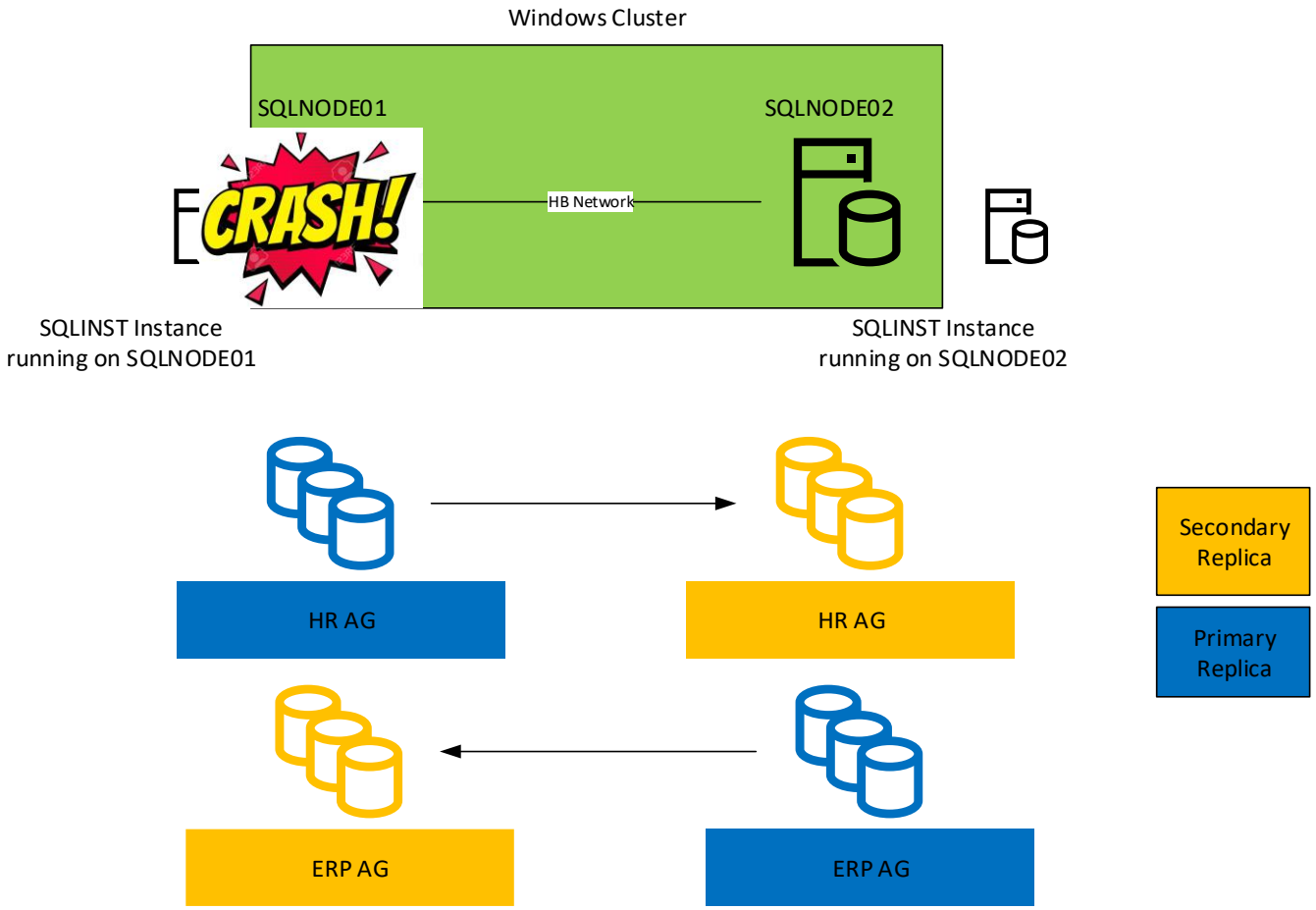
Overview


Domain Controller
Client connecting
Always On
Availability Groups
SQLNODE01
SQLNODE02
HB Network
Log Stream
Databases in SQLNODE01
Primary Replica
Databases in SQLNODE02
Secondary Replica

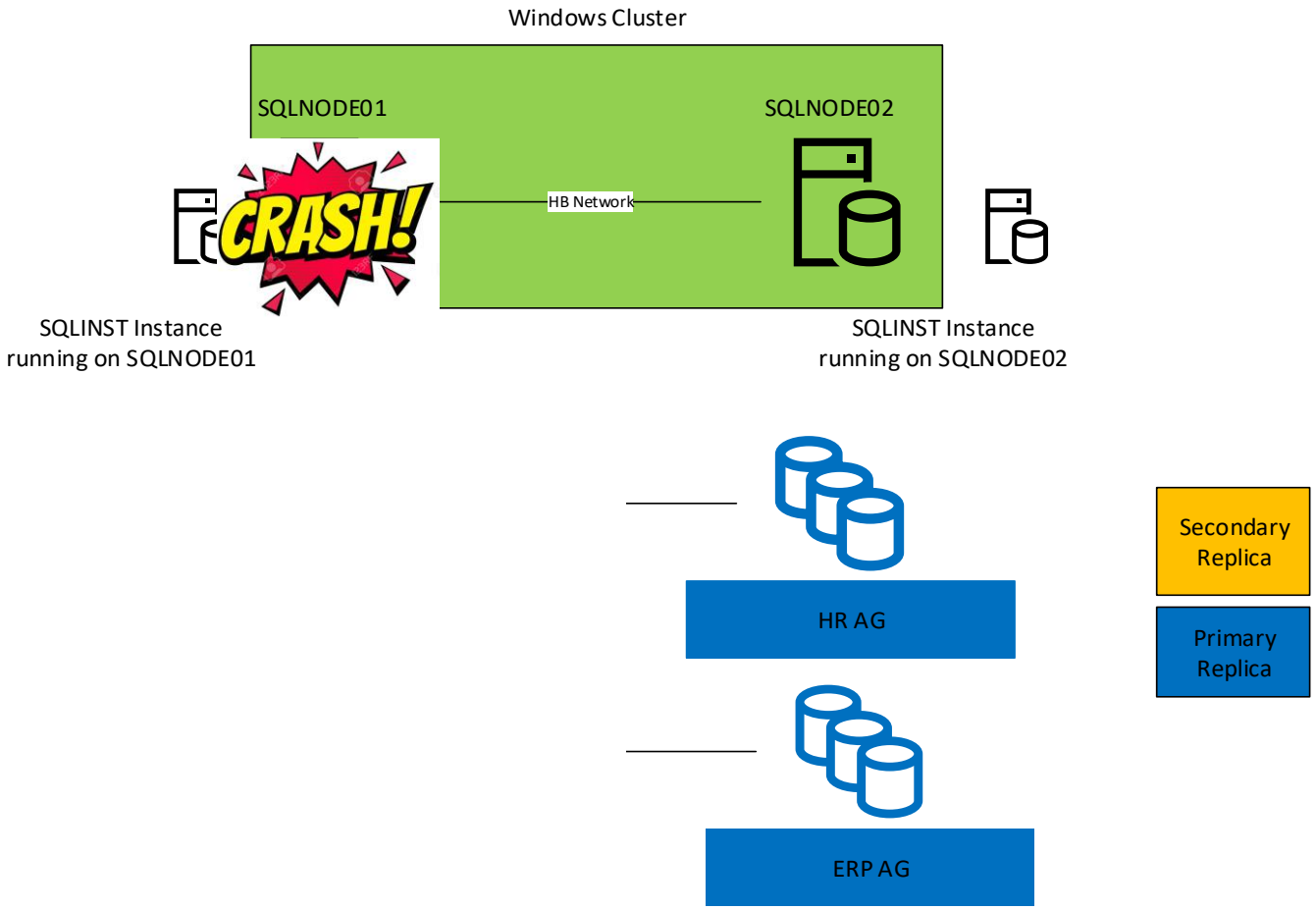
A “better active-active”



