



Azure SQL Databases, tales from the trenches

Data Saturday Oslo





Høyskolen
Kristiania



dbWatch

Quest®



redgate



XpertBI



Cloudberries



Microsoft
Azure

INSPIRIT
THE DATA PLATFORM COMPANY



Database

Trenches

Setup





The old way

SQL Server

Choosing your own hardware
Standard or Enterprise Edition
Configuration

Azure SQL

The new way



Cloud service, Managed Instance or on a VM
What Tier to choose
What SKU to choose
Network connectivity challenges
No more SA!
Migration is... different

Where to look

Where to start
What to look out for



Opinions



Reitse Eskens

Dataplatform consultant Axians Business Analytics



SQL: DBA, Performance tuning

Azure: architect, developer, admin

SQL Classes

Public speaker

Photography, running, cycling

Certified beyond repair

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On premises

SQL Server

Choosing your own hardware
Standard or Enterprise Edition
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Azure SQL

Let's cloud!

Cloud service, Managed Instance or on a VM
What Tier to choose
What SKU to choose
Network connectivity challenges
No more SA!
Migration is... different



- ▶ Datawarehousing
- ▶ From on-premises to Azure
- ▶ New database

| QUESTIONS

- ▶ Lift and shift or migrate?
- ▶ What Tier should I choose?
- ▶ Within the Tier, what SKU?
- ▶ Can I change between Tiers?
- ▶ Do I need to think about other things?

A close-up photograph of a person's hands playing a piano. The hands are positioned on the keys, with the right hand higher up and the left hand lower. The person is wearing a yellow, textured sweater. The piano keys are white and black. In the top left corner of the piano, there is a small gold-colored letter 'G'.

Key Performance Indicators

- ▶ VM if you want to transfer your workload to the cloud without any changes
- ▶ MI if you want to transfer your workload to the cloud but want to take some advantages of cloud offerings
- ▶ PaaS if you want all the cloud goodies with the least management overhead

- ▶ Basic
- ▶ Standard
- ▶ Premium
- ▶ General Purpose (serverless or provisioned)
- ▶ Hyperscale
- ▶ Business Critical

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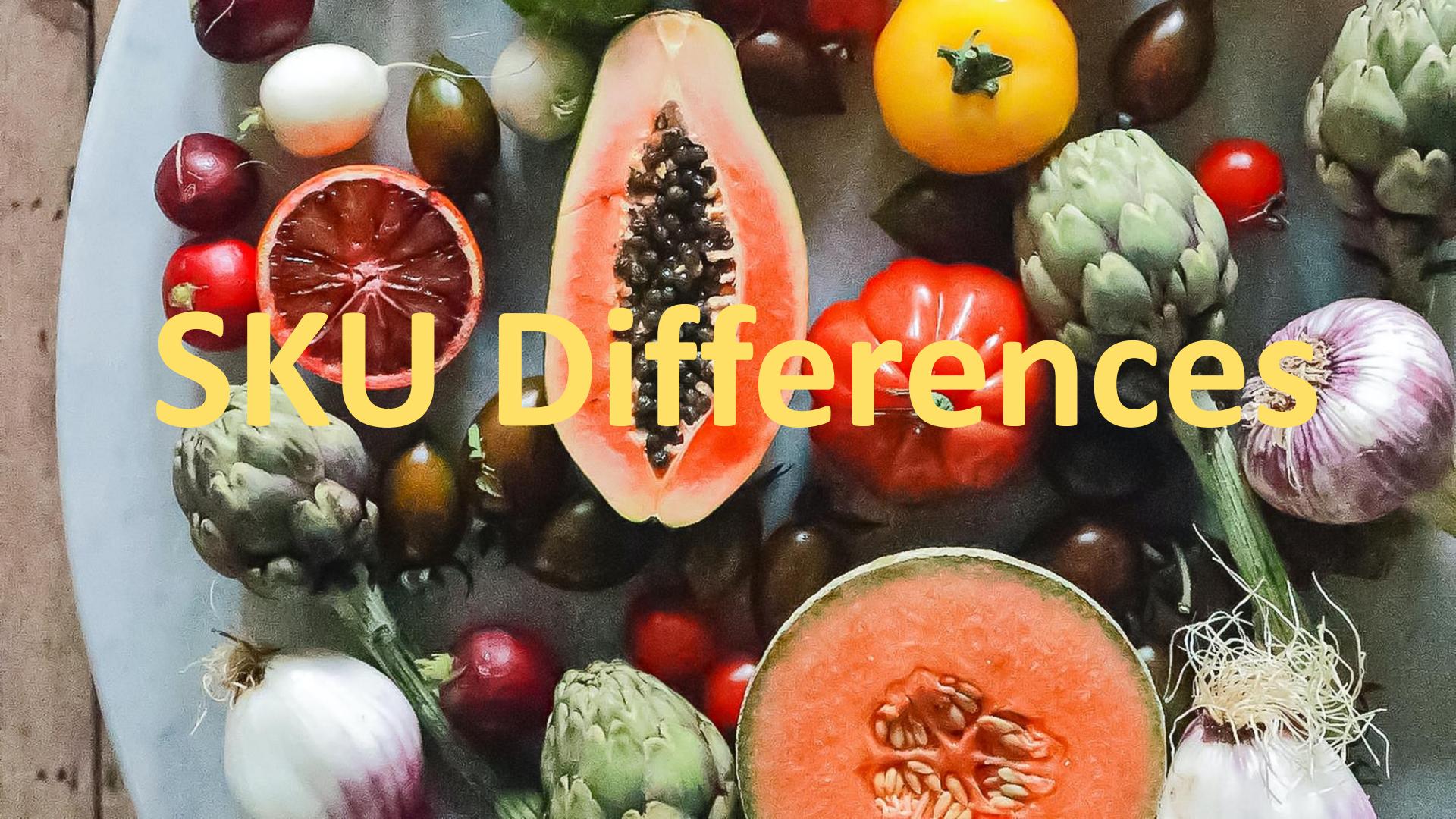
- ▶ Basic
- ▶ Standard
- ▶ Premium
- ▶ General Purpose (serverless (<183 h/month) or provisioned)
- ▶ Hyperscale
- ▶ Business Critical

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Full Recovery Model!!

