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# Enhance SQL Server Without Spending More on Hardware or Licenses

*“What took you so long?”*

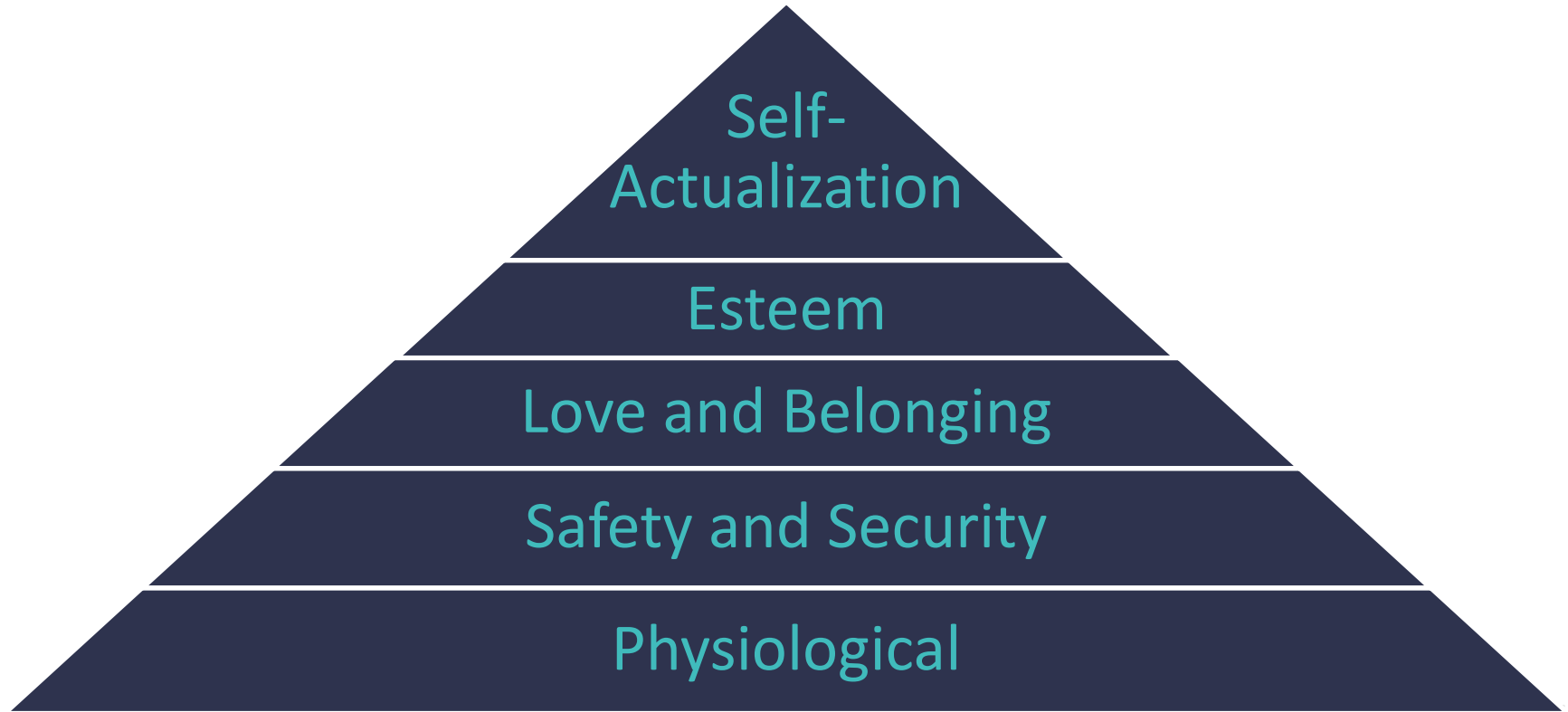
April 26, 2023



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# Maslow's Hierarchy of Needs



