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Azure SQL Databases, tales from the trenches

dataMinds Connect 2022

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element 61
experience & expertise

Microsoft

inetum realdolmen
Positive digital flow

bmatix
Act informed

LACO KNOWLEDGE, AND MORE.

ilytix

DataSense
Because your data makes sense!

MICROPOLE

KPMG

delaware
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AKABI

ADVANCING ANALYTICS

u2u

Adapt and Enable

cegeka
IN CLOSE COOPERATION

Business & Decision

MONIN
Database Managed Services

ORDINA
Ahead of change

nine altitudes
REACH NEW HEIGHTS

Tabular Editor


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 connectity challenges
No more SA!
Migration is… different

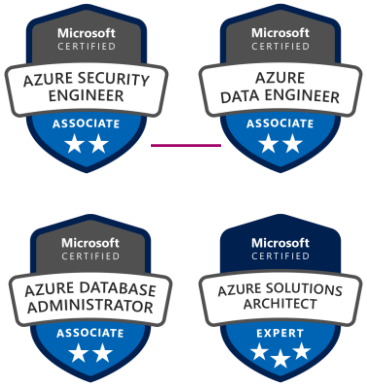
Where to look

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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http://sqlreitse.home.blog

On premises

SQL Server

Choosing your own hardware
Standard or Enterprise Edition
Configuration

Azure SQL

Let’s cloud!

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

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

- 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?

- 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!

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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- Premium
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- Hyperscale
- Business Critical

- Basic
- Standard
- Premium
- General Purpose (serverless (< 183 hours per month) or provisioned)
- Hyperscale
- Business Critical

- Basic
- Standard
- Premium
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- Hyperscale
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Full Recovery Model!


SKU Differences

- DTU's (Database Transaction Units)
- Cores
- Minumum number of cores
- Database sizing
- TempDB files
- Storage
- Iops (Input Output oPerations)
- 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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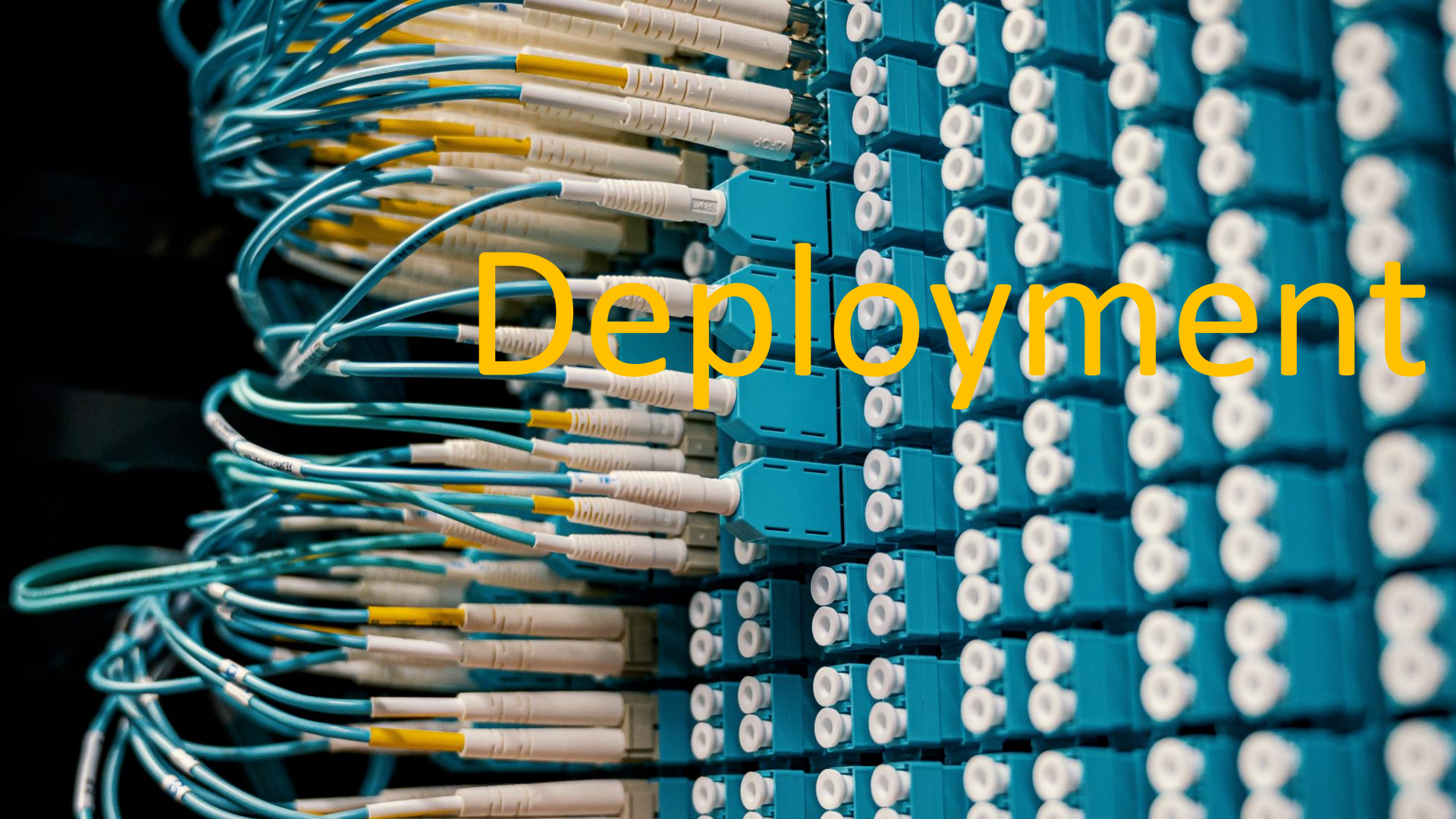
So, we choose a Tier, choose the SKU and success?

- Yeah, well… no

- Start small
- Keep your KPI in check
- Keep your budget in check
- Don’t be afraid to experiment
- Re-evaluate when load or volume changes


Deployment

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

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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 in
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
- Outbound Firewall settings (data exfiltration)