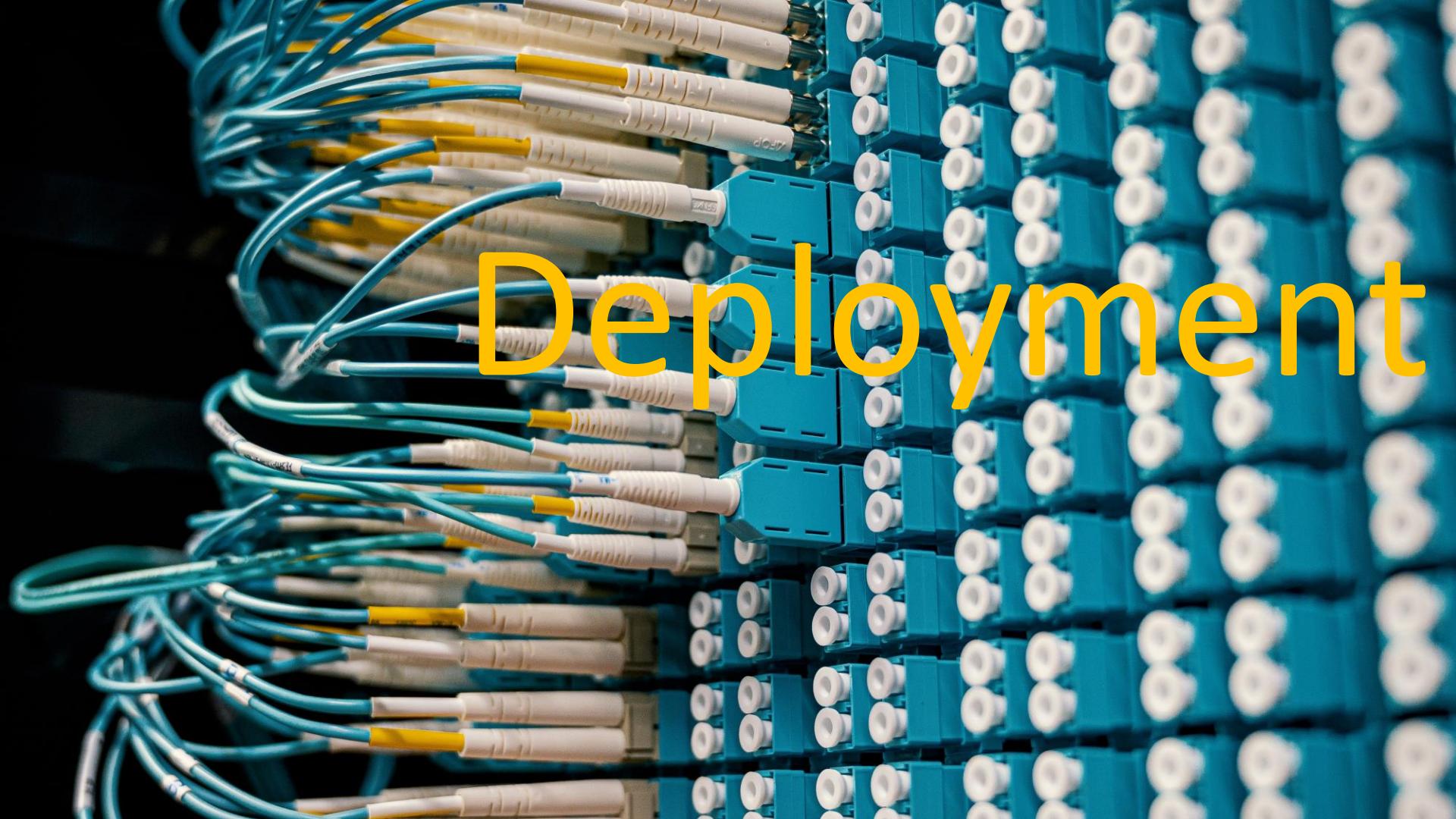
SKU Differences



- ▶ DTU's
- ▶ Cores
- ▶ Minimum number of cores
- ▶ Database sizing
- ▶ TempDB files
- ▶ Storage
- ▶ IOPS
- ▶ Log Rate
- ▶ Replication
- ▶ Backups

- ▶ Blend of CPU, Memory, reads and writes
- ▶ Calculator: <https://dtucalculator.azurewebsites.net/>
 - Total % Processor Time
 - Total disk reads per second
 - Total disk writes per second
 - Total log bytes flushed per second

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A close-up photograph of a network rack. The rack is filled with a dense arrangement of blue and yellow fiber optic cables. These cables are terminated at a series of blue modular connectors, which are mounted on a dark-colored panel. The connectors have white cylindrical ports. The word "Deployment" is overlaid on the image in a large, bold, yellow sans-serif font.

Deployment

- ▶ Connectivity
- ▶ Public or Private Endpoint
- ▶ Network and Firewall
- ▶ Duration

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- ▶ Duration



Feedback

Public access Private access **Connectivity**

Outbound networking

Restrict network access to a specific set of resources by supplying their fully-qualified domain names. [Learn more](#)

Restrict outbound networking

Restrictions disabled.

[Configure outbound networking restrictions](#)

Connection Policy

Configure how clients communicate with your SQL database server. [Learn more](#)

Connection policy

- Default - Uses Redirect policy for all client connections originating inside of Azure and Proxy for all client connections originating outside Azure
- Proxy - All connections are proxied via the Azure SQL Database gateways
- Redirect - Clients establish connections directly to the node hosting the database

Encryption in transit

This server supports encrypted connections using Transport Layer Connections (TLS). Any login attempts from clients using a TLS version less than the Minimum TLS Version shall be rejected. For [more](#)

Minimum TLS version

TLS 1.0

- ▶ Connectivity
- ▶ Public or Private Endpoint
- ▶ Network and Firewall
- ▶ Duration

Security



- ▶ Azure AD Administratorsgroup
- ▶ Azure AD Usergroup(s)
- ▶ SQL Accounts

Where to look

Where to start
What to look out for



- ▶ On-premises twice as fast
- ▶ Analyse disk performance, wait stats and use Query Store
- ▶ Change tier and SKU
- ▶ Change ETL process
- ▶ Azure 10% quicker than on-premises
- ▶ Writes slow you down!

- ▶ Read the documentation
- ▶ Create a script
- ▶ Run it for baseline
- ▶ Run it against the Azure offerings
- ▶ Read the documentation



- ▶ Hardware check
- ▶ Insert
- ▶ Select
- ▶ Delete
- ▶ Update
- ▶ SqlStress to (over)load the database
- ▶ Databases as-is, no configuration or tuning