# Hierarchy of Database Needs\*

Future  
Proof

Performance

Capacity

Security

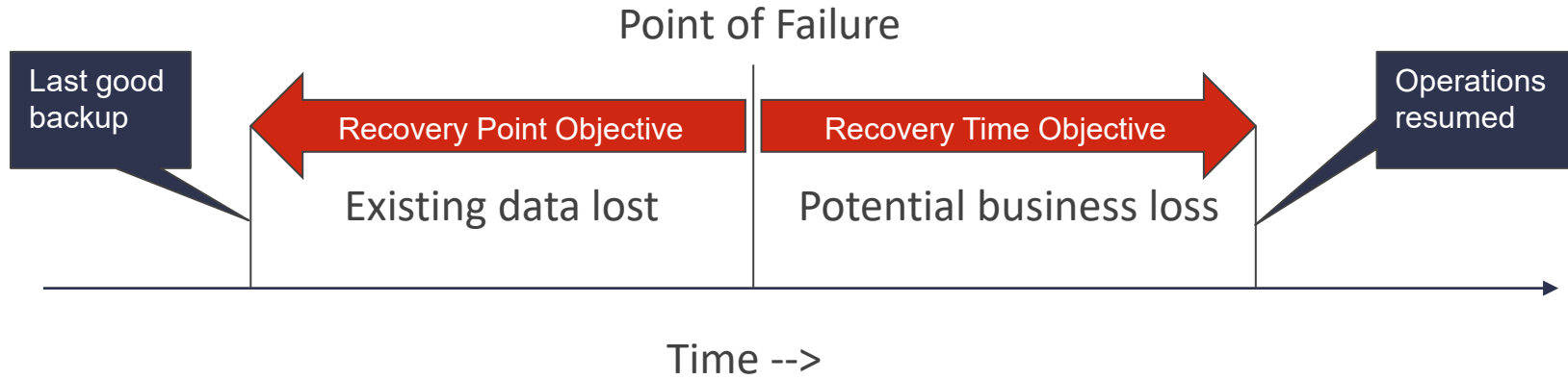
Backups



# Poll Question #1

- Where is your organization in regards to addressing Hierarchy of Database Needs?
  - We do not have a handle on database Backups
  - Backups are good, but Security is an open book
  - We are struggling with Capacity
  - We could use some help with Performance Tuning
  - We're in pretty good shape for most, but the Future is uncertain

# Defining Your Backup Strategy Recovery Objectives



Time is money, how much are you willing to lose?



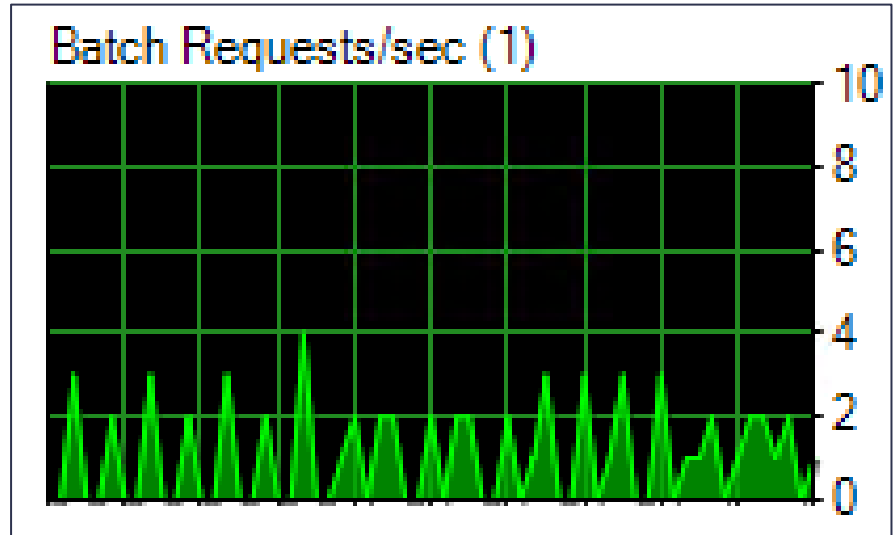
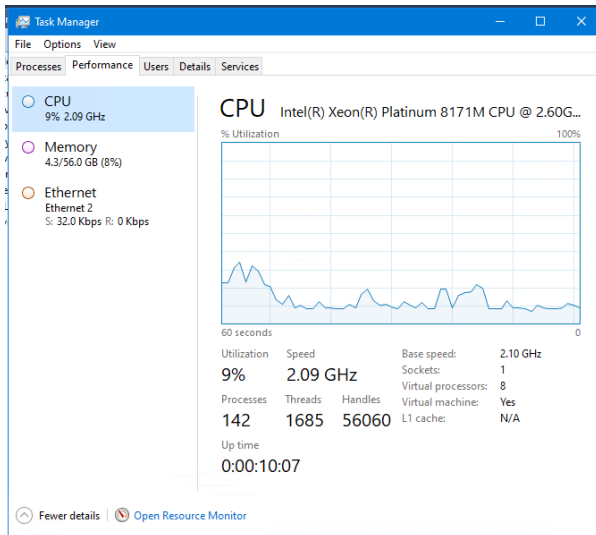
# Speed Vs. Work in Your Car