Where to look

Where to start
What to look out for

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

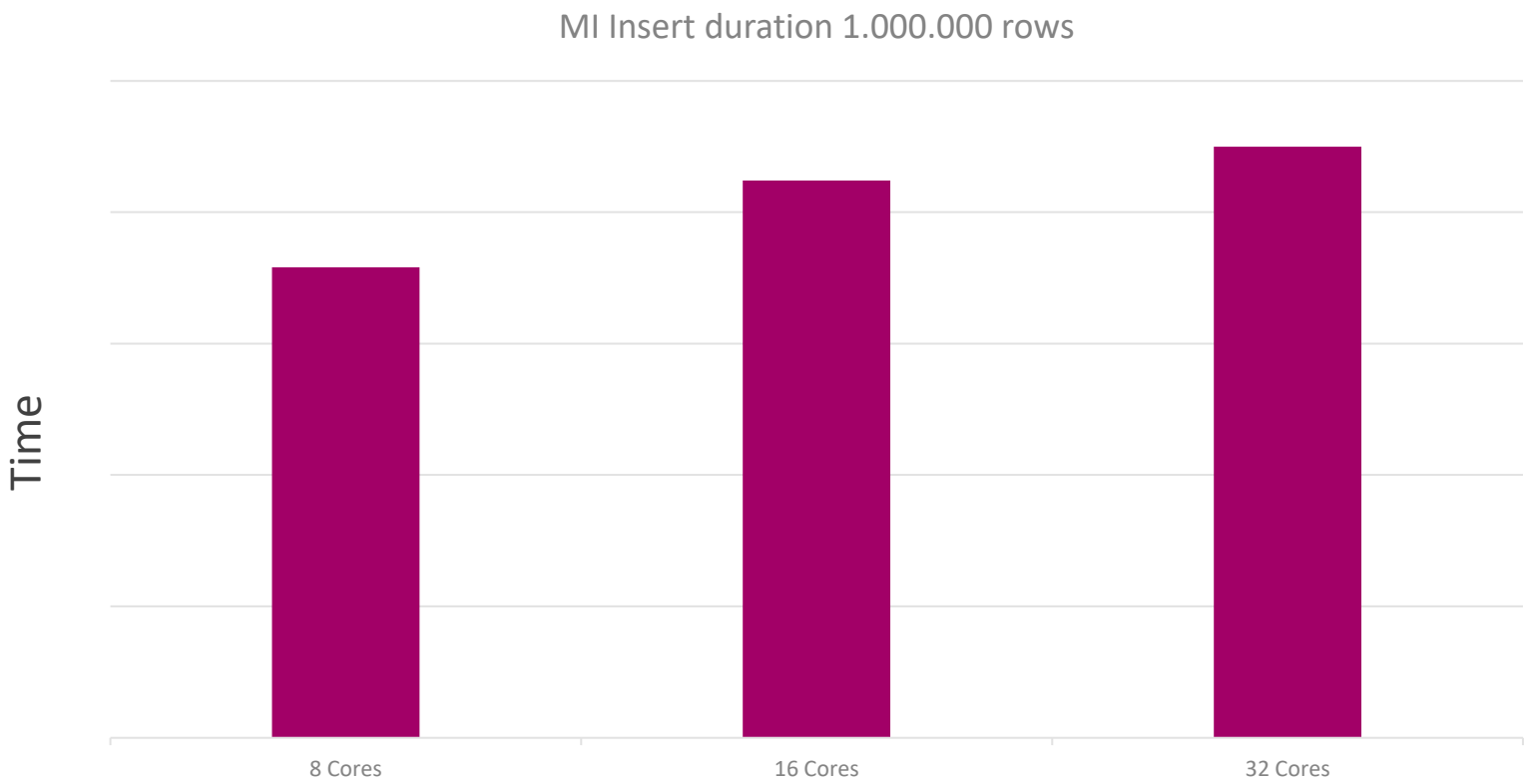
- Hardware check

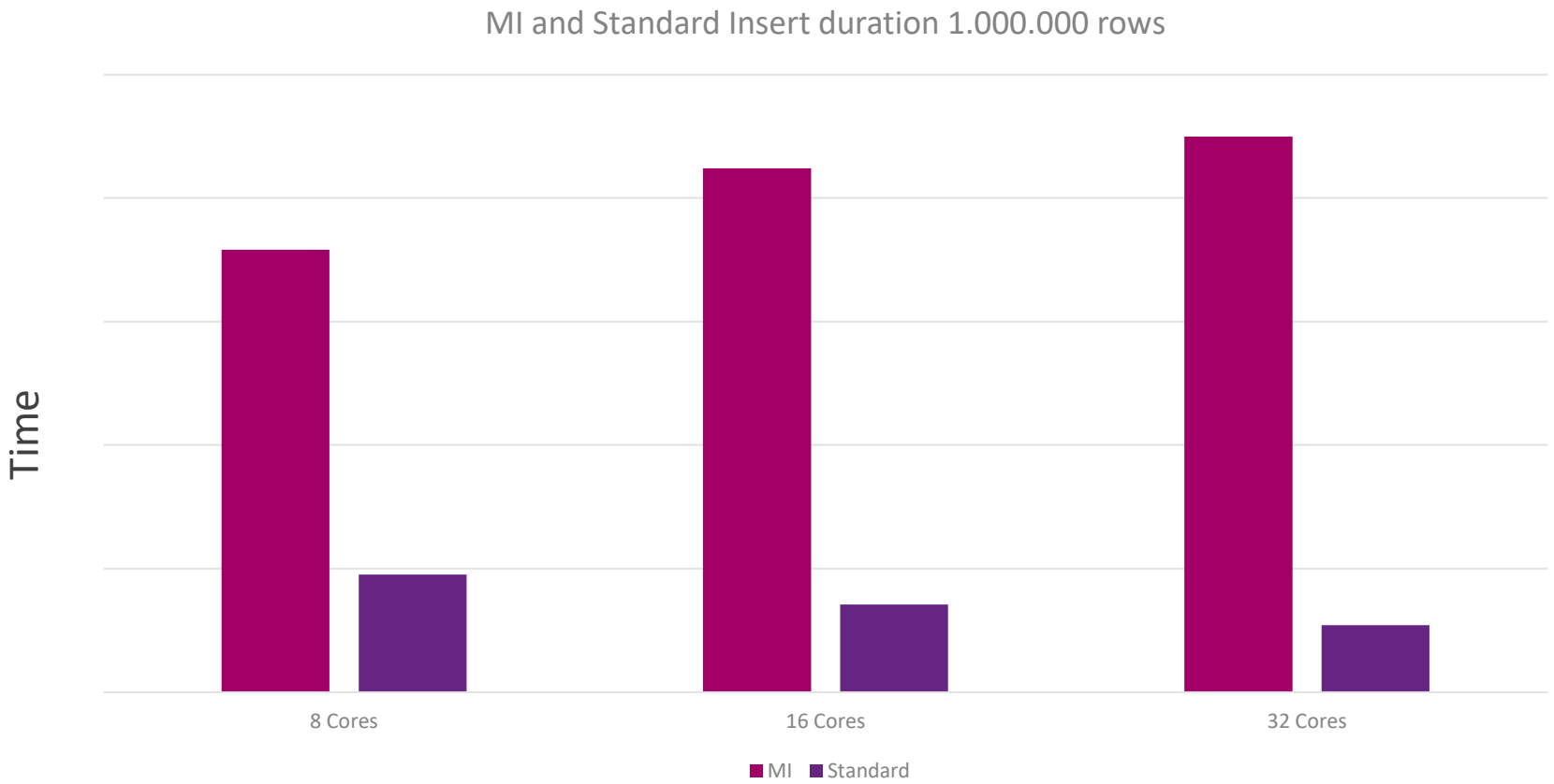
- Insert
- Select
- Delete
- Update