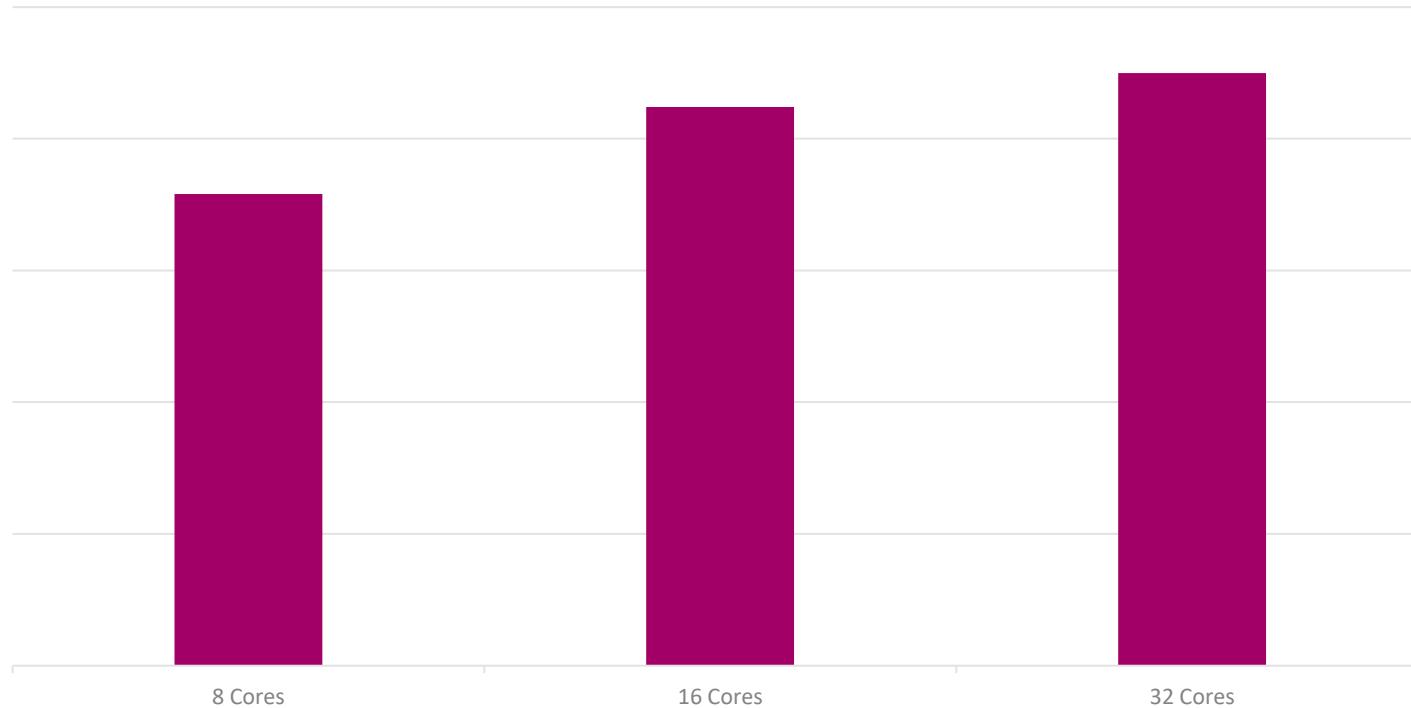
| RESULTS!