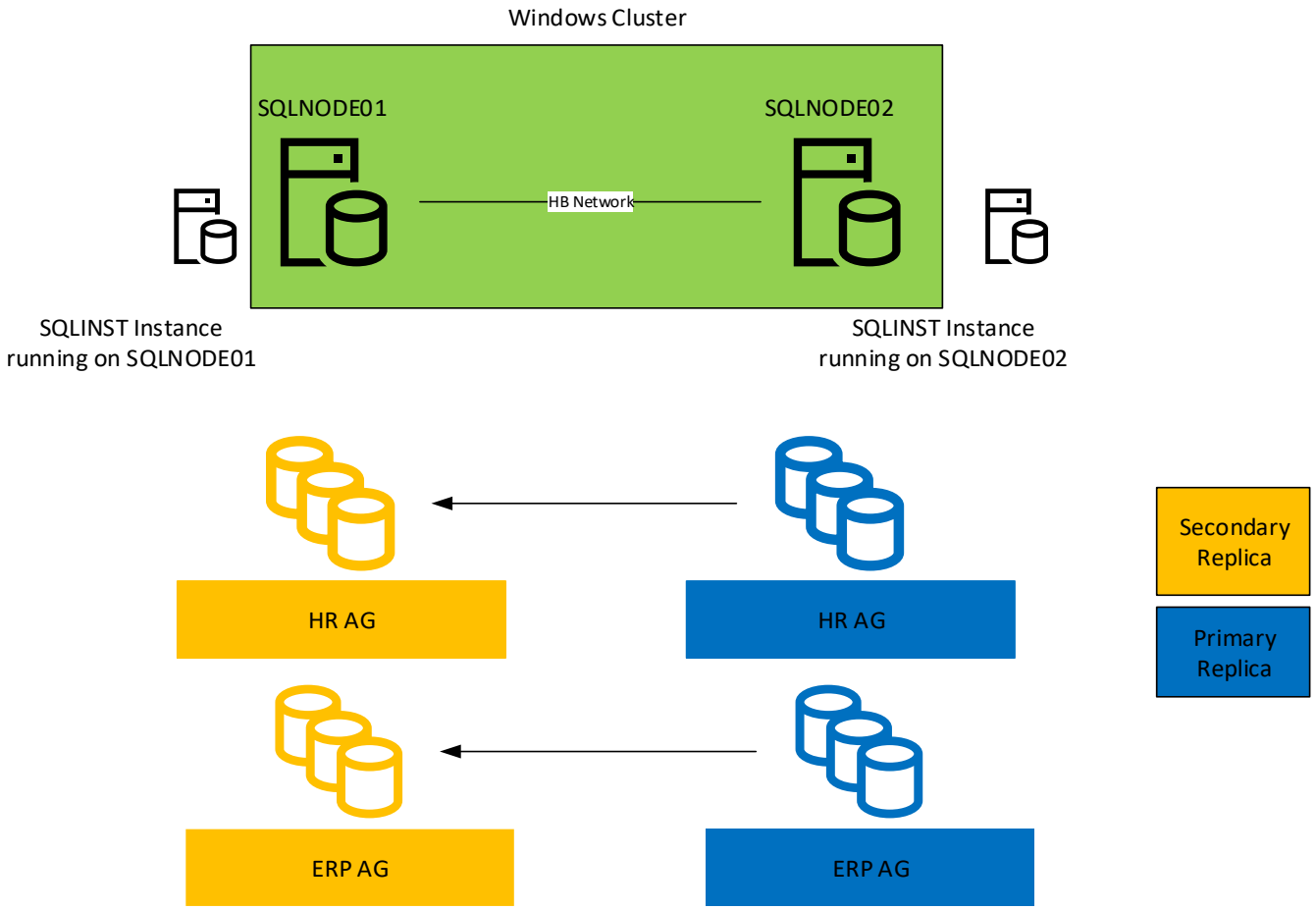
A “better active-active”



A “better active-active”



A “better active-active”



Newer versions

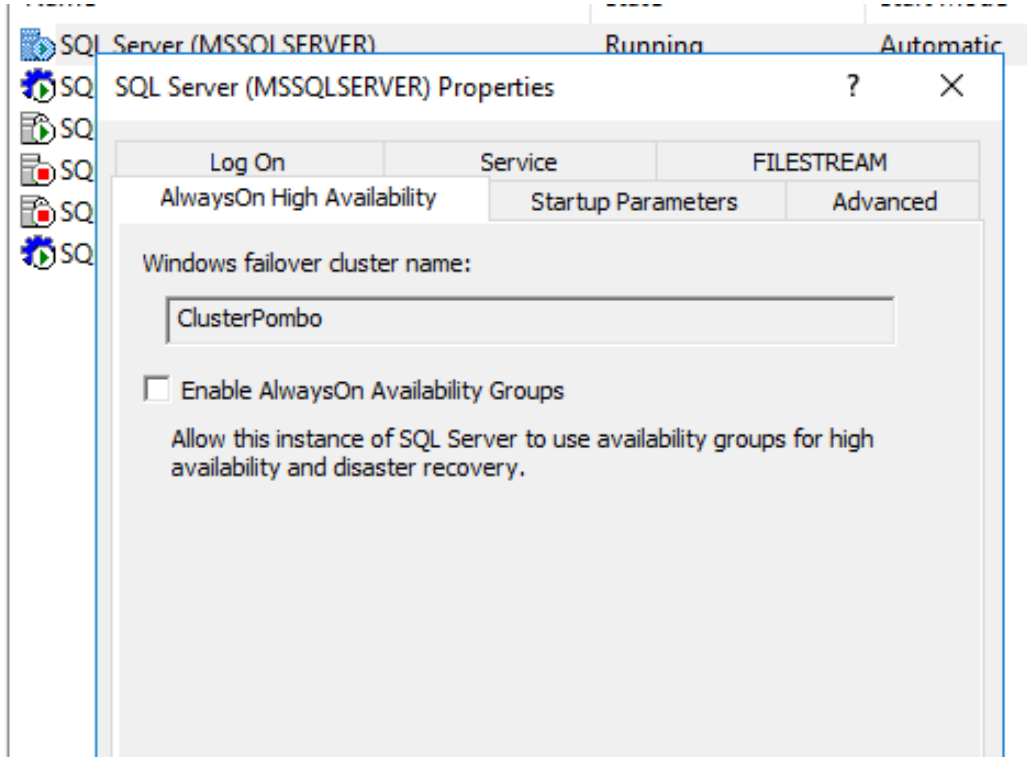
- After SQL SERVER 2016, you can “Seed” the initial data synchronization (TF 9567 to compress it).
- After SQL SERVER 2016 there’s an additional health check: on the Database level.
- After SQL SERVER 2017, you don’t need a Cluster to **replicate** data (Read scale).
- After Windows Server 2016 you don’t need an AD to create a Windows Cluster.
- SQL 2022: Now has Contained AGs

https://docs.microsoft.com/en-us/sql/database-engine/availability-groups/windows/tune-compression-for-availability-group?view=sql-server-ver15