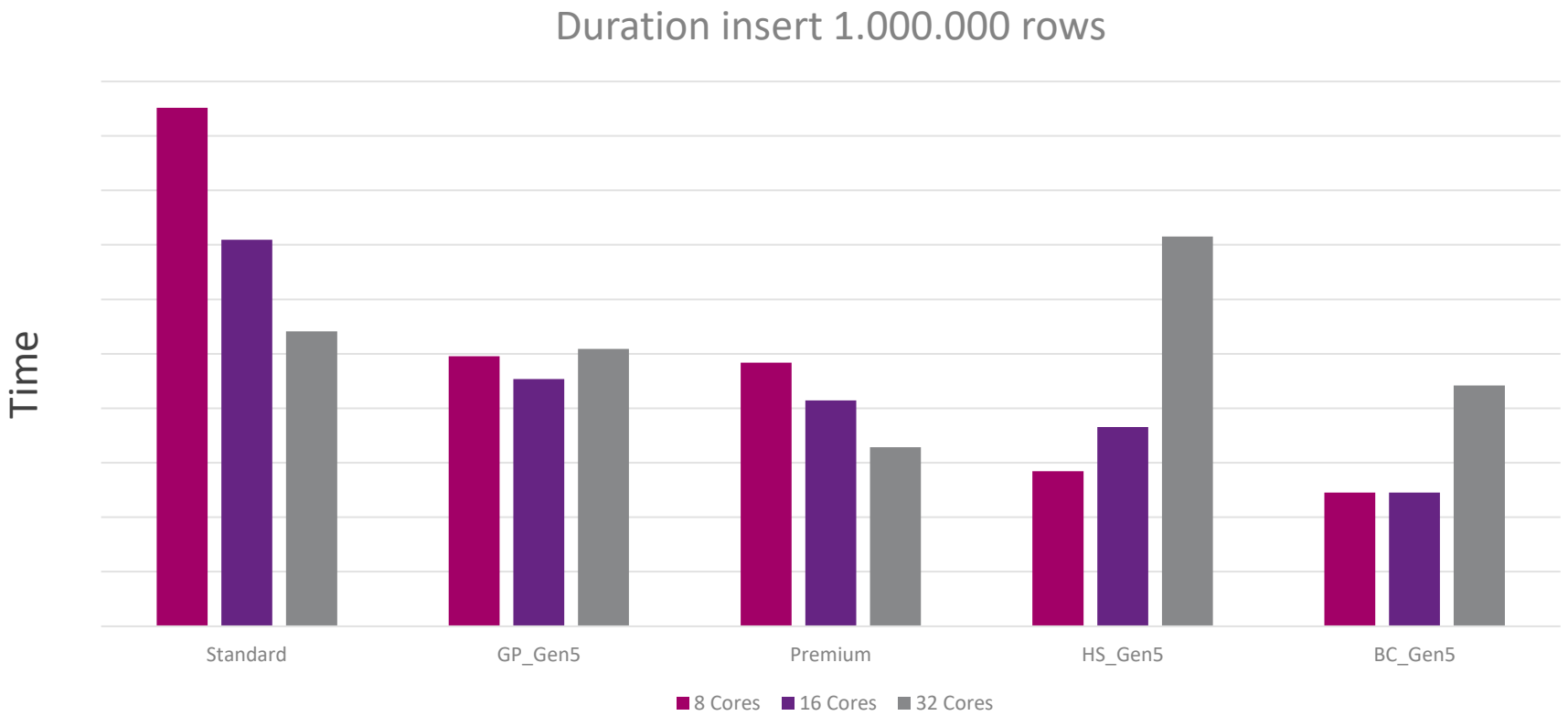
- SqlStress to (over)load the database

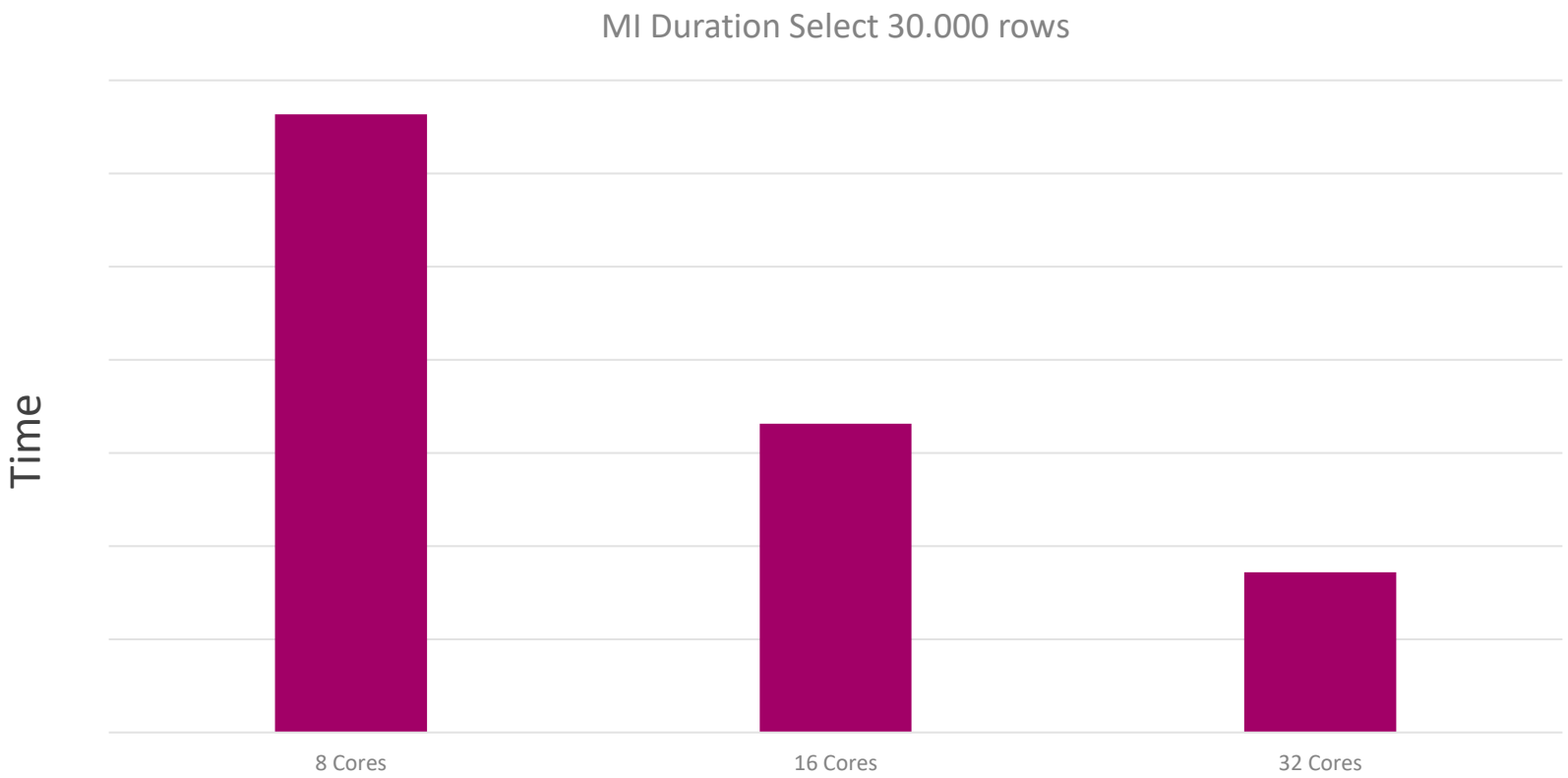
- Databases as-is, no configuration or tuning

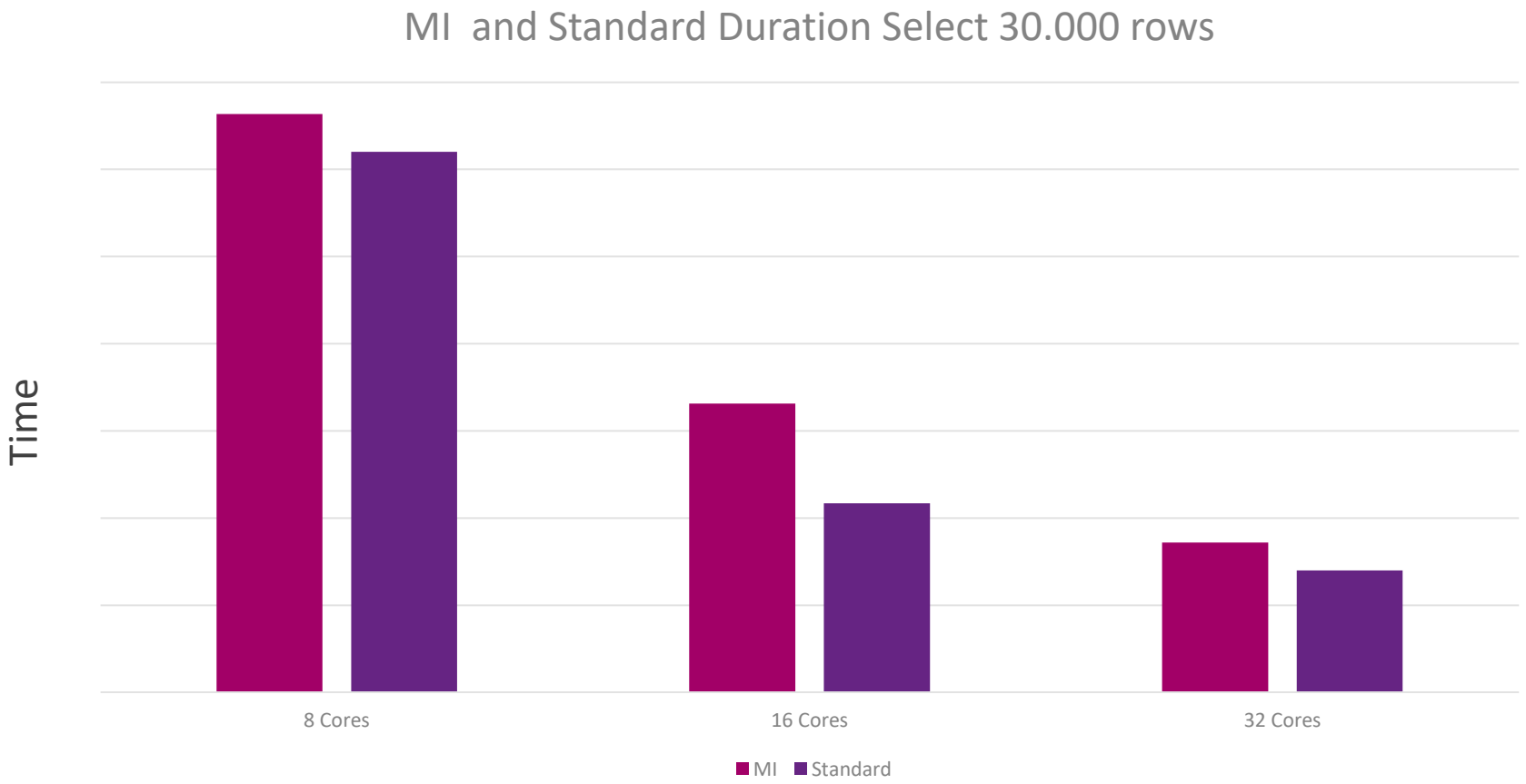
- 8, 16 and 32 core environments
- Per query graphs