- ▶ 8, 16 and 32 core environments
- ▶ Per query graphs

INSERT PERFORMANCE

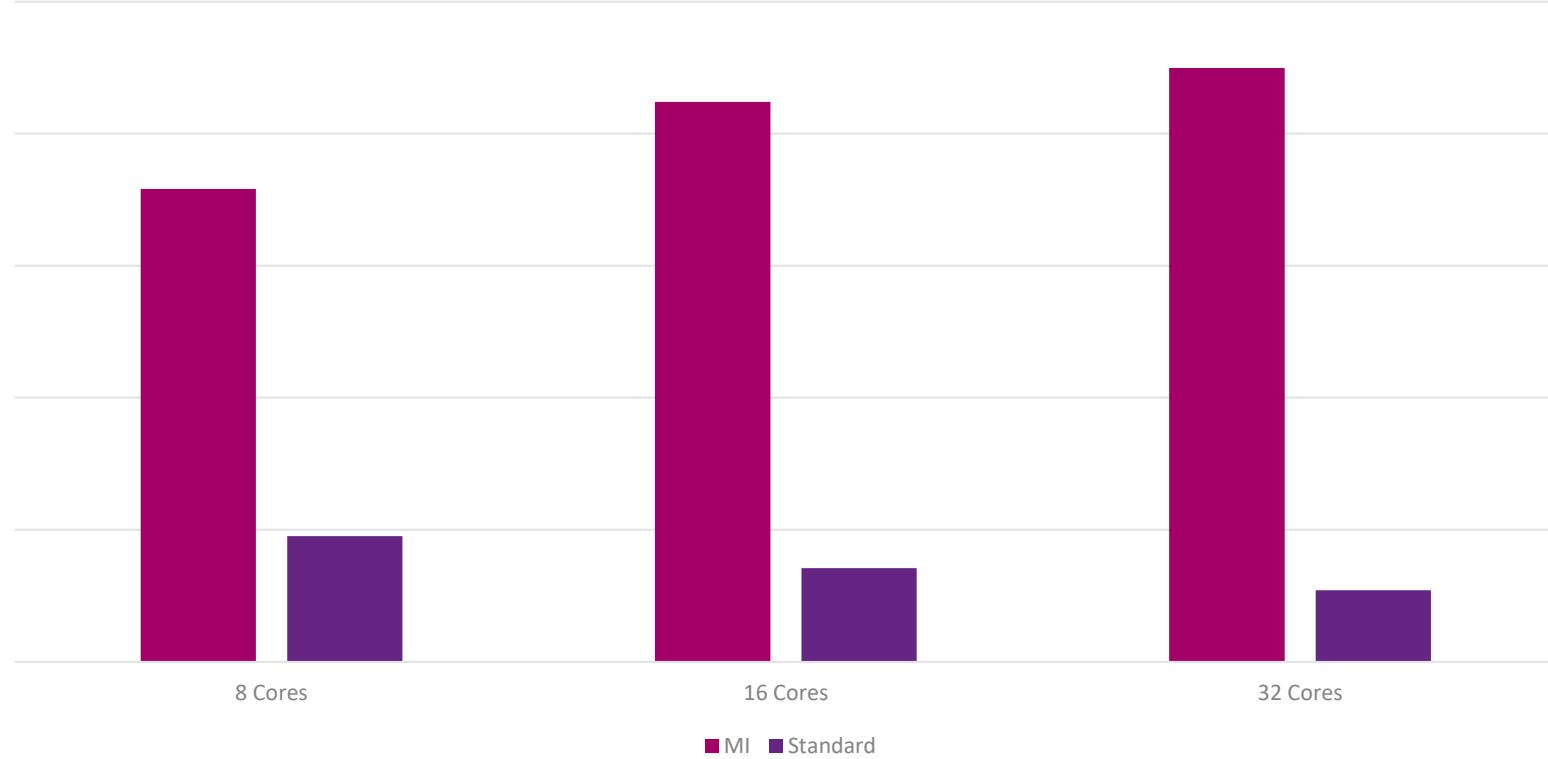
MI Insert duration 1.000.000 rows

Time

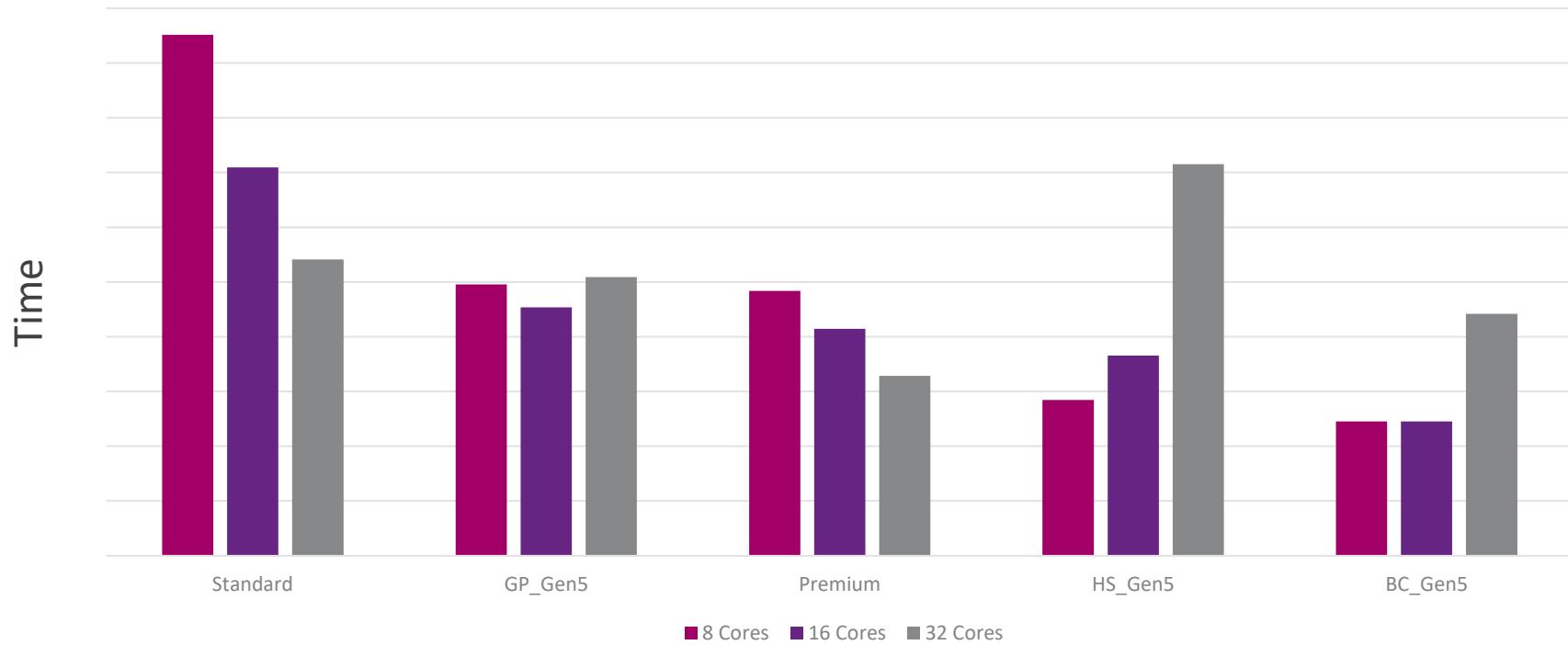


MI and Standard Insert duration 1.000.000 rows

Time

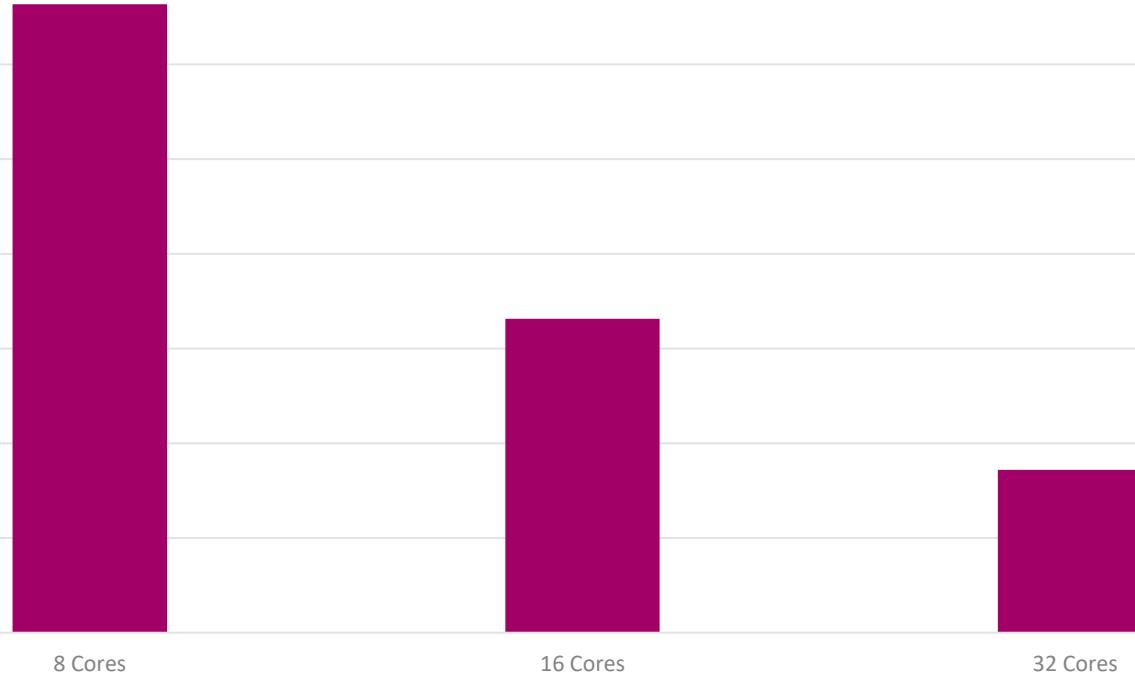


Duration insert 1.000.000 rows



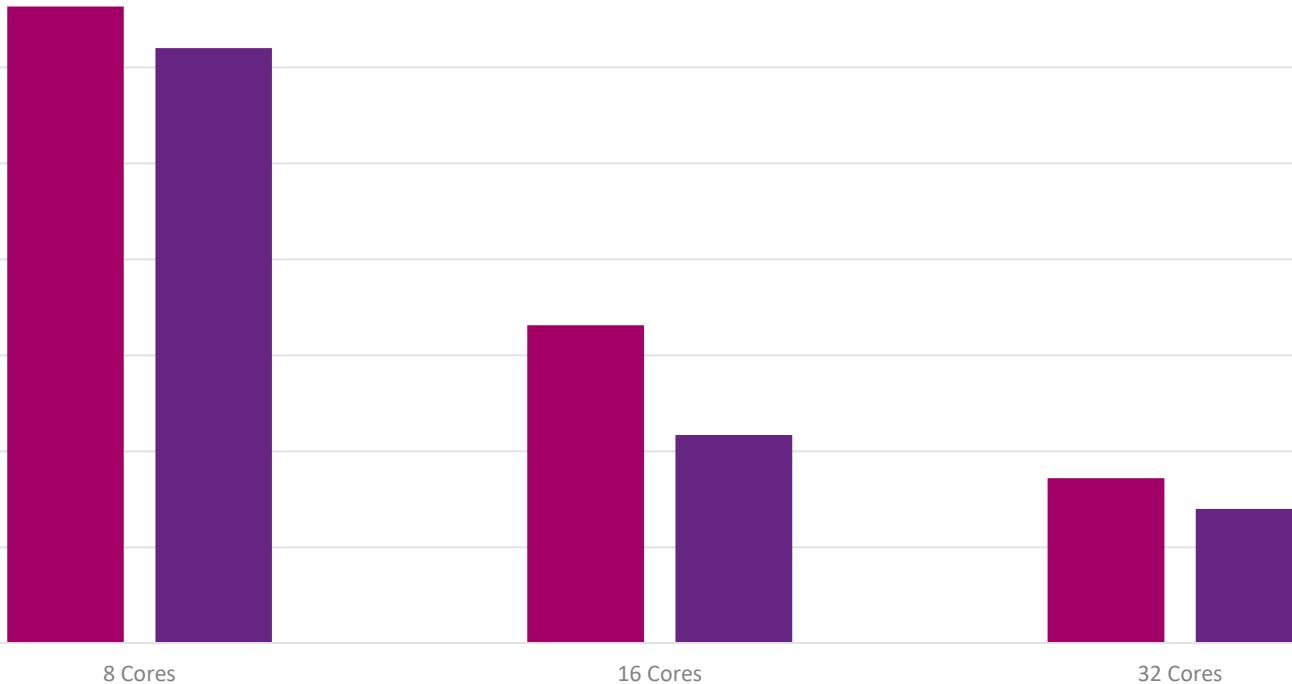
MI Duration Select 30.000 rows

Time



MI and Standard Duration Select 30.000 rows

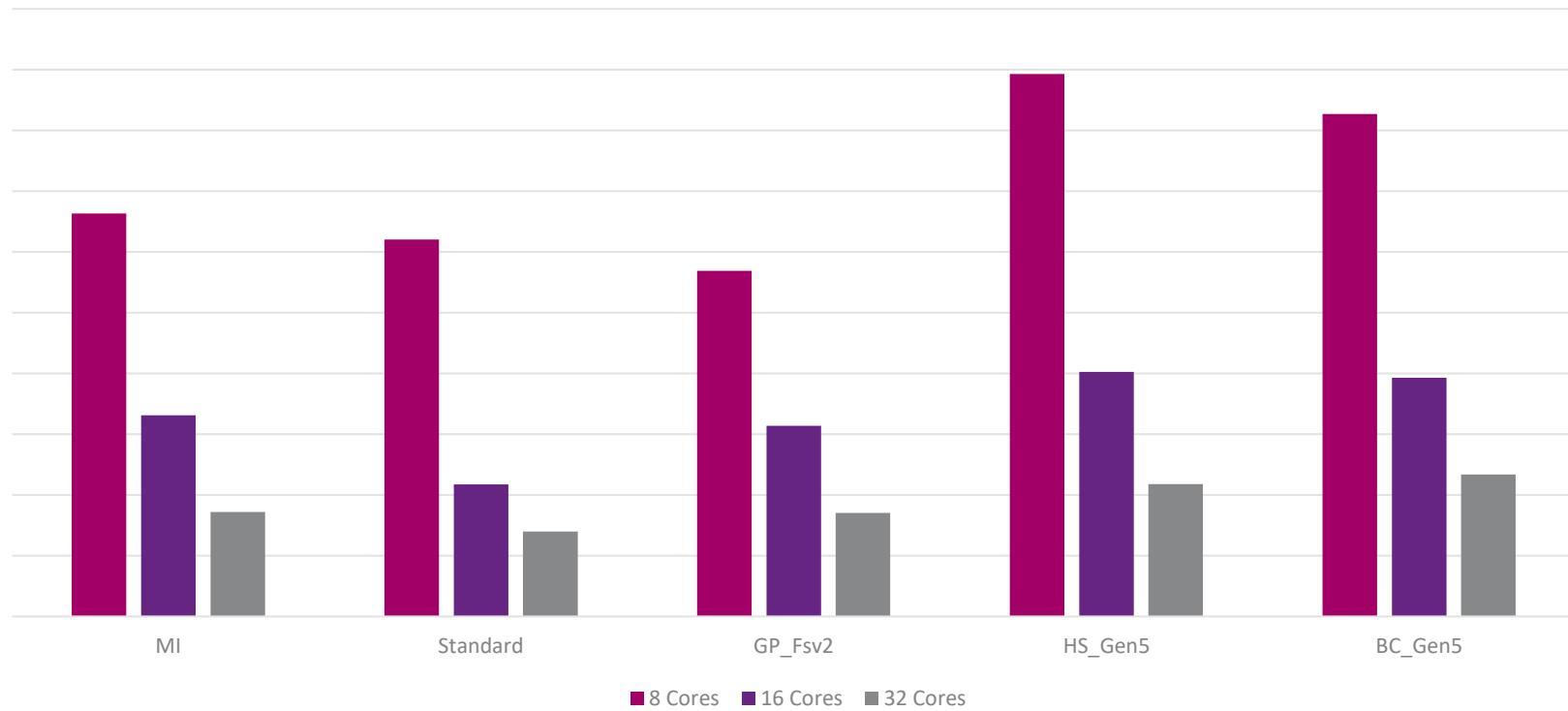
Time



■ MI ■ Standard

Duration Select 30,000 rows

