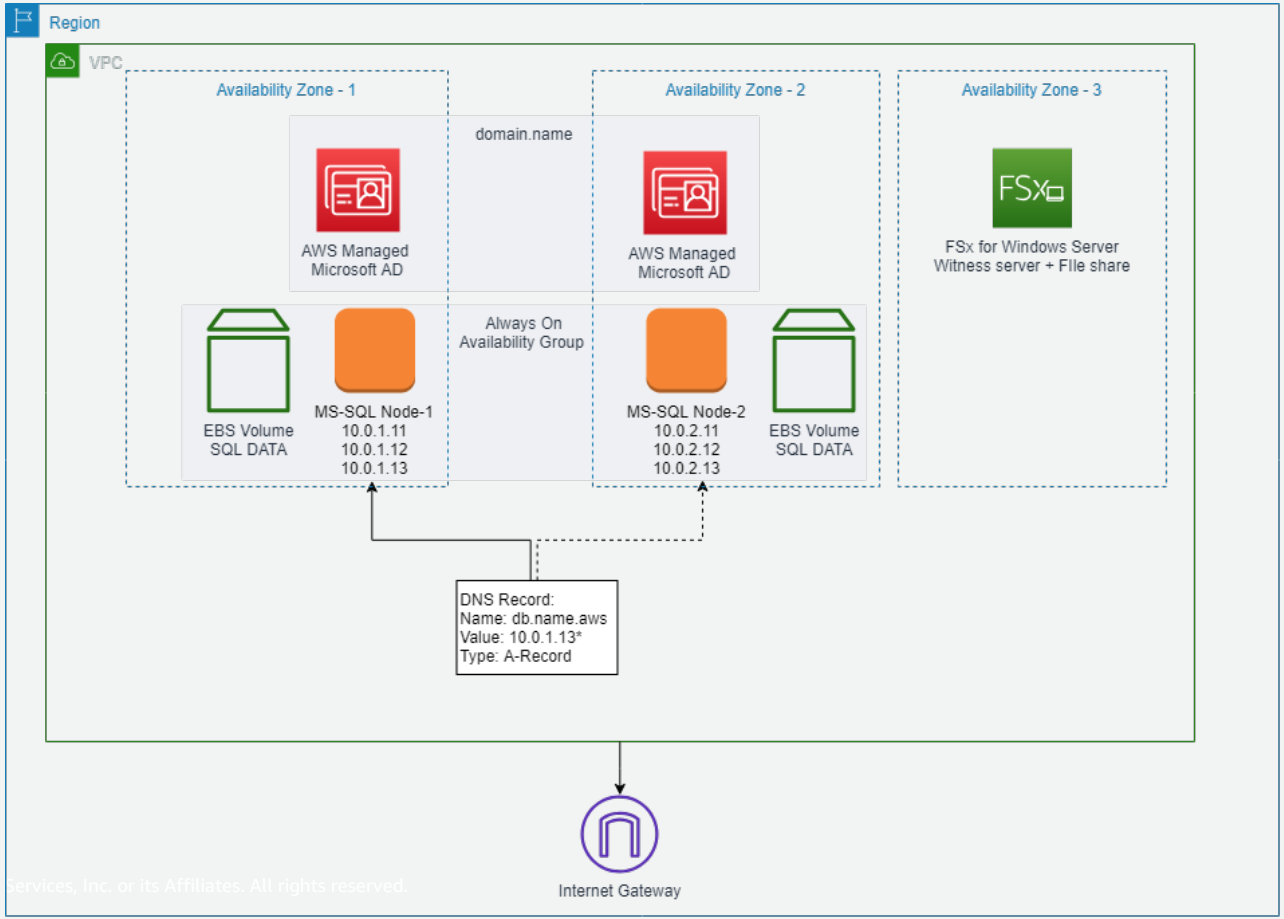
MS-SQL Availability Group Workshop

Workshop architecture

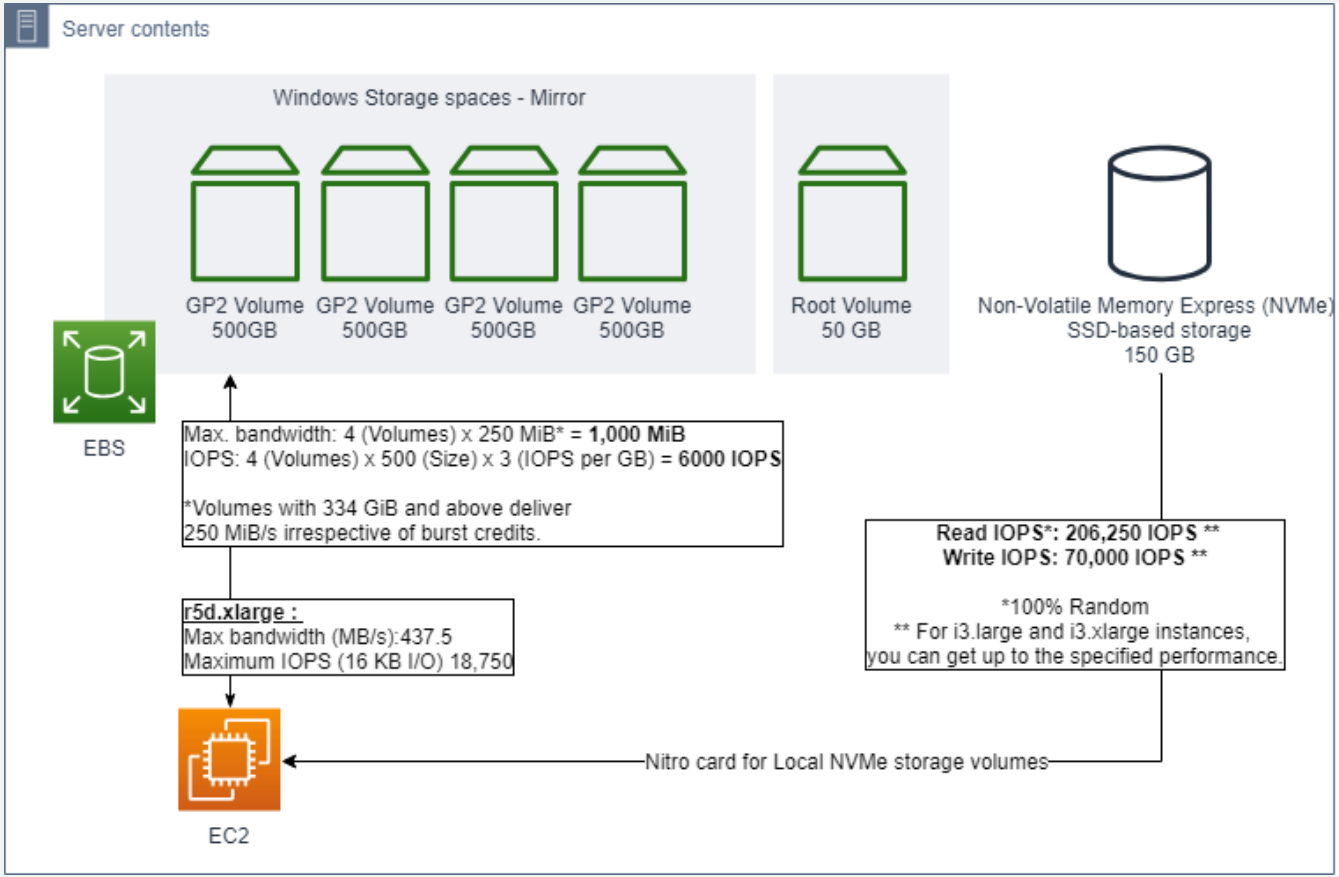


Main goals

- Build a well-architected self-managed MS-SQL on AWS
- Build a full solution of MSSQL Always On availability group (Linux/Windows)
- Get familiar with AWS Directory Service and Amazon FSx for Windows
- Understand how to automate and remotely manage windows server with SSM
- Explore other ways to use AWS System Manager to run scripts on servers
- Understand the value of Local NVMe drives and how to use it to get more performance
- Understand the value of striping gp2 and how to automate the process

aws

Workshop architecture : storage layer



Why?