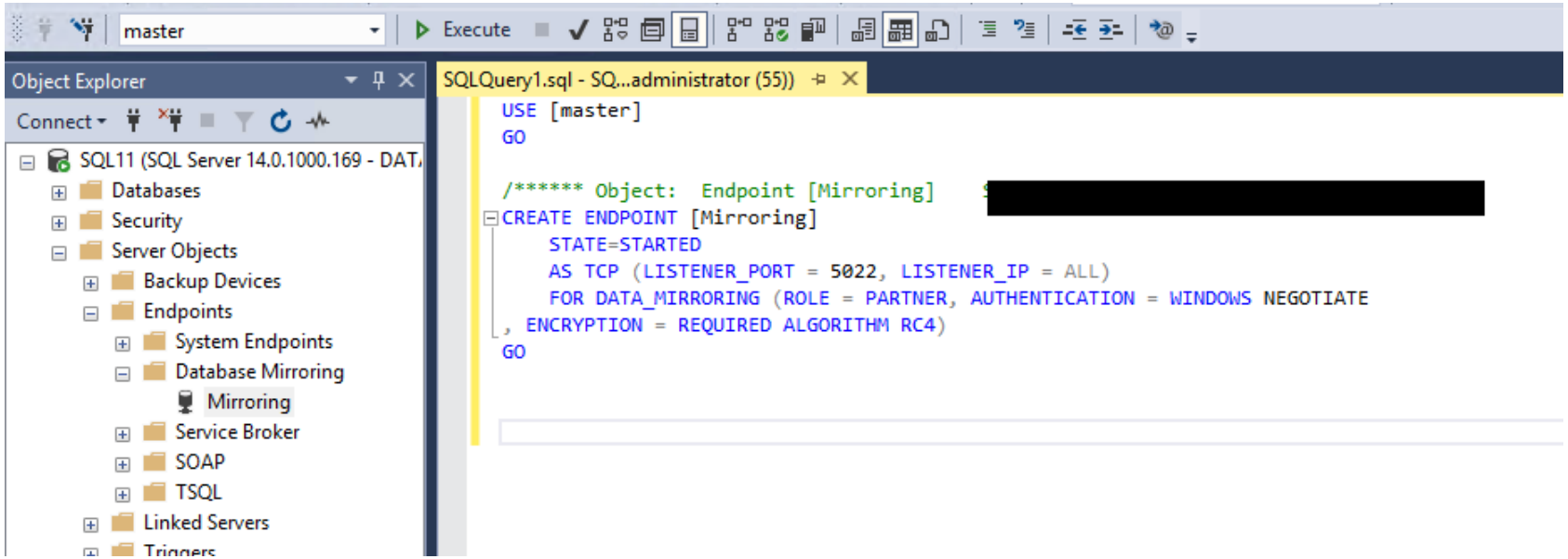
Deploying

1. Install the Windows Server Failover Cluster (or Linux with Pacemaker);
2. Install the SQL SERVER Instance (Stand alone);
3. Enable the HADR Option for the Instance on the Configuration Manager;
4. Reserve the IP and Virtual Name for the Listener;
5. Create the Endpoints;
6. Create the Availability Group;
7. Add the databases;
8. Configure the Listener;
9. Check on the Windows Server Cluster Manager if a new role was added.

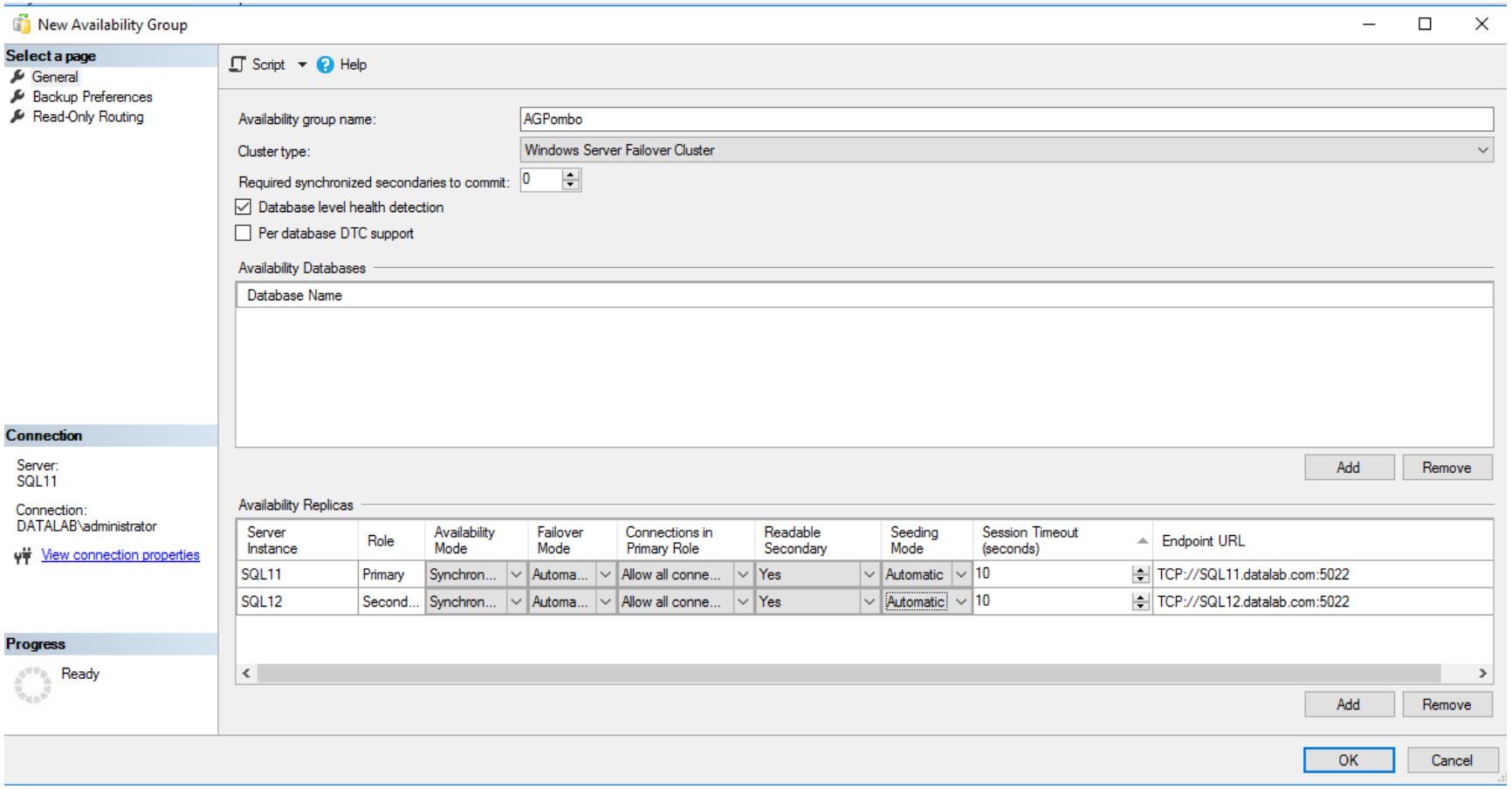
Deploying


SQL Server (MSSQLSERVER)
Running
Automatic
SQL Server (MSSQLSERVER) Properties
Log On
Service
FILESTREAM
AlwaysOn High Availability
Startup Parameters
Advanced
Windows failover cluster name:
ClusterPombo
Enable AlwaysOn Availability Groups
Allow this instance of SQL Server to use availability groups for high availability and disaster recovery.