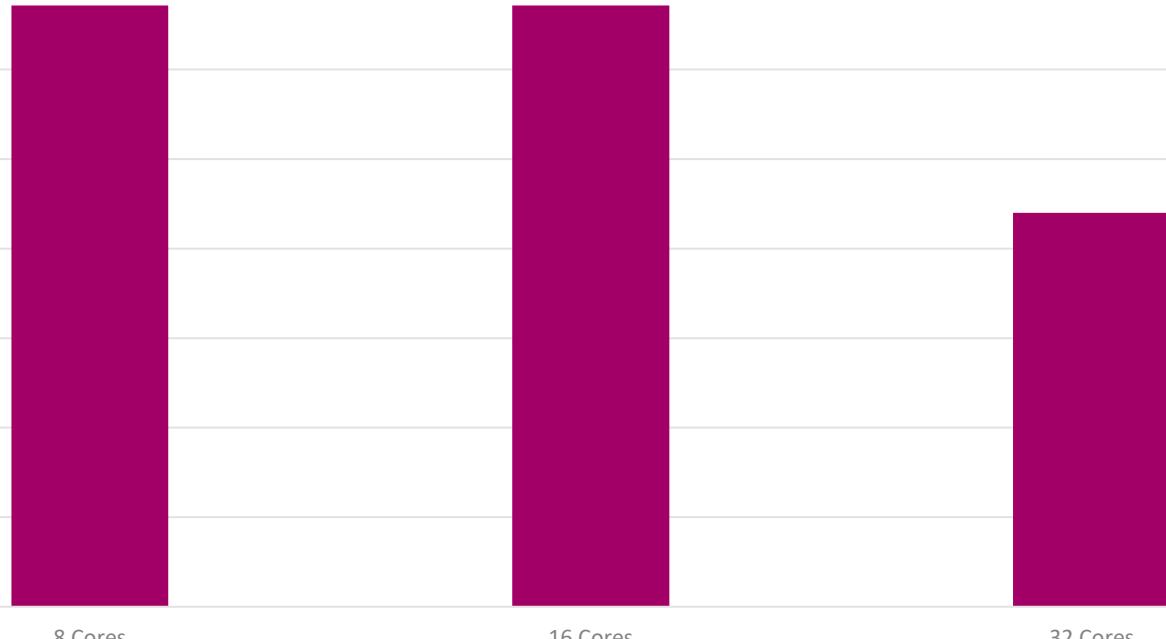
Time



UPDATE AND DELETE PERFORMANCE

MI Duration 300.000 rows

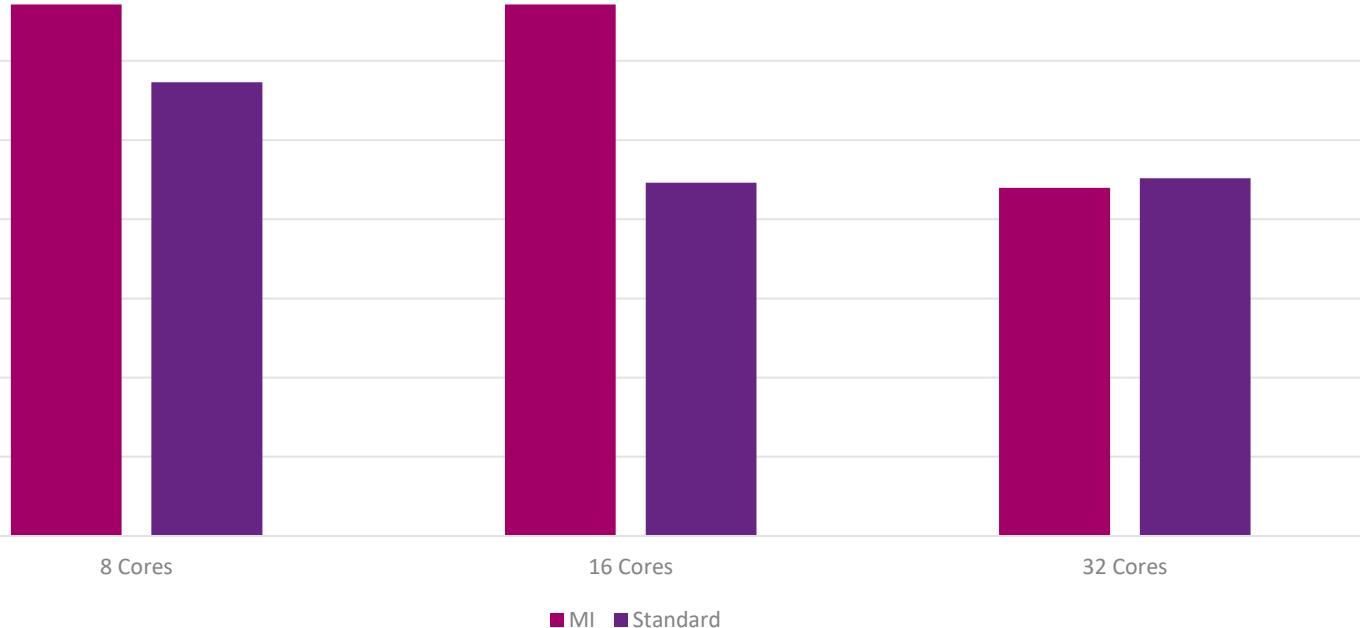
Time



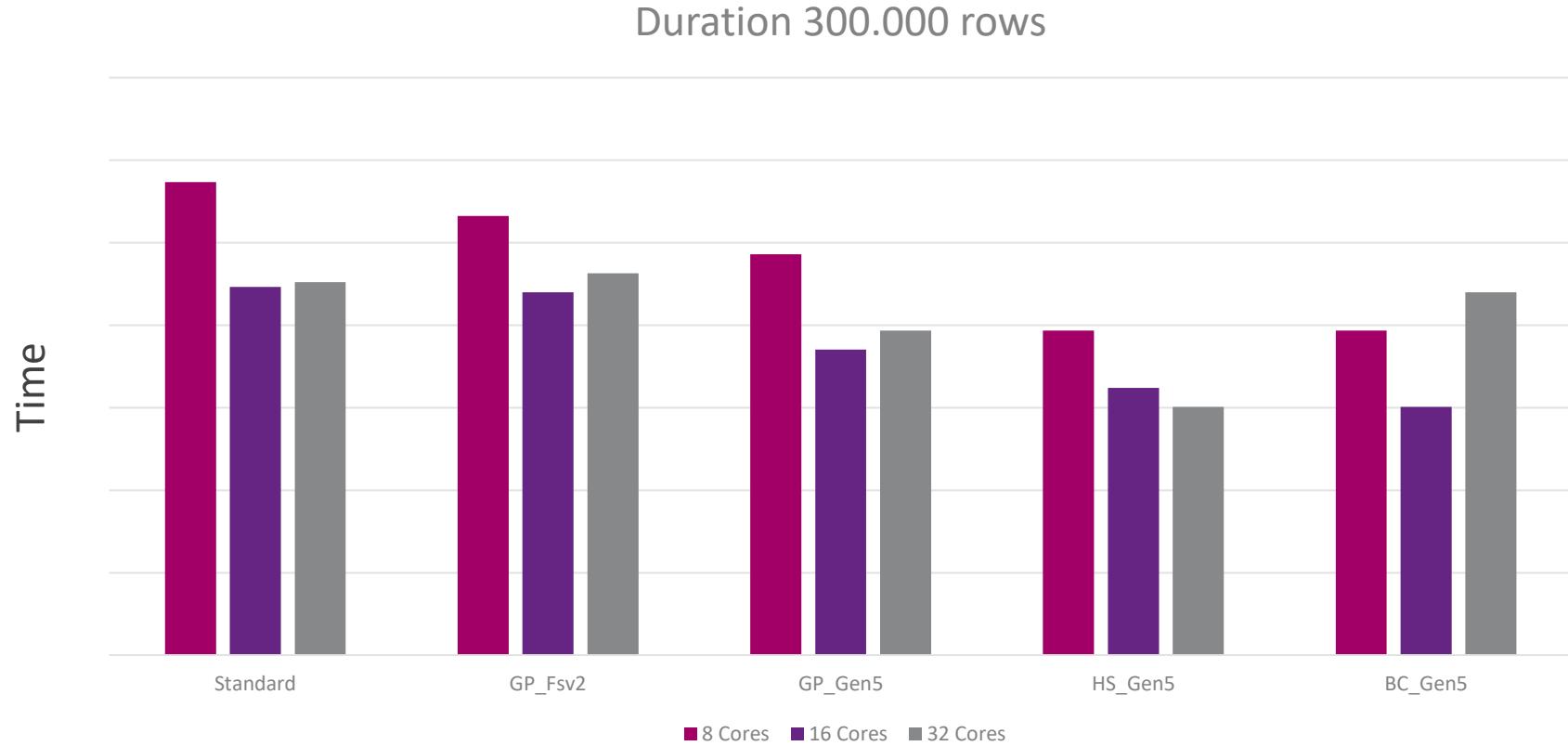
UPDATE AND DELETE PERFORMANCE

MI and Standard Duration 300.000 rows

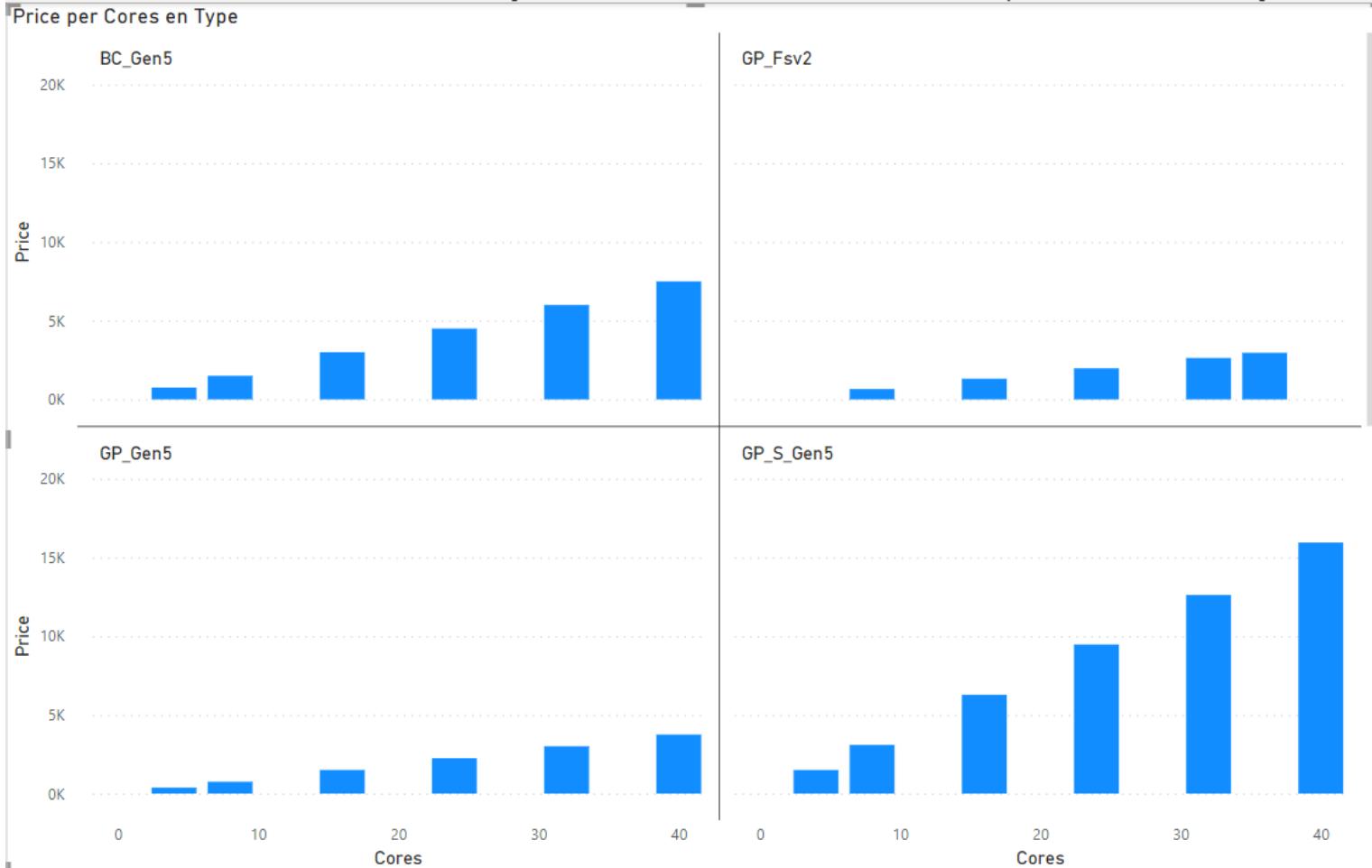
Time



UPDATE AND DELETE PERFORMANCE



PRICING



PRICING

Price per Cores en Type

HS_Gen5

20K

15K

10K

5K

0K

MI

Premium

20K

15K

10K

5K

0K

Standard

0

10

20

30

40

Cores

0

10

20

30

40

Cores