- How fast are you going? (Speedometer)
- How hard is the engine working? (Tachometer)



# Speed Vs. Work in SQL Server

- How fast are you going? (Batch Requests per second)
- How hard is SQL Server working? (CPU, Memory, Disk activity)





# Indicators of Poor Performance

- Slow transactions (reading and writing of data)
  - CPU, RAM and Disk resources need NOT be constrained to experience slow transactions
  - Even if resource usage is high, that resource may not be at fault
- Deadlocks
  - When two processes each lock an object, then want control over the other's locked object
  - Can be masked by modern applications that handle transaction retries

# Poll Question #2

- Are you noticing any of the following related to your SQL Server?
  - Users are experiencing slow data operations (reading and writing)
  - Users are getting error messages, or kicked out of the database
  - CPU, RAM, DISC consumption seem to be higher than normal
  - Scheduled jobs are failing
  - Some or all of the above



# My Wife Sent Me on a Grocery Errand

*“It shouldn’t take more than 15 minutes:  
10 minutes round trip and 5 minutes in the store.”*

What if I came back an hour later?

Would she say:

- *“You need a faster car with more horsepower!”*
- *“What took you so long?”*

# “What Took You So Long?”

If you think your SQL Server is having performance issues, why is the first thought:

*“We need to give it more hardware.”*

We should be asking:

*“What is taking SQL Server so long?”*

*“What queries are consuming resources?”*



# SQL Server Wait Statistics and Operation Statistics

- Wait Statistics are recorded for:
  - Disk IO: Reading and Writing data (data and log files, backups, TempDB)
  - CPU
  - Memory
  - Parallelism
  - Network
- Operation Statistics (Resources used, by each query)
  - Reads, Writes, CPU, Memory, No. of Executions
- ALL Statistics are lost when SQL is shut-down
  - Rebooting a slowly performing server means you will lose these statistics