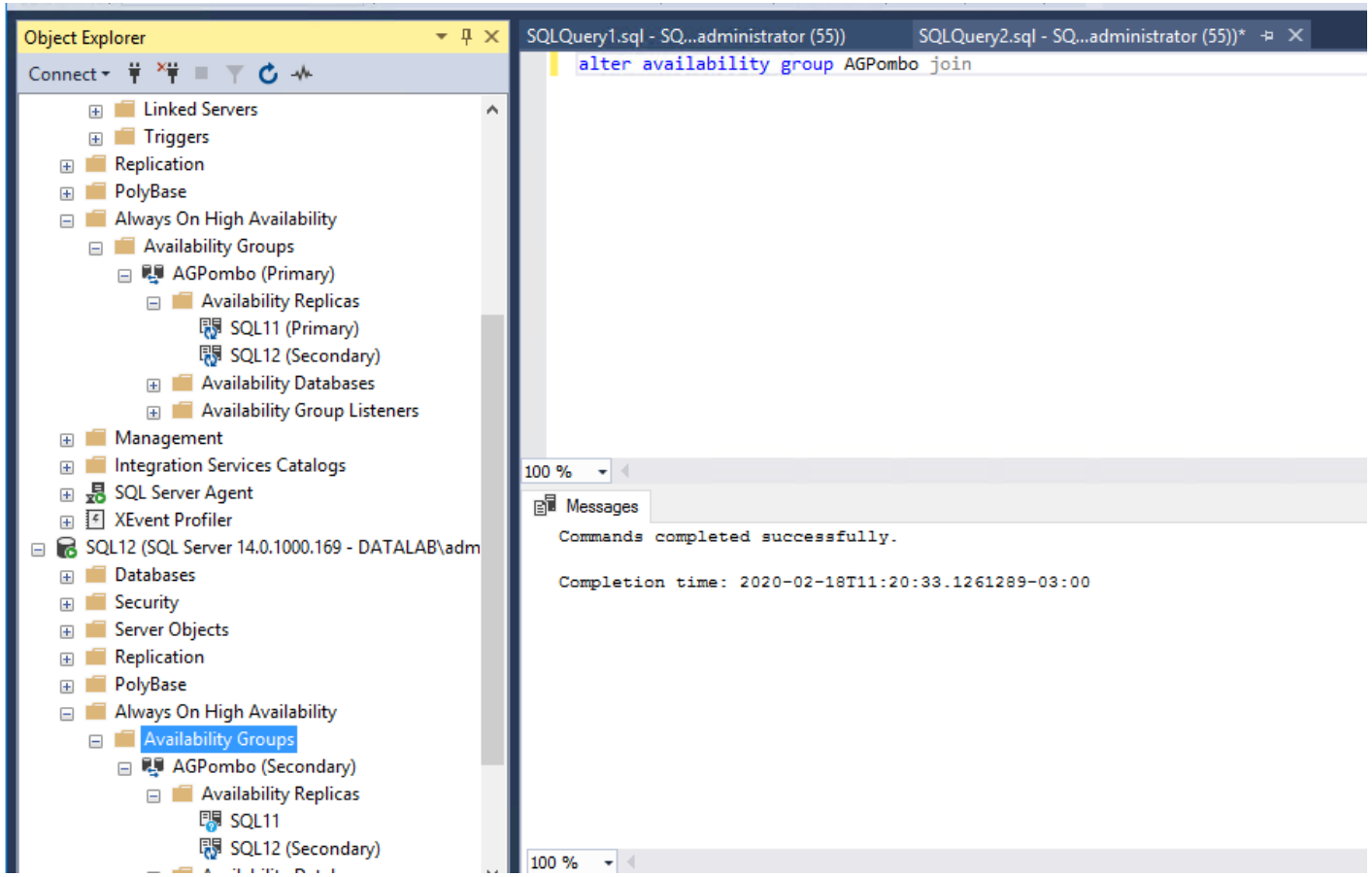
Deploying


master
Execute
Object Explorer
Connect
SQL11 (SQL Server 14.0.1000.169 - DAT
Databases
Security
Server Objects
Backup Devices
Endpoints
System Endpoints
Database Mirroring
Mirroring
Service Broker
SOAP
TSQL
Linked Servers
SQLQuery1.sql - SQ...administrator (55))
USE [master]
GO
/****** Object: Endpoint [Mirroring]
CREATE ENDPOINT [Mirroring]
STATE=STARTED
AS TCP (LISTENER_PORT = 5022, LISTENER_IP = ALL)
FOR DATA_MIRRORING (ROLE = PARTNER, AUTHENTICATION = WINDOWS NEGOTIATE
, ENCRYPTION = REQUIRED ALGORITHM RC4)
GO

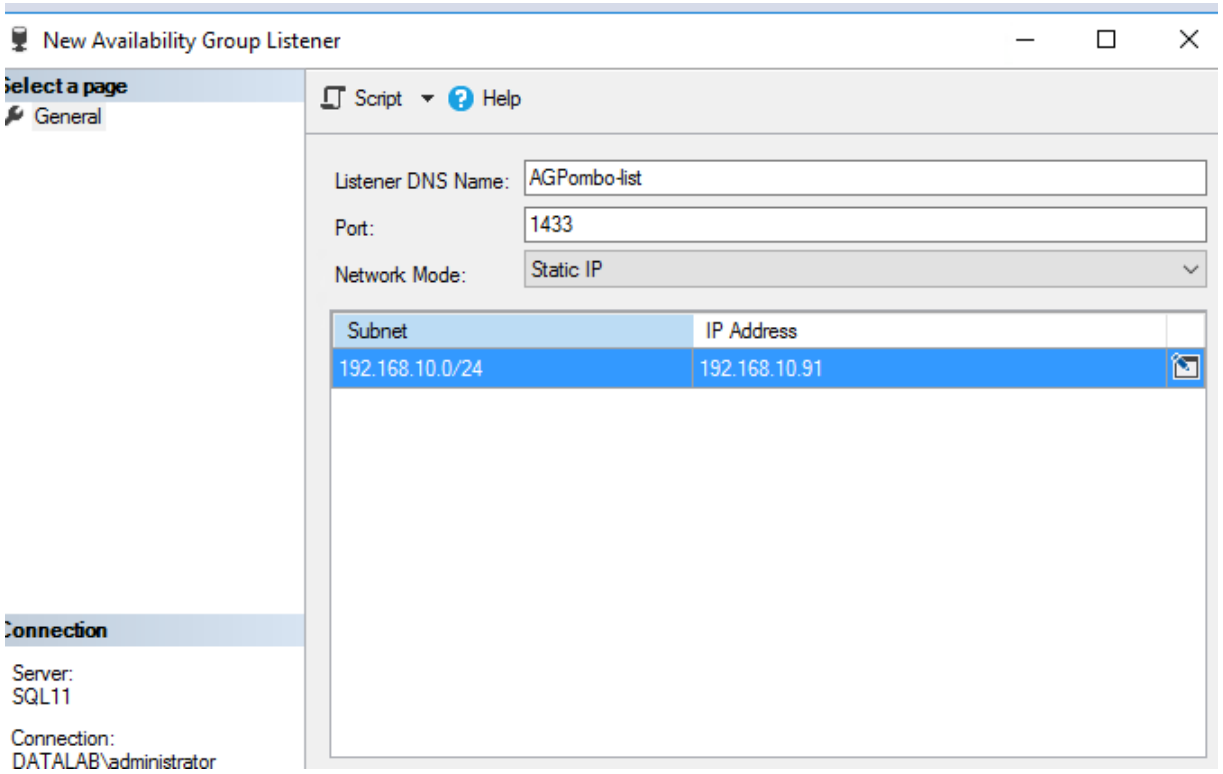
Deploying


New Availability Group
Select a page
General
Backup Preferences
Read-Only Routing
Script
Help
Availability group name:
AGPombo
Cluster type:
Windows Server Failover Cluster
Required synchronized secondaries to commit:
0
Database level health detection
Per database DTC support
Availability Databases
Database Name
Add
Remove
Availability Replicas
Server Instance
Role
Availability Mode
Failover Mode
Connections in Primary Role
Readable Secondary
Seeding Mode
Session Timeout (seconds)
Endpoint URL
SQL11
Primary
Synchron...
Automa...
Allow all conne...
Yes
Automatic
10
TCP://SQL11.datalab.com:5022
SQL12
Second...
Synchron...
Automa...
Allow all conne...
Yes
Automatic
10
TCP://SQL12.datalab.com:5022
Add
Remove
Connection
Server:
SQL11
Connection:
DATALAB\administrator
View connection properties
Progress
Ready
OK
Cancel