| WAIT STATS

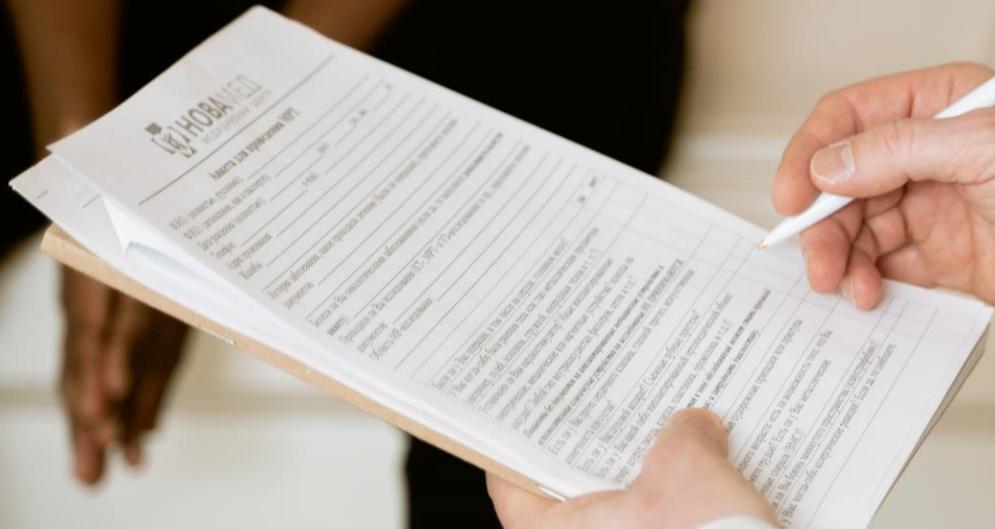
- ▶ Write log
- ▶ Resource Governor
- ▶ IO Queue limit
- ▶ Sos Scheduler Yield
- ▶ Backup IO
- ▶ Page Latch
- ▶ Latch
- ▶ CXPacket
- ▶ Hadr fabric callback

| LIMITATIONS

- ▶ <https://docs.microsoft.com/en-us/azure/azure-sql/database/resource-limits-vcore-single-databases?view=azuresql>

- ▶ <https://docs.microsoft.com/en-us/azure/azure-sql/database/resource-limits-dtu-single-databases?view=azuresql>

Concluding



MAIN POINTS

- ▶ If you have intermittent workloads, start with standard or serverless
- ▶ If you have a continuous workload, or at least more than 25% of the time, go provisioned
- ▶ If you need speed, go hyperscale or business critical
- ▶ If you need large databases (over 40 TB), go hyperscale
- ▶ If you have legacy stuff, go either managed instance or use a VM.

A side-on collision between a red car and a yellow car. The red car's front end is crushed, and glass shards are flying through the air. The yellow car's front right corner is impacted. In the background, a banner reads "AXA crashtests".