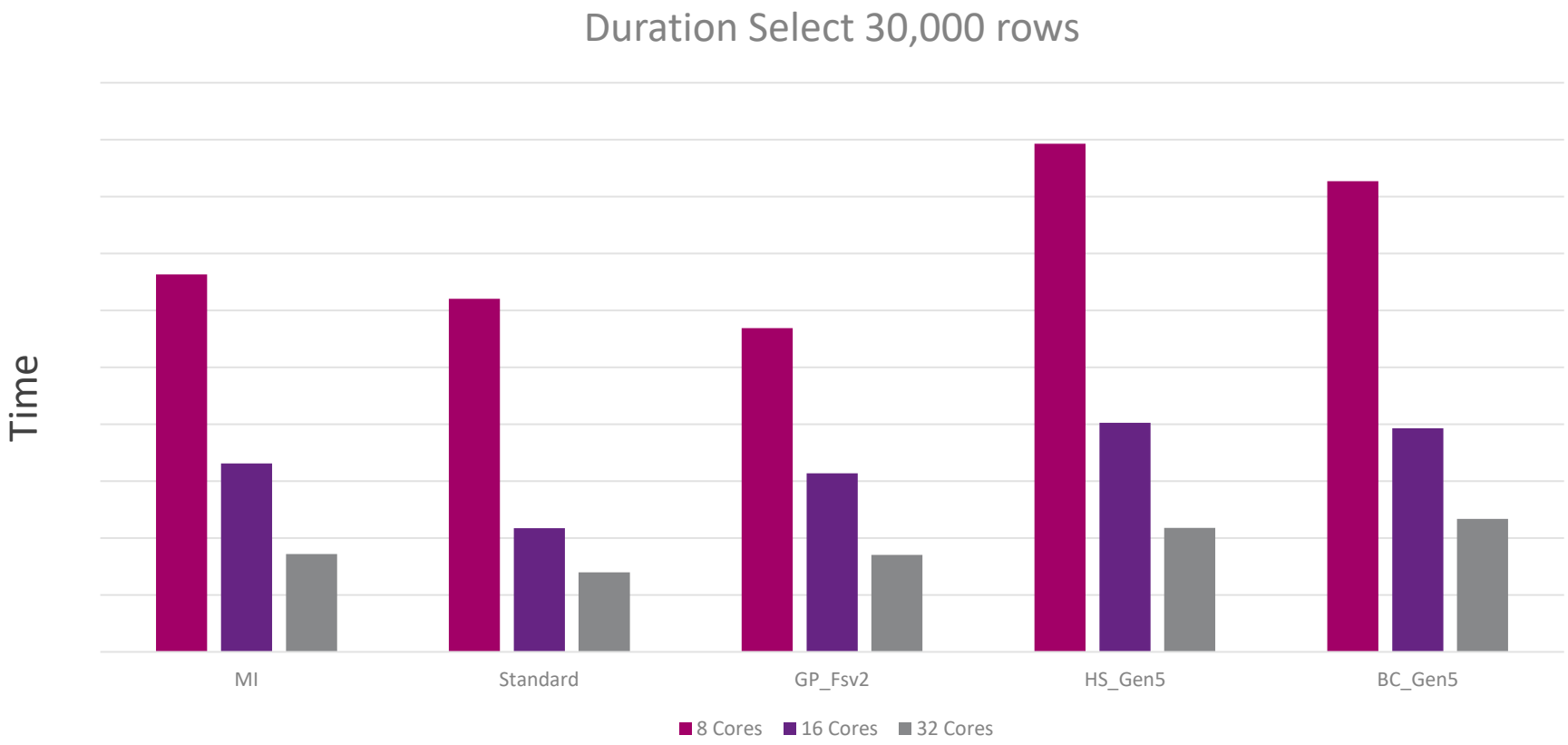

MI Insert duration 1.000.000 rows
Time
8 Cores
16 Cores
32 Cores

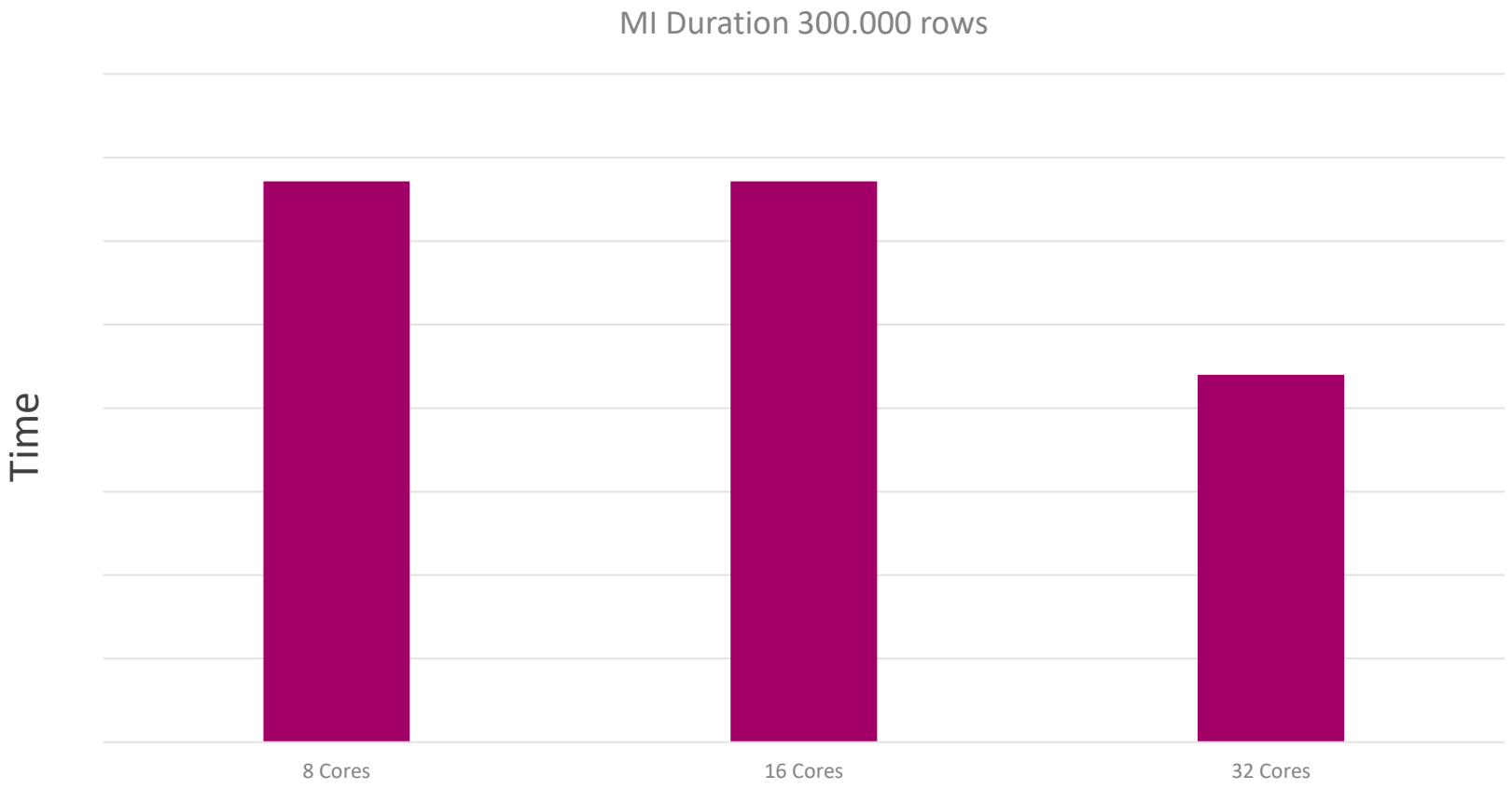

MI and Standard Insert duration 1.000.000 rows
Time
8 Cores
16 Cores
32 Cores
MI
Standard


Duration insert 1.000.000 rows