Amazon EC2 Instance sizing for EBS

m4.large
2 vCPU
8-GiB RAM

Dedicated to Amazon EBS

450 Mbps ~ 56.25 MiB/s
3,600 16K IOPS

2 TiB GP2 volume:
6,000 IOPS
160 MiB/s max throughput

m4.2xlarge
8 vCPU
32-GiB RAM

Dedicated to EBS

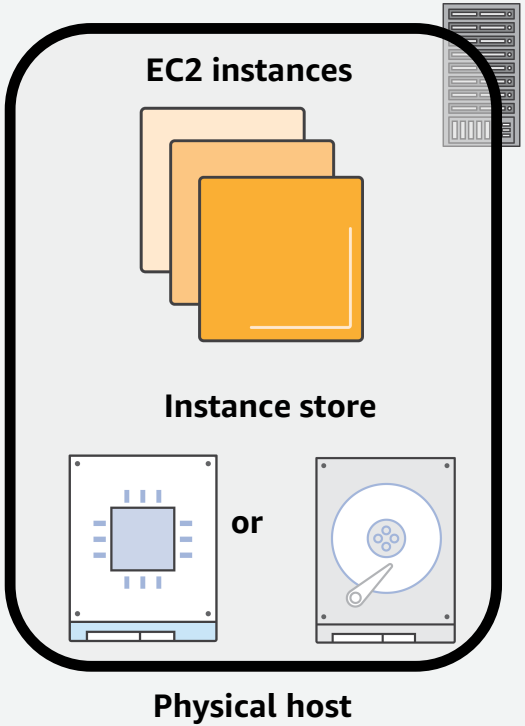
1 Gbps ~ 125 MiB/s

8,000 16K IOPS

2 TiB GP2 volume:
6,000 IOPS
160 MiB/s max throughput

aws

What is Amazon EC2 instance store?



- Local to instance
- Non-persistent data store
- SSD or HDD
- Data not replicated (by default)
- No snapshot support

* Not all instance types have local, instance storage

aws

Amazon EC2 Instance store use cases

Temporary storage (SQL Server TempDB)

R5d instance type

- Temporary storage (SQL Server TempDB)
- Very low latency (0.1 ms)
- Extremely high IOPS (over 3 million vs. 80K for EBS-optimized)
- Higher throughput (almost 10x EBS max)

D2 instance type

- Up to 48 TB of HDD-based local storage

aws

Amazon EBS Volume types

Volume Type	General Purpose: GP2	Provisioned IOPS: PIOPS/IO1	Throughput Optimized: ST1	Cold HDD: SC1
Technology:	SSD		Magnetic	
Sizes:	1 GiB – 16 TiB	4 GiB – 16 TiB	500 GiB – 16TiB	
Max. IOPS / Volume	16,000	64,000	500	250
Max. IOPS / Instance	80,000			
Max. Throughput: / Volume	250 MiB/sec	1,000 MiB/sec	500 MiB/sec	250 MiB/sec
Max Throughput / Instance	1,750 MiB/sec			

aws

Storage example for striping

	Volume size	Number of Volumes	Total Size	IOPS	MAX Throughput	Price	
Provisioned IOPS (IO1)	4,000	1	4,000	24000	1000 MB/s	$ 2,060	Throughput assumes 42 KiB I/O size or above
	1,000	4	4,000	8000 * 4 = 32,000	1000 * 4 = 4000 MB/s	$ 2,580	
	4,000	1	4,000	32,000	1000 MB/s	$ 2,580	Throughput assumes 32 KiB I/O size or above
General Purpose SSD (GP2) Ratio 3 IOPS/ GiB	1,000	4	4,000	3000 * 4 = 12,000	250 * 4 = 1000 MB/s	$ 400	
	2,000	4	8,000	6000 * 4 = 24,000	250 * 4 = 1000 MB/s	$ 800	
	2,500	4	10,000	7500 * 4 = 30,000	250 * 4 = 1000 MB/s	$ 1,000	* (double volume size and 1/3 of the price)

Workshop details

Part 1: Infrastructure – Cloudformation template

- Amazon VPC
- AWS Directory Service
- Amazon FSx for Windows

Part 2: Building the MSSQL Cluster

- Automations & Management (AWS Tools for PowerShell, SSM, Session Manager)
    - Storage Layer automations
    - Build MSSQL Basic cluster (SQL Standard) with Managed AD and FSx running on two nodes of r5d.xlarge

Part 3: Testing : Load test with Hammer DB

aws

Let’s start

Login with your 12 digit hash

https://dashboard.eventengine.run

Workshop URL

https://EC2mssqlWorkshop.com

aws