TEST



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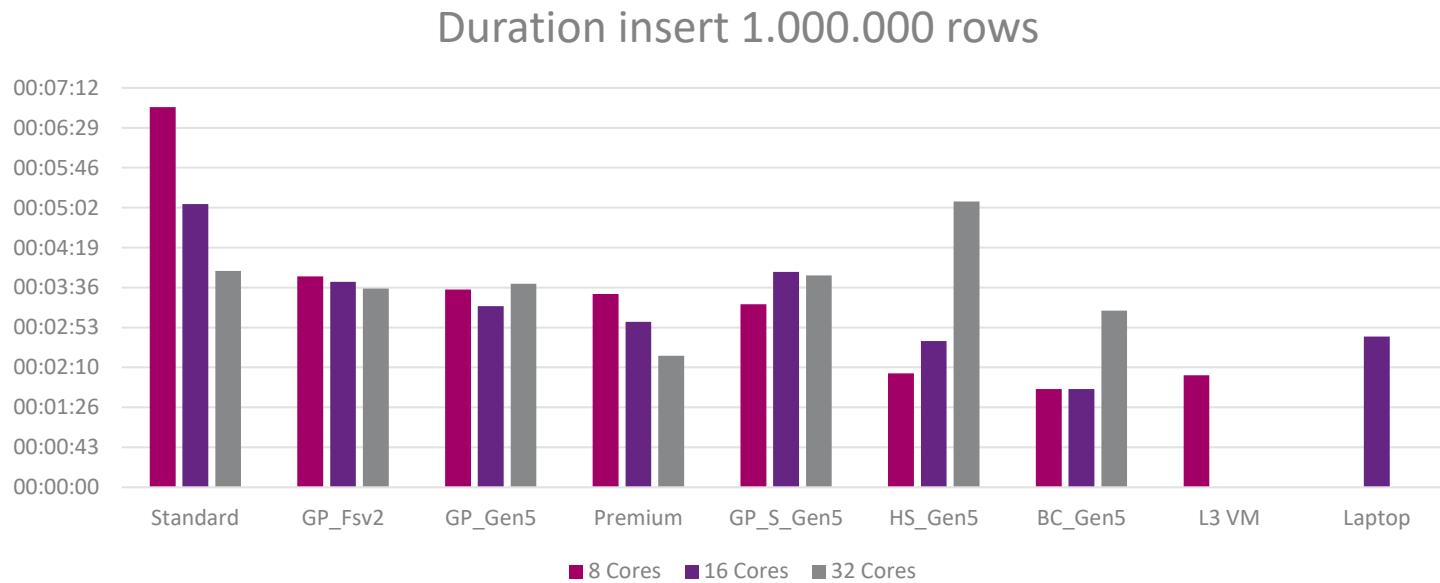
Reitse.eskens@axians.com

<https://www.linkedin.com/in/reitseeskens/>

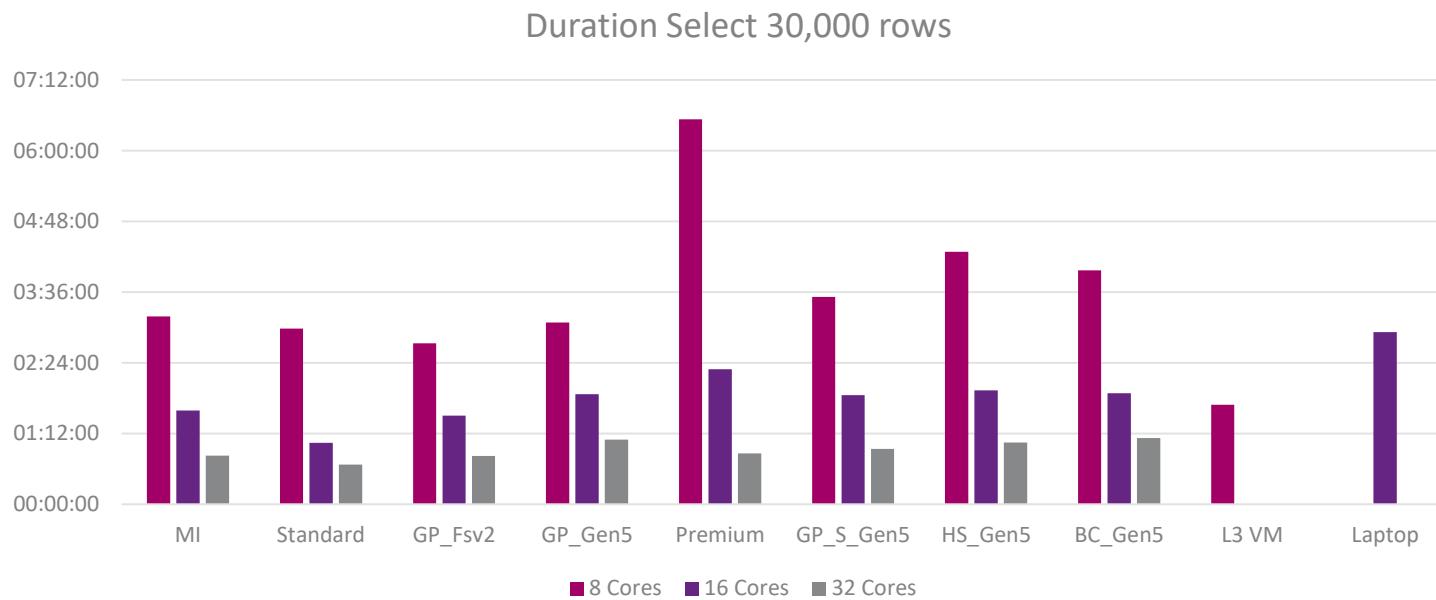
<https://github.com/reitse/Speaking>

@2meterDBA

Thank you!

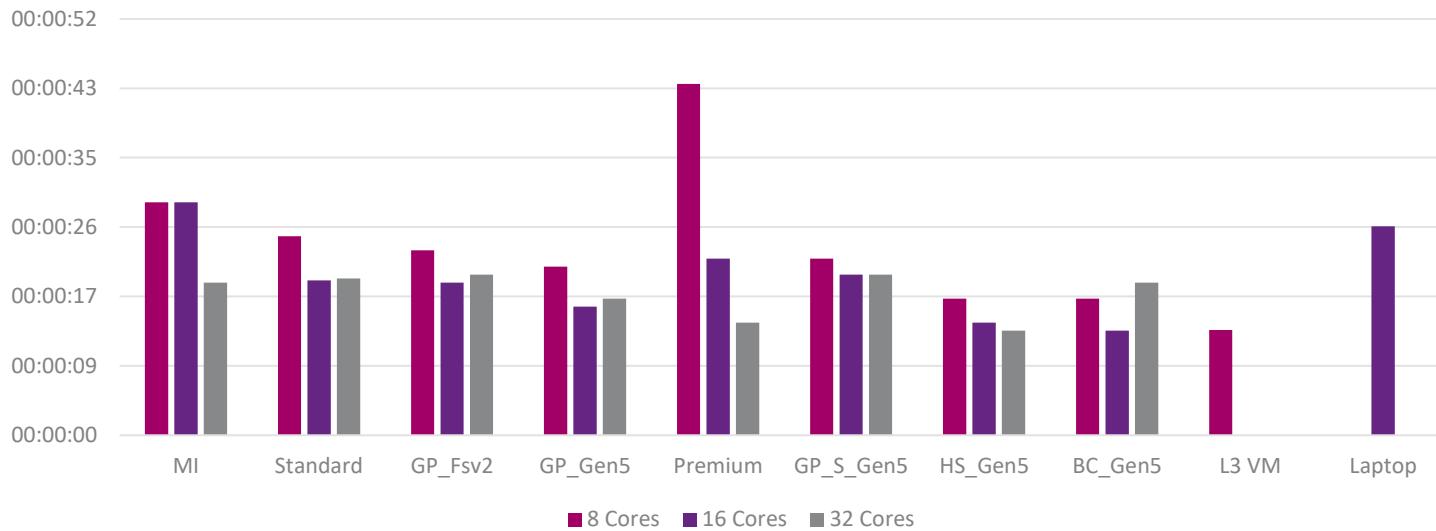


SELECT PERFORMANCE



UPDATE PERFORMANCE

Duration Update 300,000 rows



DELETE PERFORMANCE