Time
Standard
GP_Gen5
Premium
HS_Gen5
BC_Gen5
8 Cores
16 Cores
32 Cores

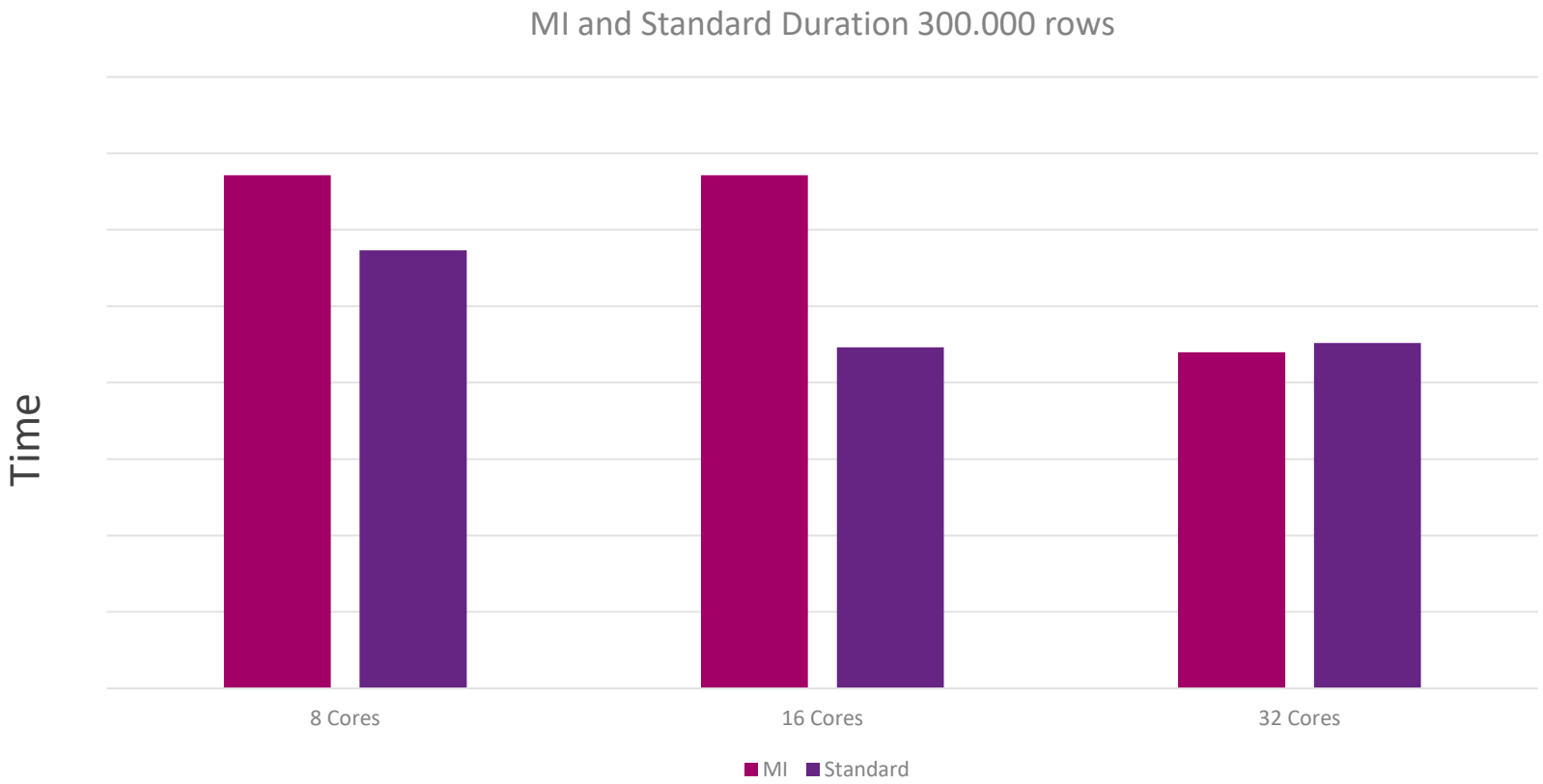

MI Duration Select 30.000 rows
Time
8 Cores
16 Cores
32 Cores


MI and Standard Duration Select 30.000 rows
Time
8 Cores
16 Cores
32 Cores
MI
Standard