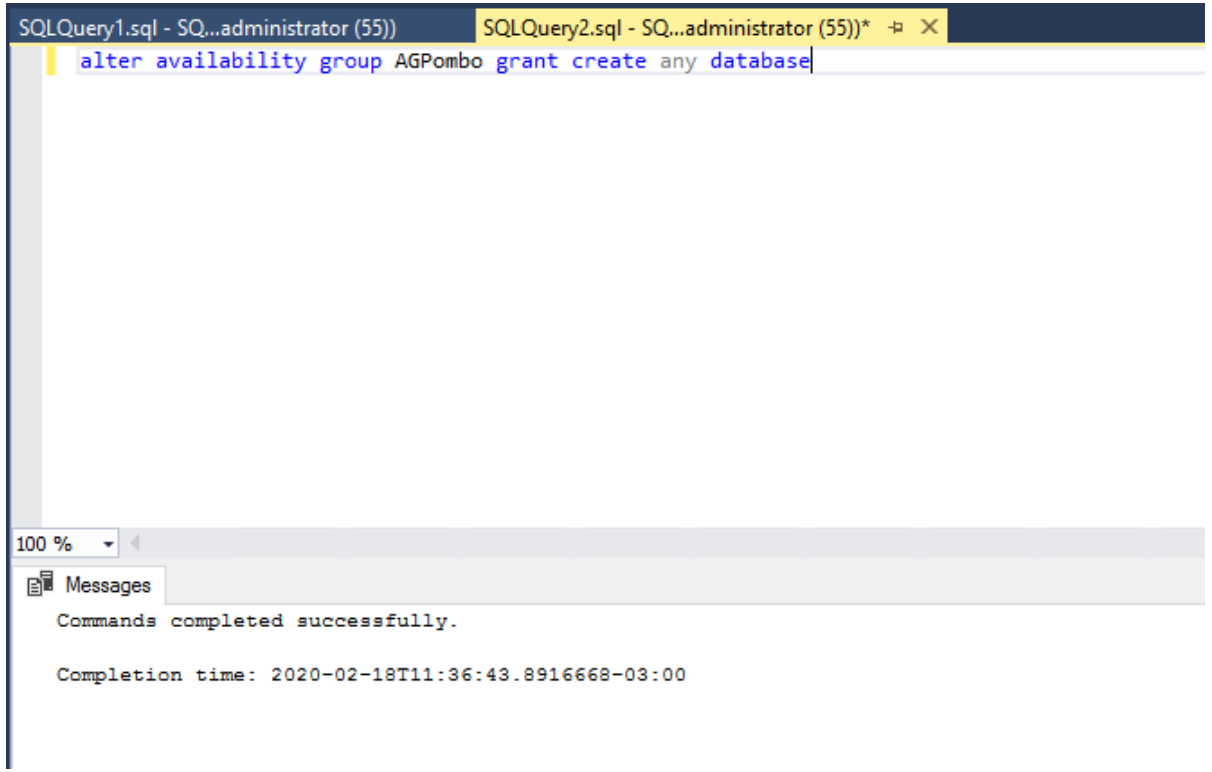
Deploying


Object Explorer
Connect
Linked Servers
Triggers
Replication
PolyBase
Always On High Availability
Availability Groups
AGPombo (Primary)
Availability Replicas
SQL11 (Primary)
SQL12 (Secondary)
Availability Databases
Availability Group Listeners
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
SQL12 (SQL Server 14.0.1000.169 - DATALAB\adm
Databases
Security
Server Objects
Replication
PolyBase
Always On High Availability
Availability Groups
AGPombo (Secondary)
Availability Replicas
SQL11
SQL12 (Secondary)
SQLQuery1.sql - SQ...administrator (55))
SQLQuery2.sql - SQ...administrator (55))*
alter availability group AGPombo join
100 %
Messages
Commands completed successfully.
Completion time: 2020-02-18T11:20:33.1261289-03:00
100 %

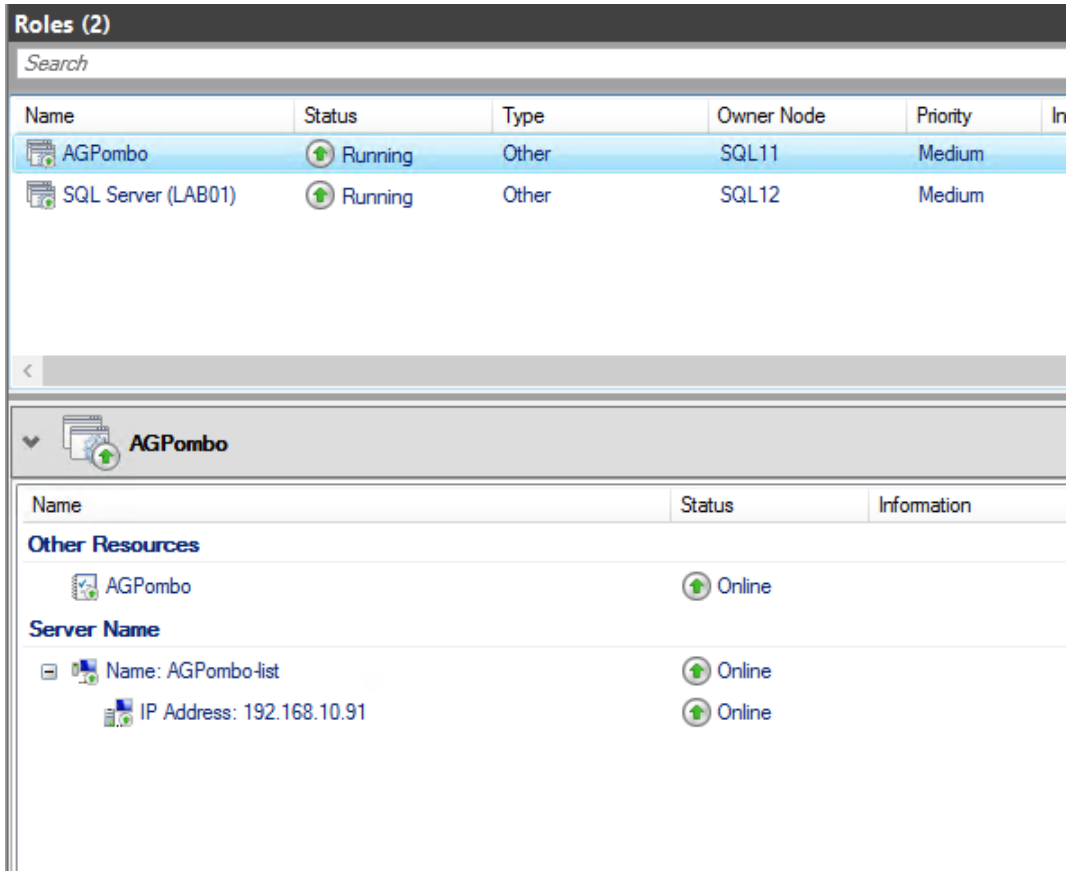
Deploying


New Availability Group Listener
Select a page
General
Script
Help
Listener DNS Name:
AGPombo-list
Port:
1433
Network Mode:
Static IP
Subnet
IP Address
192.168.10.0/24
192.168.10.91
Connection
Server:
SQL11
Connection:
DATALAB\administrator