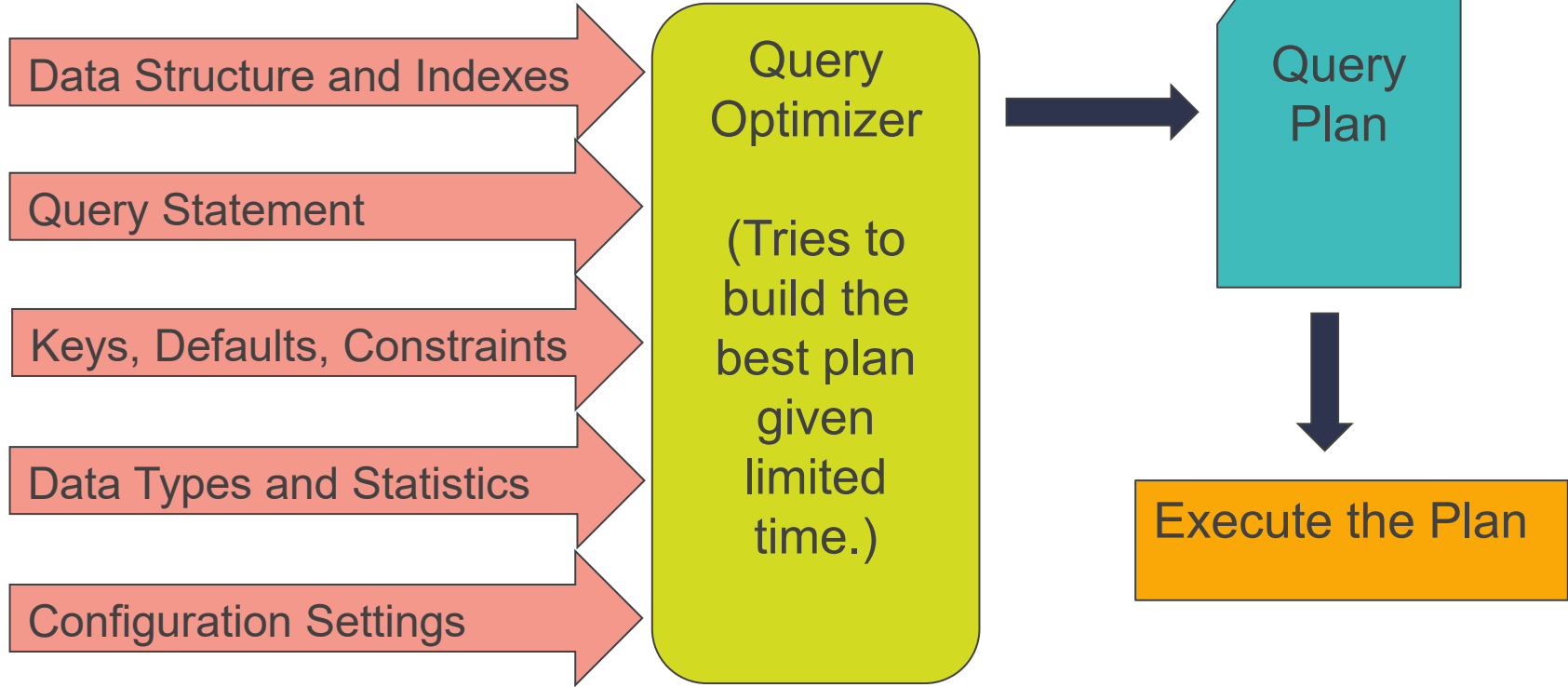


# Factors Affecting Performance

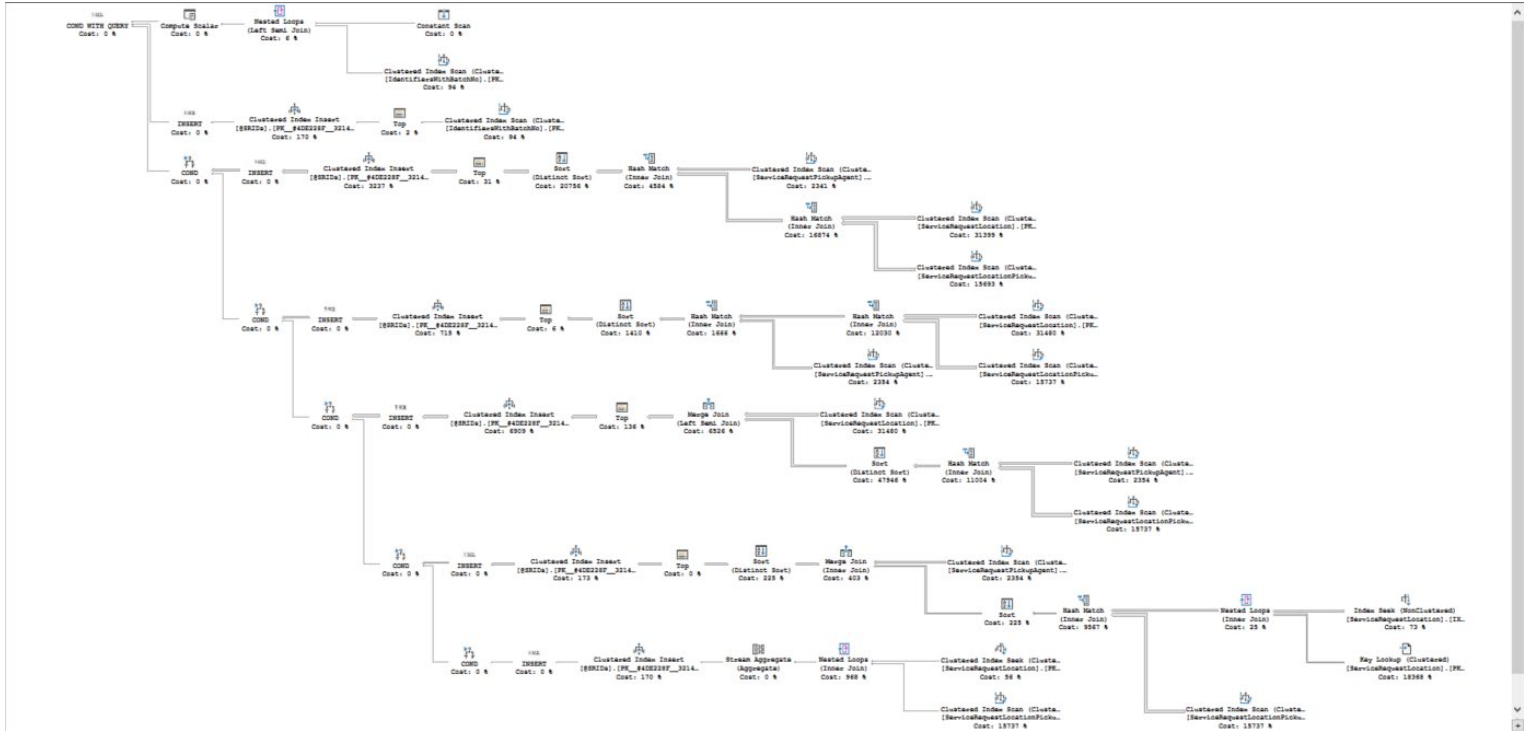
- Hardware Specifications (CPU, RAM, Disk IOPS)
- Configurations (Operating System, SQL Server, Database, Query)
- Database model (Tables, Keys, Constraints)
- Data Types (define how wide a result set might be)
- Indexes and their Maintenance
- Bad Query code
- Statistics (estimate how long a result might be)
- Network and Operating System
- Slow Downstream Data Consumers