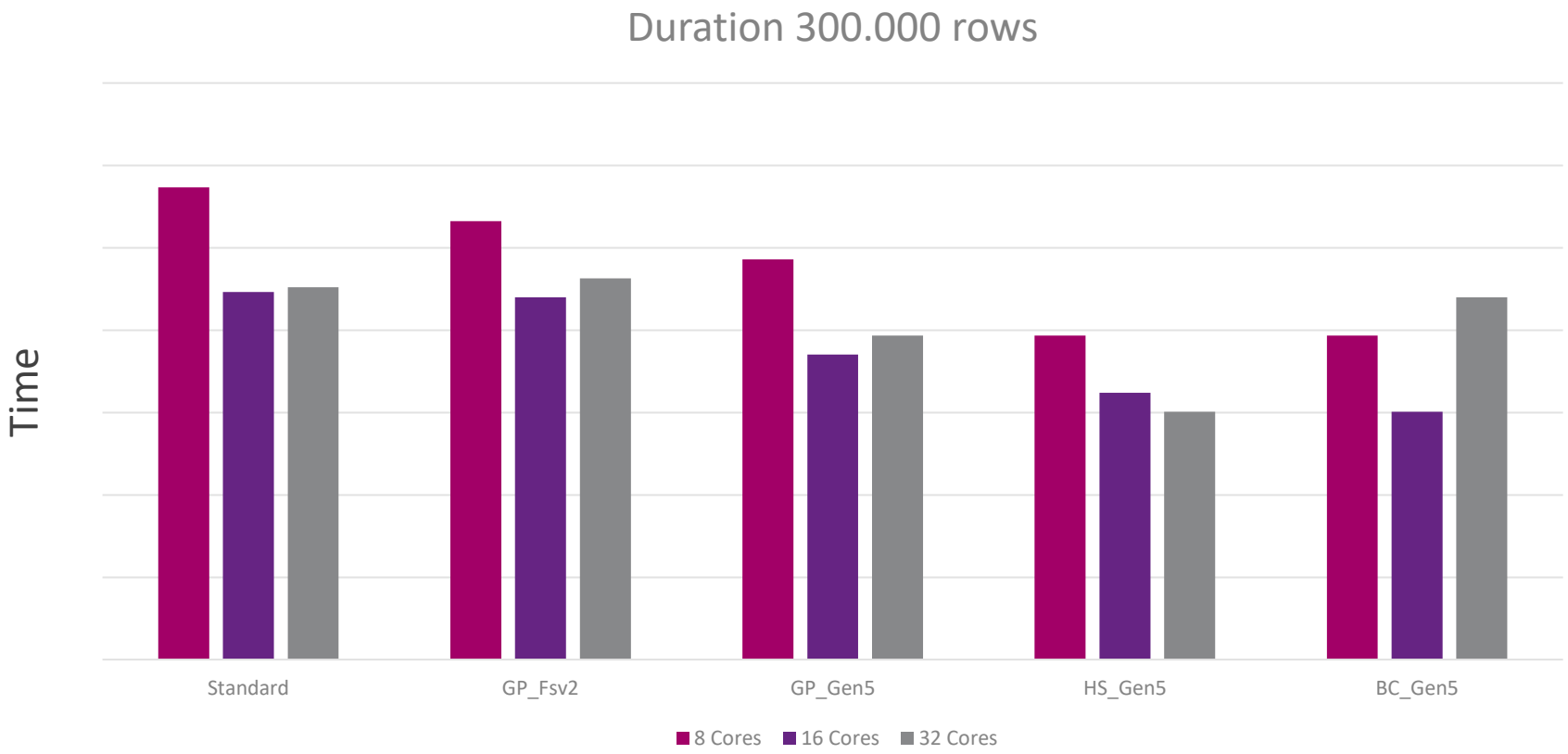

Duration Select 30,000 rows
Time
MI
Standard
GP_Fsv2
HS_Gen5
BC_Gen5
8 Cores
16 Cores
32 Cores