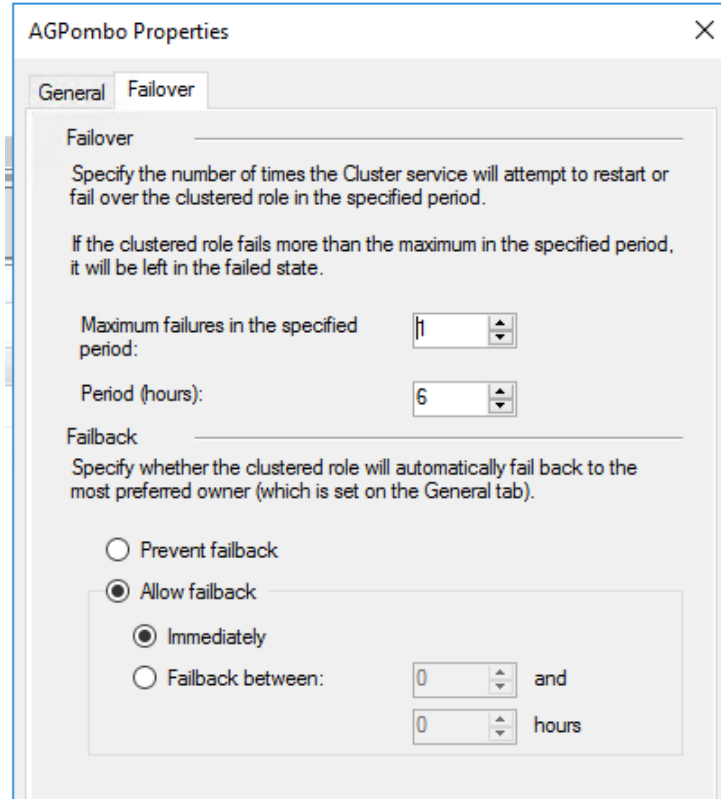
Deploying


SQLQuery1.sql - SQ...administrator (55))
SQLQuery2.sql - SQ...administrator (55))*
alter availability group AGPombo grant create any database
100 %
Messages
Commands completed successfully.
Completion time: 2020-02-18T11:36:43.8916668-03:00

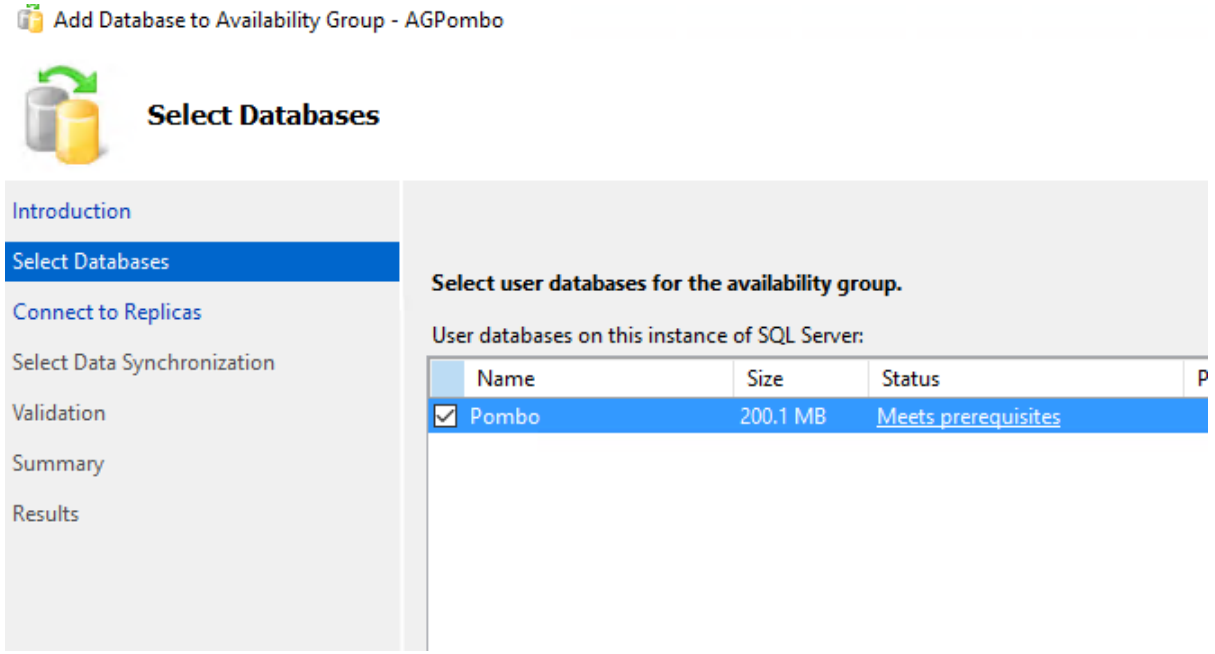
Deploying


Roles (2)
Search
Name
Status
Type
Owner Node
Priority
AGPombo
Running
Other
SQL11
Medium
SQL Server (LAB01)
Running
Other
SQL12
Medium
AGPombo
Name
Status
Information
Other Resources
AGPombo
Online
Server Name
Name: AGPombo-list
Online
IP Address: 192.168.10.91
Online