# SQL Server Query Optimizer

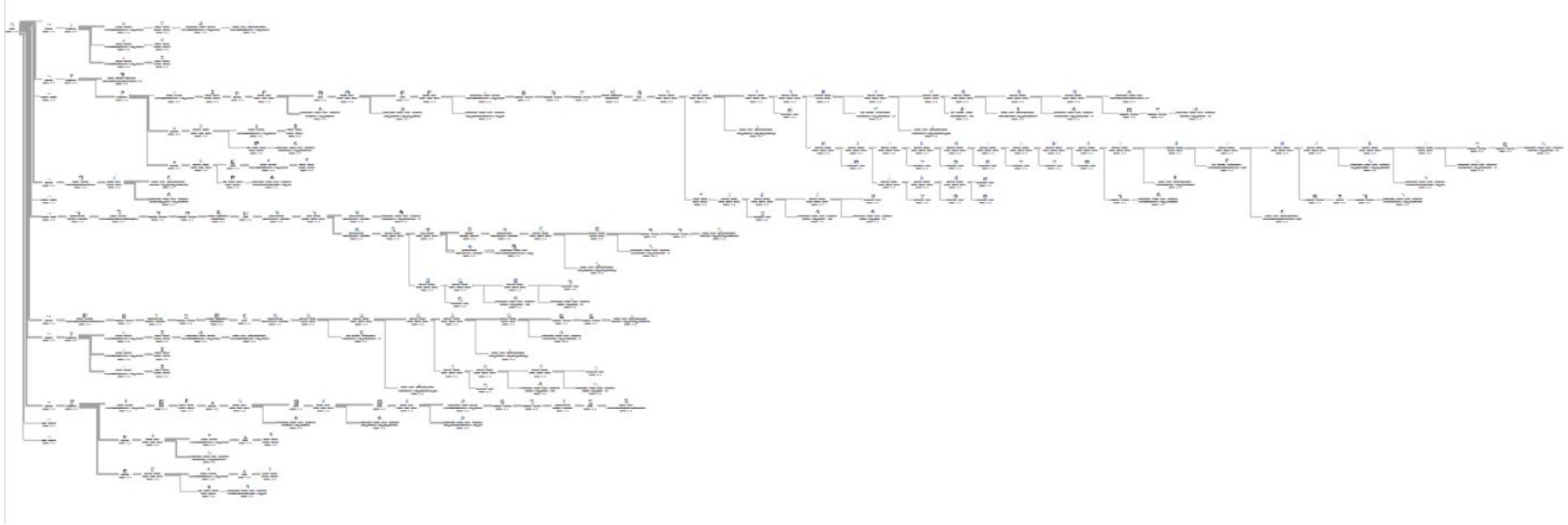


# A Moderate Query Plan

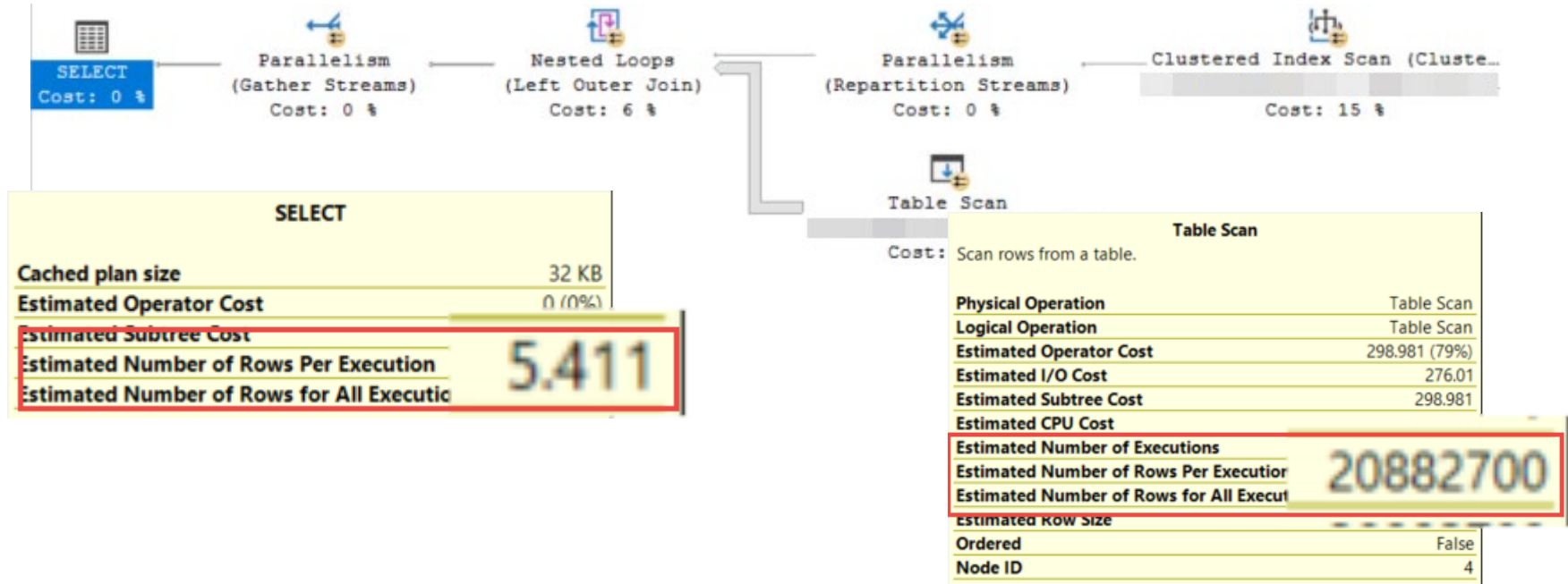




# A Complex Query Plan



# A Simple Query with an Inefficient Plan



# Do These Pain Points Sound Familiar?

- A recent database restore took way longer than expected or promised, or we lost more data than was acceptable.
- We have no RPO or RTO defined.
- We have slow data response times, occasionally or continually.
- We are rebooting the server daily, weekly, or immediately in response to slow performance.
- We installed SQL Server and used default configurations.
- We are constantly changing configuration settings while chasing performance issues.



# Do These Pain Points Sound Familiar?

- We have nobody to maintain our SQL Server and databases.
- We have much higher data volumes than when we started.
- We have a change in data usage patterns.
- We get errors and deadlocks.
- We are granting higher than needed security permissions.
- We are throwing money at hardware without any noticeable gain in SQL Server performance.

# Free SQL Server Health and Performance Scan

- A light-weight yet comprehensive scan of your SQL Server installation
- Wait Statistics and Operational Statistics (“What is taking you so long?”)
- Problematic Queries (High CPU, RAM, Reads, Writes, etc.) with Plans
- Server and Database Configuration Settings
- Backups review
- Database file sizes and drive capacities
- Security review of high privilege accounts
- Indexing Review (Duplicate, Missing, Unused, etc.)
- Maintenance Plans, SQL Agent Jobs
- Alerts, Operators, and Database Mail



# Poll Question #3

- Would you like a free scan of your SQL Server installation?
  - Yes
  - No

If you are interested in learning more about our services, please contact:

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