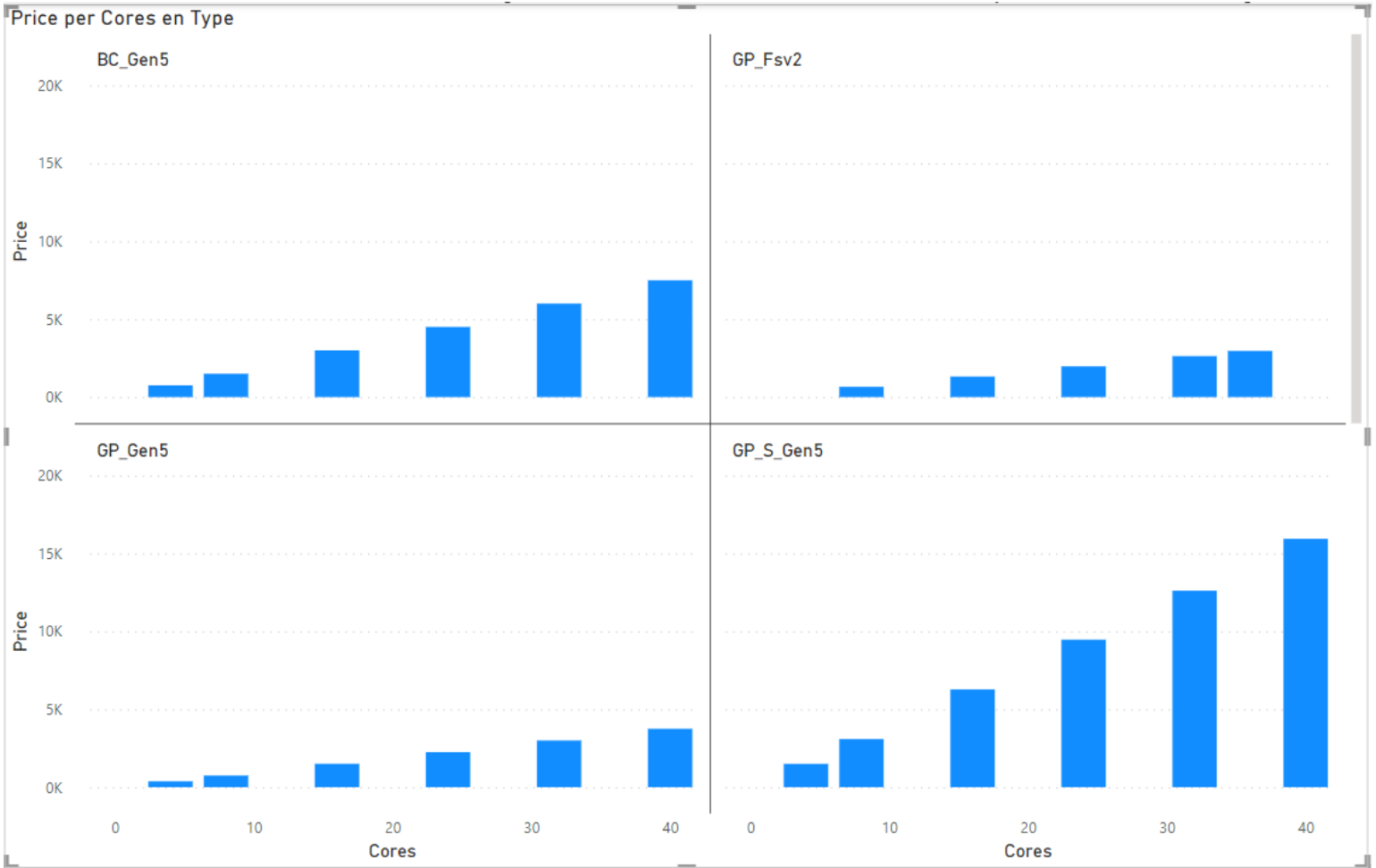

MI Duration 300.000 rows
Time
8 Cores
16 Cores
32 Cores

UPDATE AND DELETE PERFORMANCE

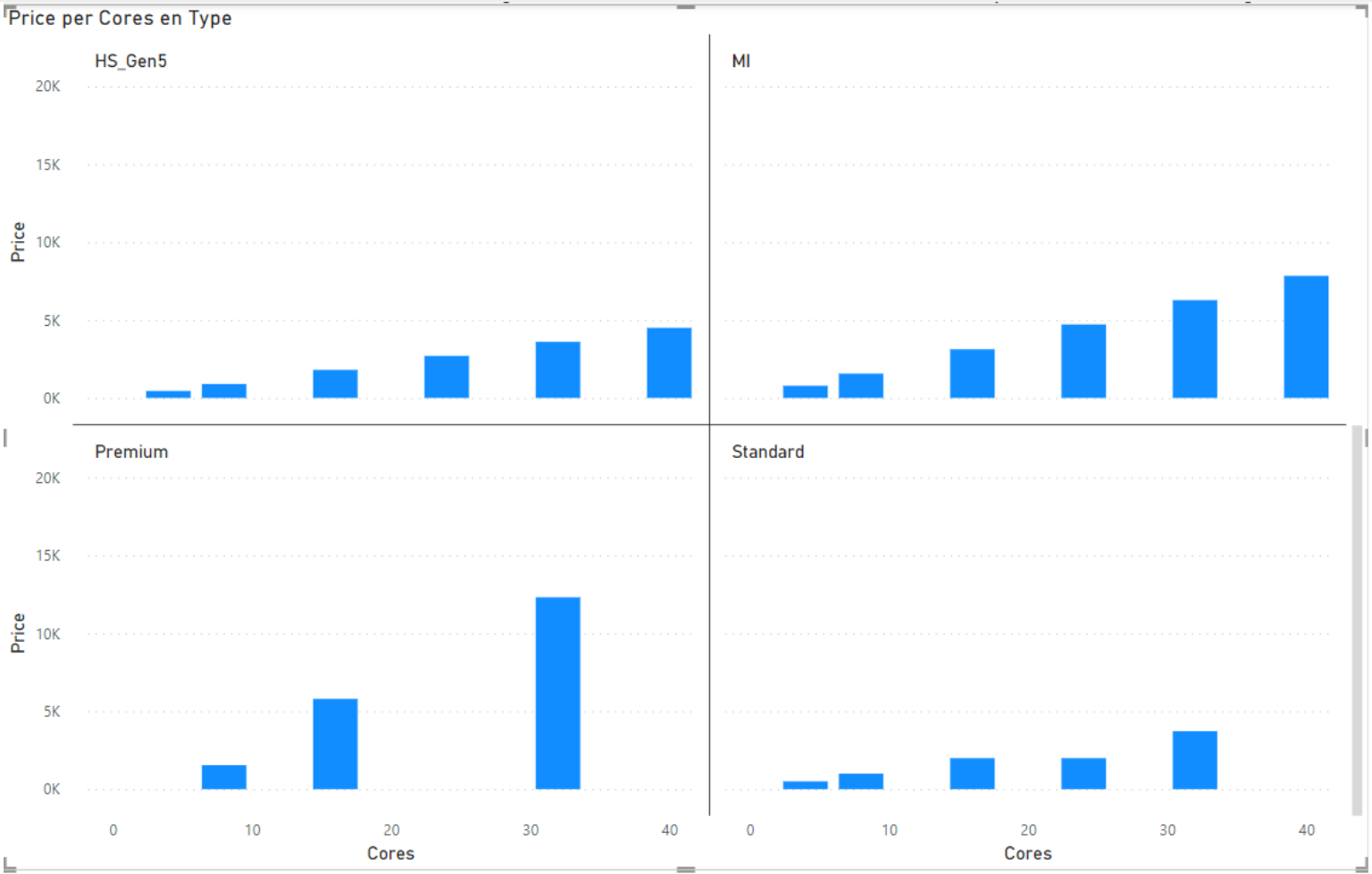


UPDATE AND DELETE PERFORMANCE




Price per Cores en Type
BC_Gen5
GP_Fsv2
GP_Gen5
GP_S_Gen5
Price
20K
15K
10K
5K
0K
0
10
20
30
40
Cores

PRICING


Price per Cores en Type
HS_Gen5
MI
Premium
Standard
Price
20K
15K
10K
5K
0K
0
10
20
30
40
Cores

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

- 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

- If you have intermittant 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.

TEST

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Thank you!

Azure SQL Databases, tales from the trenches

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

https://github.com/reitse/Speaking

@2meterDBA

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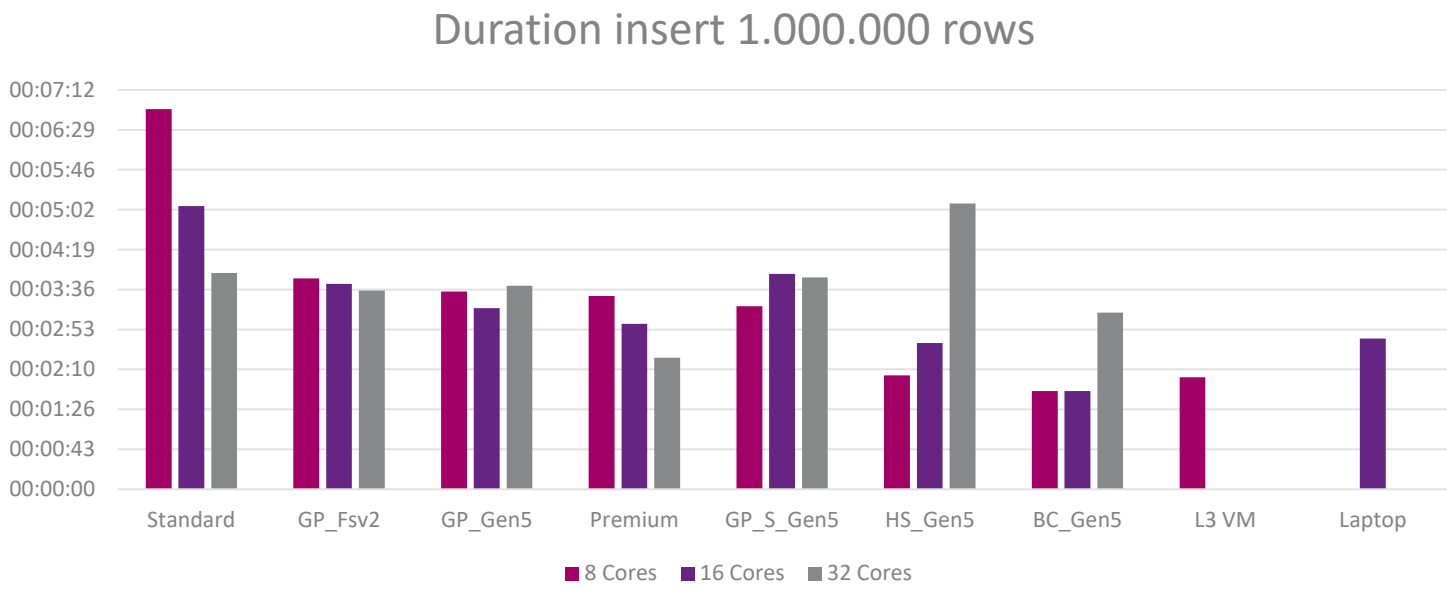
Session Feedback