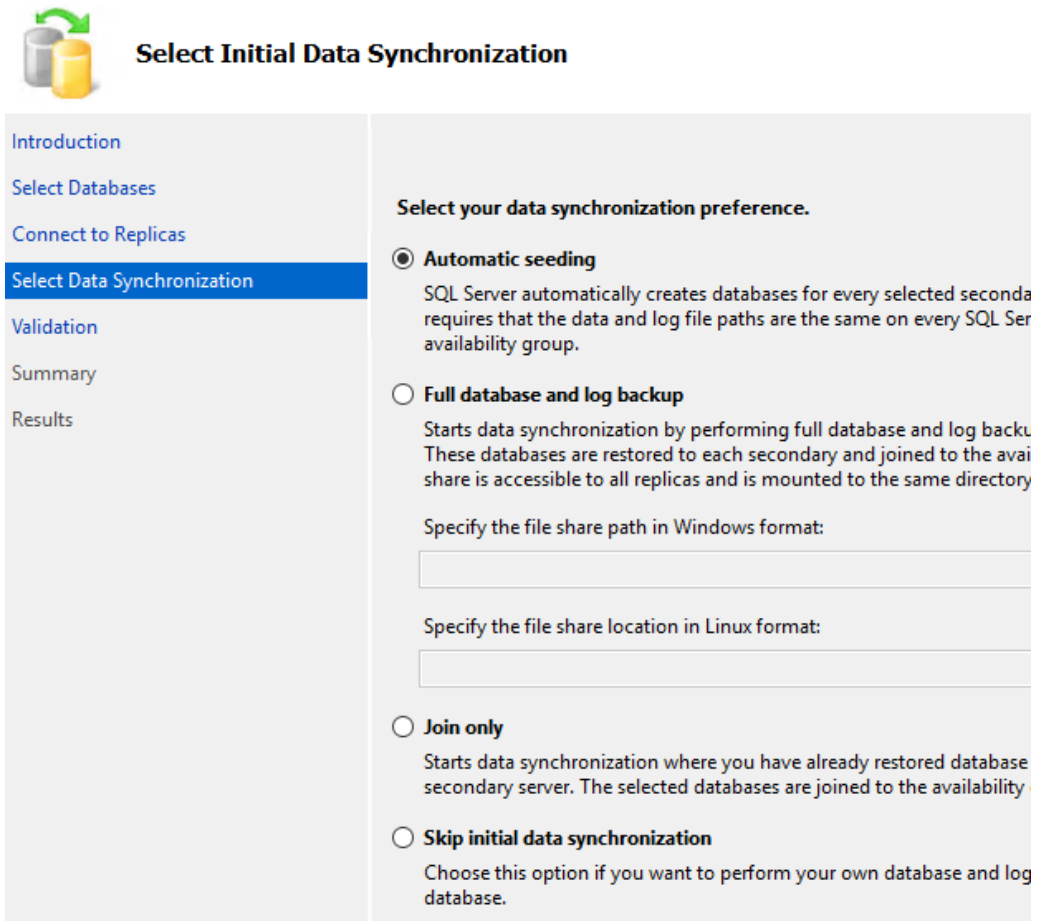
Deploying


AGPombo Properties
General
Failover
Failover
Specify the number of times the Cluster service will attempt to restart or fail over the clustered role in the specified period.
If the clustered role fails more than the maximum in the specified period, it will be left in the failed state.
Maximum failures in the specified period:
1
Period (hours):
6
Failback
Specify whether the clustered role will automatically fail back to the most preferred owner (which is set on the General tab).
Prevent failback
Allow failback
Immediately
Failback between:
0
and
0
hours

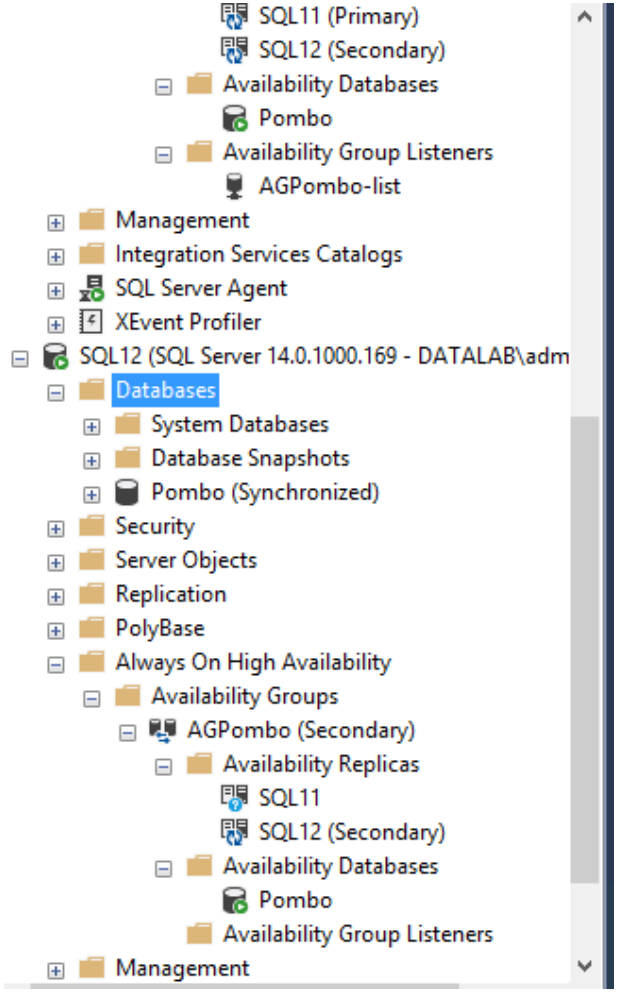
Deploying


Add Database to Availability Group - AGPombo
Select Databases
Introduction
Select Databases
Connect to Replicas
Select Data Synchronization
Validation
Summary
Results
Select user databases for the availability group.
User databases on this instance of SQL Server:
Name
Size
Status
Pombo
200.1 MB
Meets prerequisites

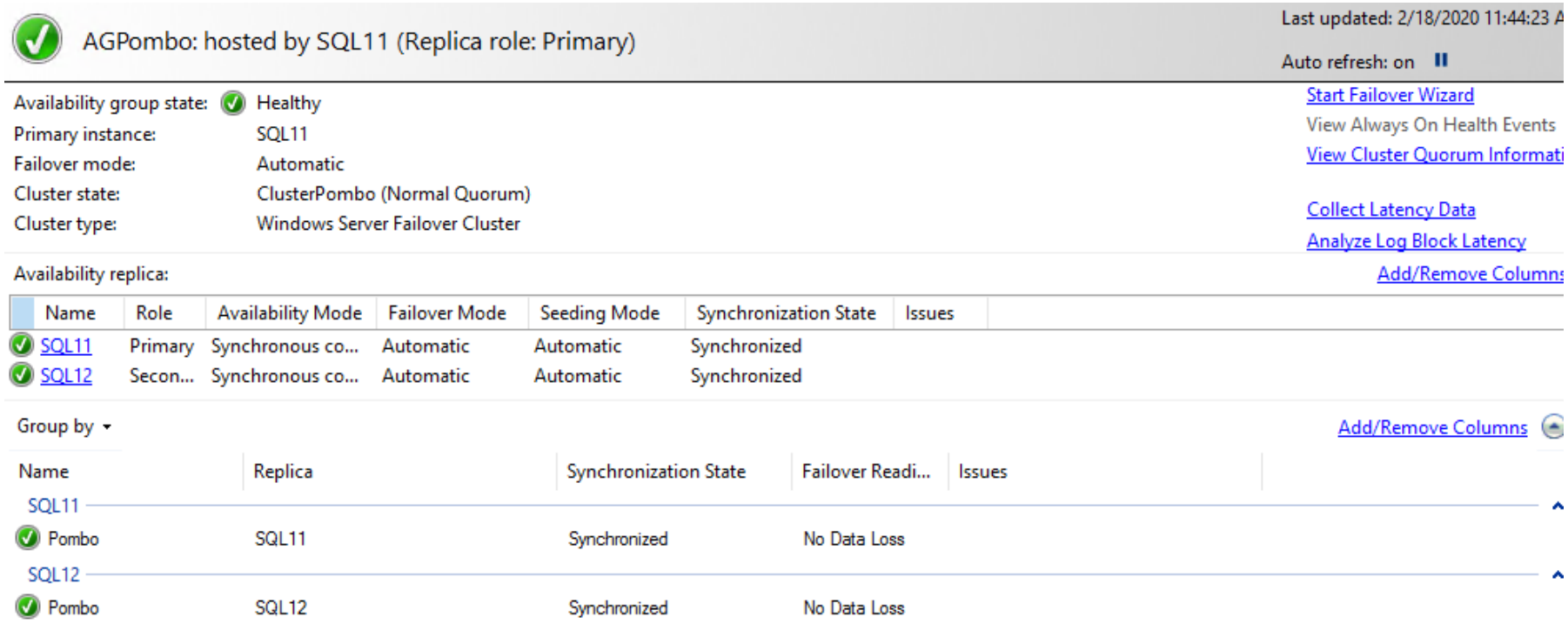
Deploying


Select Initial Data Synchronization
Introduction
Select Databases
Connect to Replicas
Select Data Synchronization
Validation
Summary
Results
Select your data synchronization preference.
Automatic seeding
SQL Server automatically creates databases for every selected seconda
requires that the data and log file paths are the same on every SQL Ser
availability group.
Full database and log backup
Starts data synchronization by performing full database and log backu
These databases are restored to each secondary and joined to the avai
share is accessible to all replicas and is mounted to the same directory
Specify the file share path in Windows format:
Specify the file share location in Linux format:
Join only
Starts data synchronization where you have already restored database
secondary server. The selected databases are joined to the availability
Skip initial data synchronization
Choose this option if you want to perform your own database and log
database.

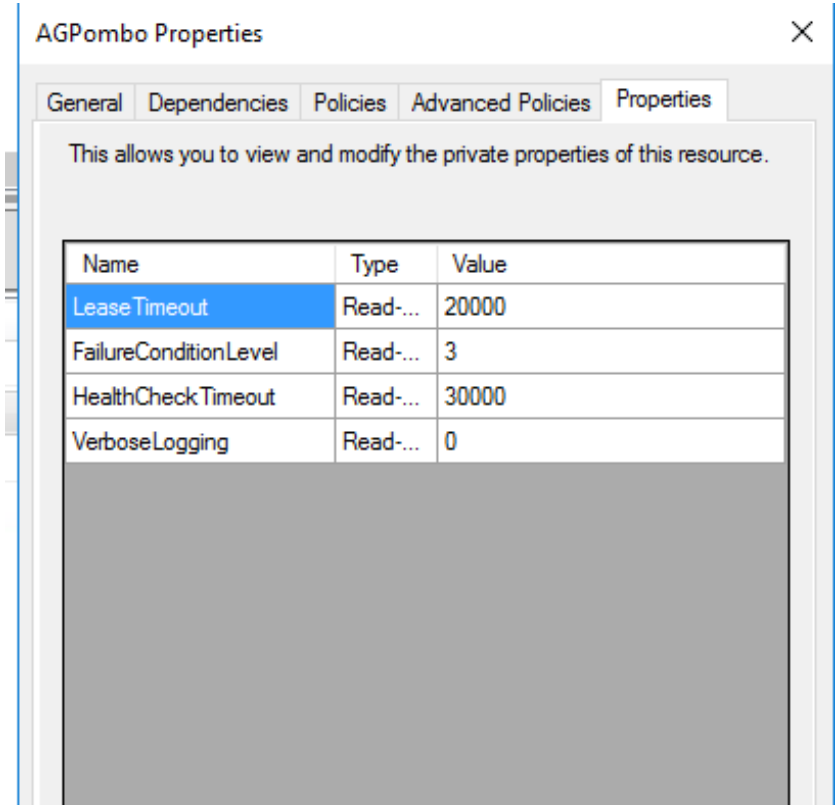
Deploying


SQL11 (Primary)
SQL12 (Secondary)
Availability Databases
Pombo
Availability Group Listeners
AGPombo-list
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
SQL12 (SQL Server 14.0.1000.169 - DATALAB\adm
Databases
System Databases
Database Snapshots
Pombo (Synchronized)
Security
Server Objects
Replication
PolyBase
Always On High Availability
Availability Groups
AGPombo (Secondary)
Availability Replicas
SQL11
SQL12 (Secondary)
Availability Databases
Pombo
Availability Group Listeners
Management

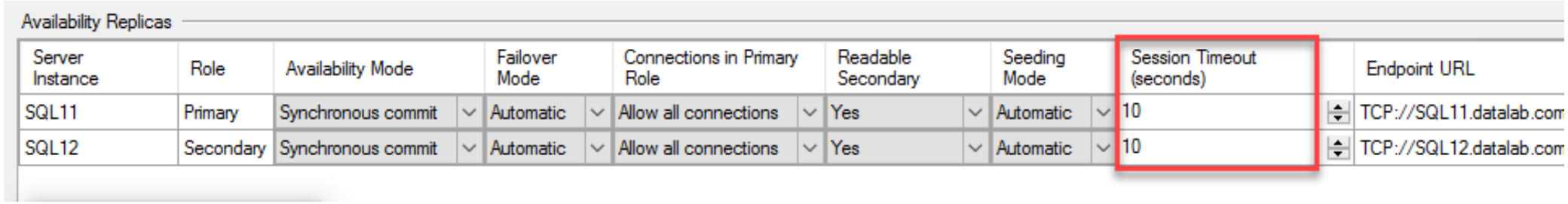
Monitoring and troubleshooting



Options and Parameters

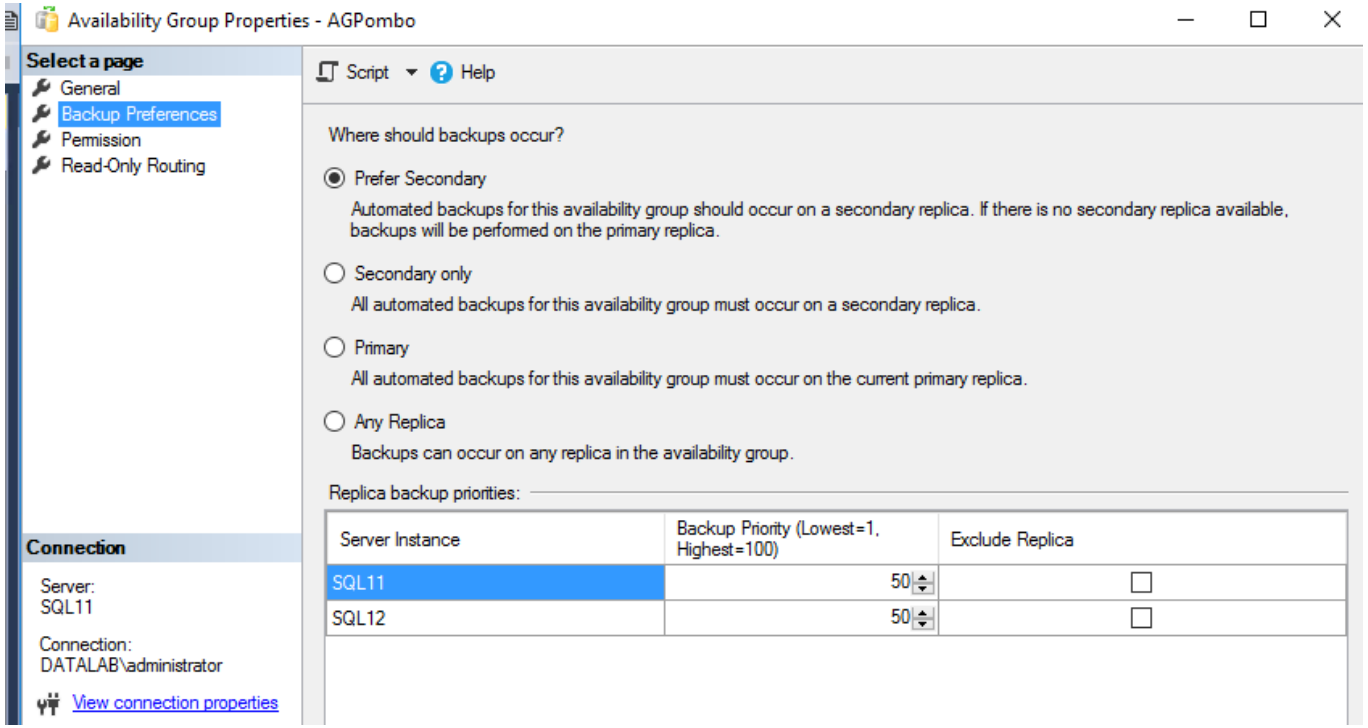


Options and Parameters



Backup considerations

- This is ignored for AD HOC Backups



Backup considerations

sys.fn_hadr_backup_is_preferred_replica

```
IF (NOT sys.fn_hadr_backup_is_preferred_replica(@DBNAME))

BEGIN Select 'This is not the preferred replica, exiting with success'; RETURN 0 -- This is a normal, expected condition, so the script returns success

END

BACKUP DATABASE @DBNAME TO DISK=<disk> WITH COPY_ONLY;
```

AO Availability Group on Standard Edition

Basic AG – Standard Edition only

- Only one database;
- Can’t open the secondary replica for READ ONLY;
- SQL SERVER 2016+;
- No backups on secondary replica;
- Can be Sync and Async.
- https://www.youtube.com/watch?v=vFUrIQfhT_o

Fim do módulo