https://bit.ly/dMC2022_SessionFeedback


Duration insert 1.000.000 rows
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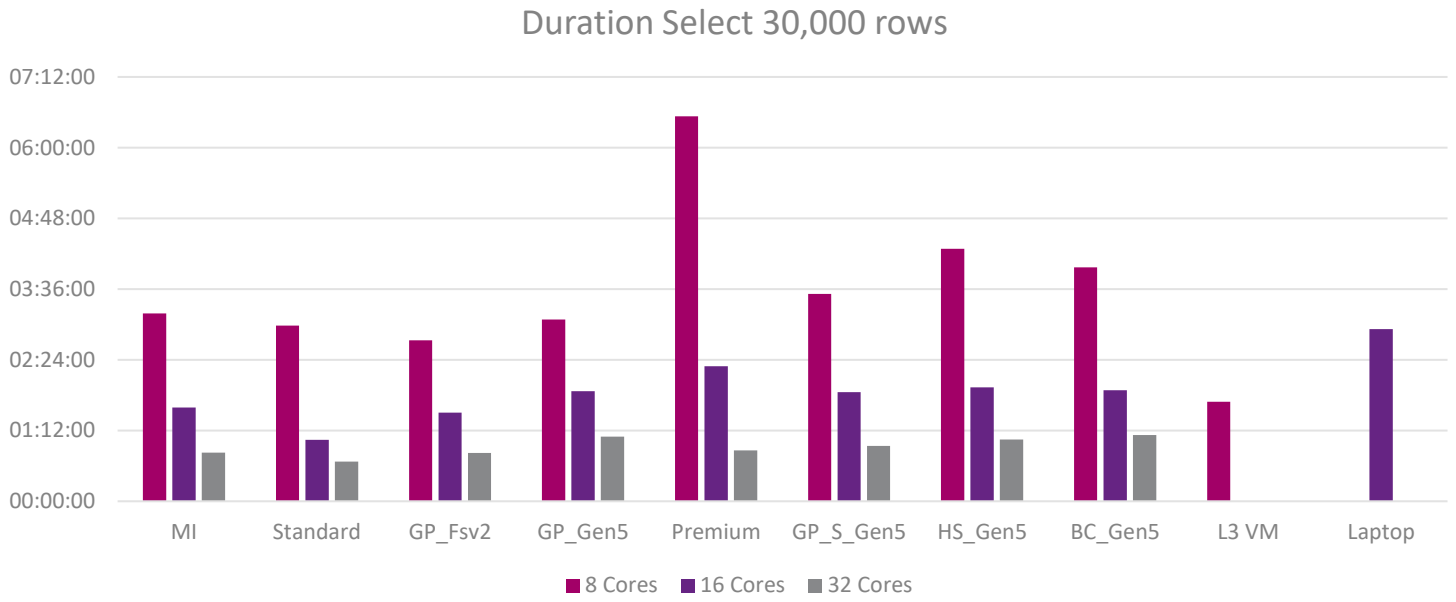
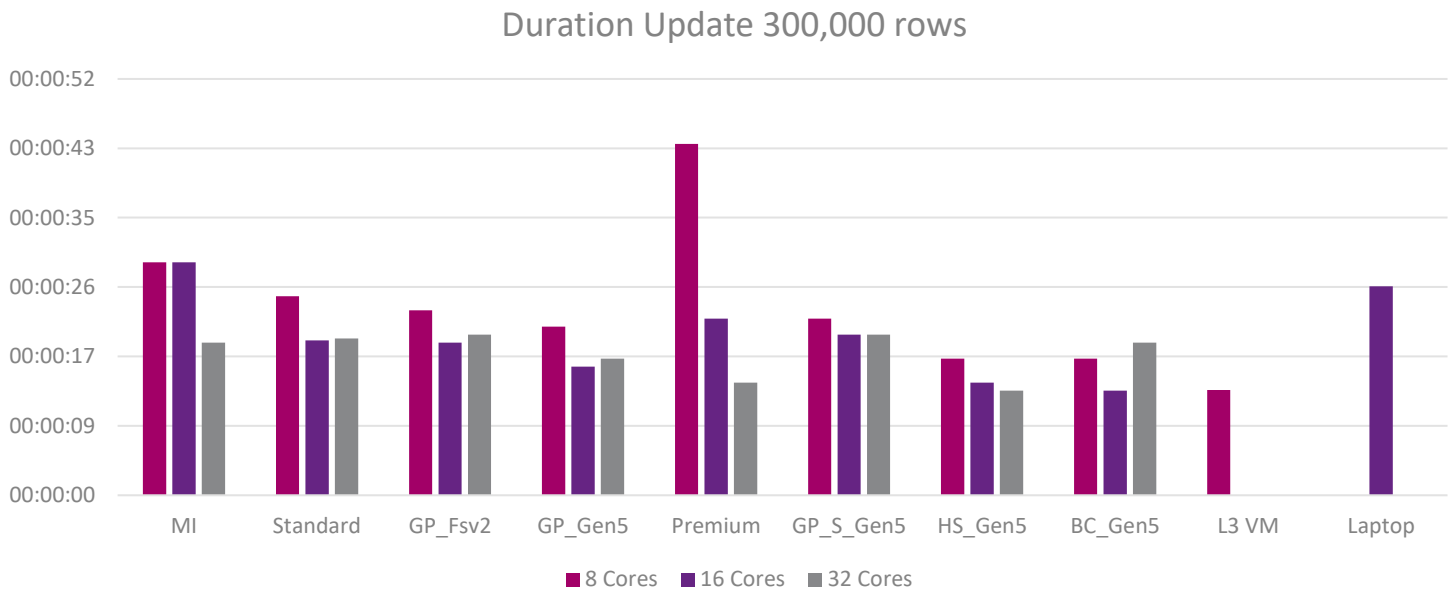
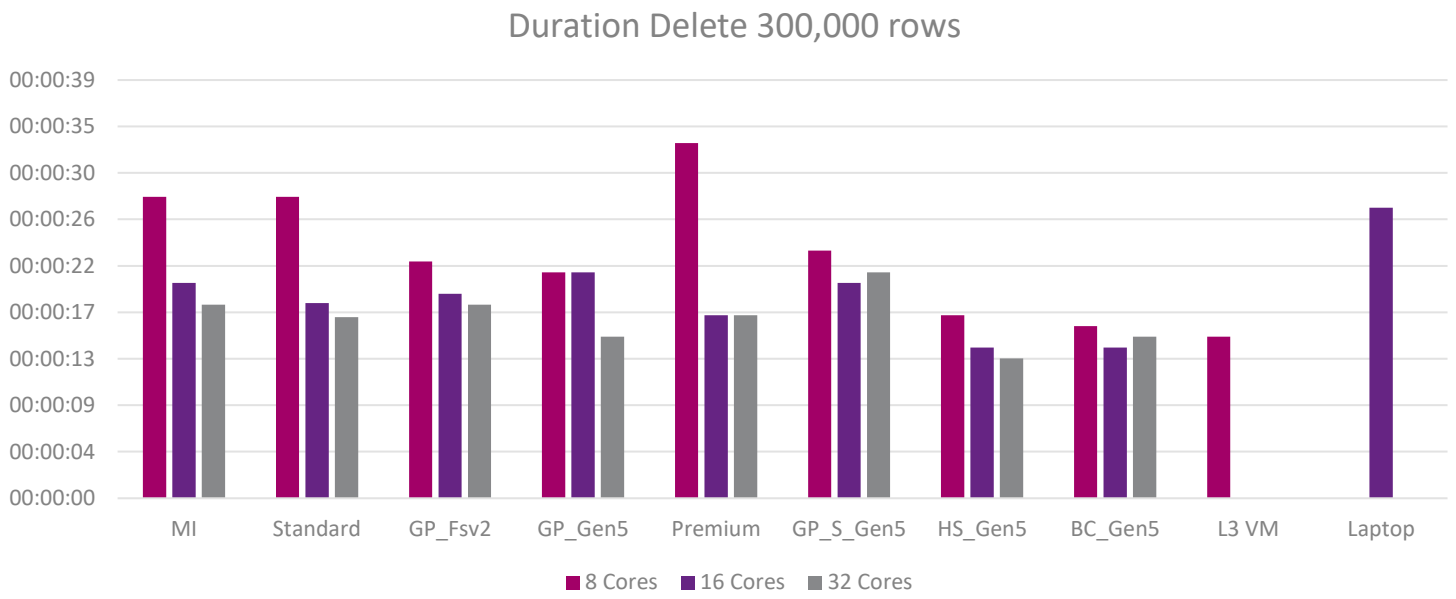
00:06:29
00:05:46
00:05:02
00:04:19
00:03:36
00:02:53
00:02:10
00:01:26
00:00:43
00:00:00
Standard
GP_Fsv2
GP_Gen5
Premium
GP_S_Gen5
HS_Gen5
BC_Gen5
L3 VM
Laptop
8 Cores
16 Cores
32 Cores


Duration Select 30,000 rows
07:12:00
06:00:00
04:48:00
03:36:00
02:24:00
01:12:00
00:00:00
MI
Standard
GP_Fsv2
GP_Gen5
Premium
GP_S_Gen5
HS_Gen5
BC_Gen5
L3 VM
Laptop
8 Cores
16 Cores
32 Cores

UPDATE PERFORMANCE



DELETE PERFORMANCE



PRICING


Pricing
14000
12000
10000
8000
6000
4000
2000
0
MI
Standard
GP_Fsv2
GP_Gen5
Premium
GP_S_Gen5
HS_Gen5
BC_Gen5
L3 VM
Laptop
8 Cores
16 Cores
32 Cores