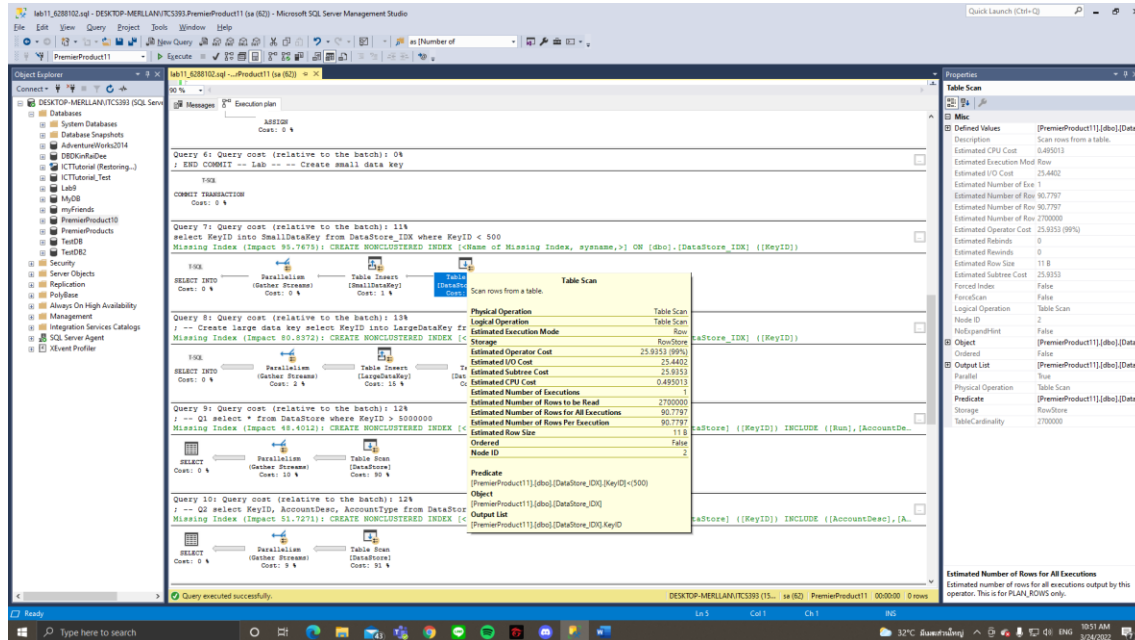
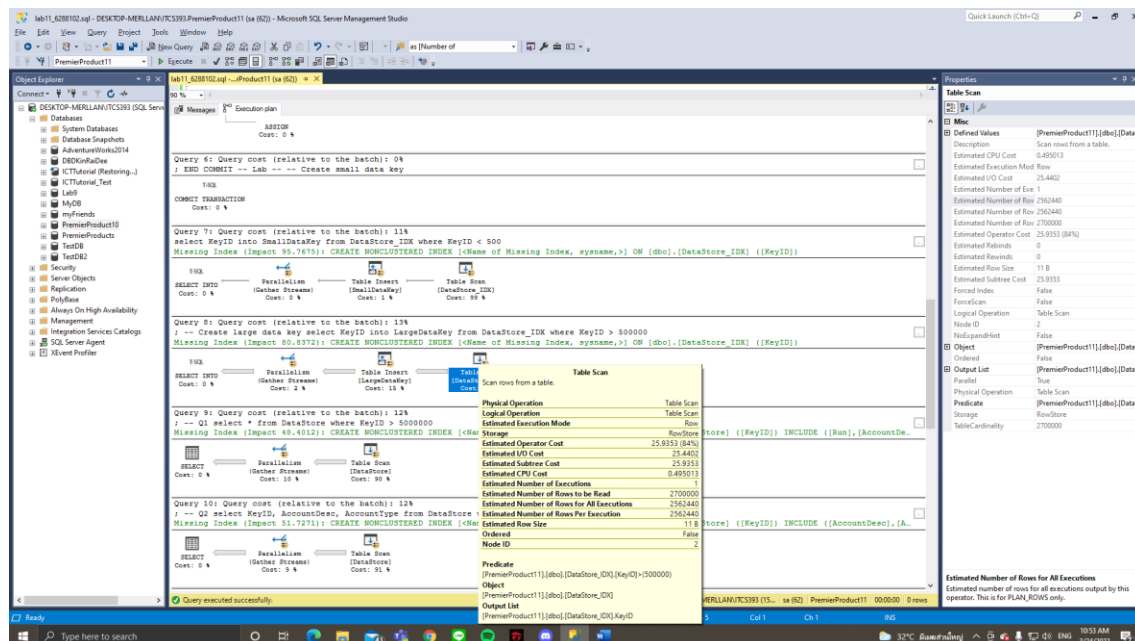


Prepare table

1. select KeyID into SmallDataKey
from DataStore_IDX
where KeyID < 500;

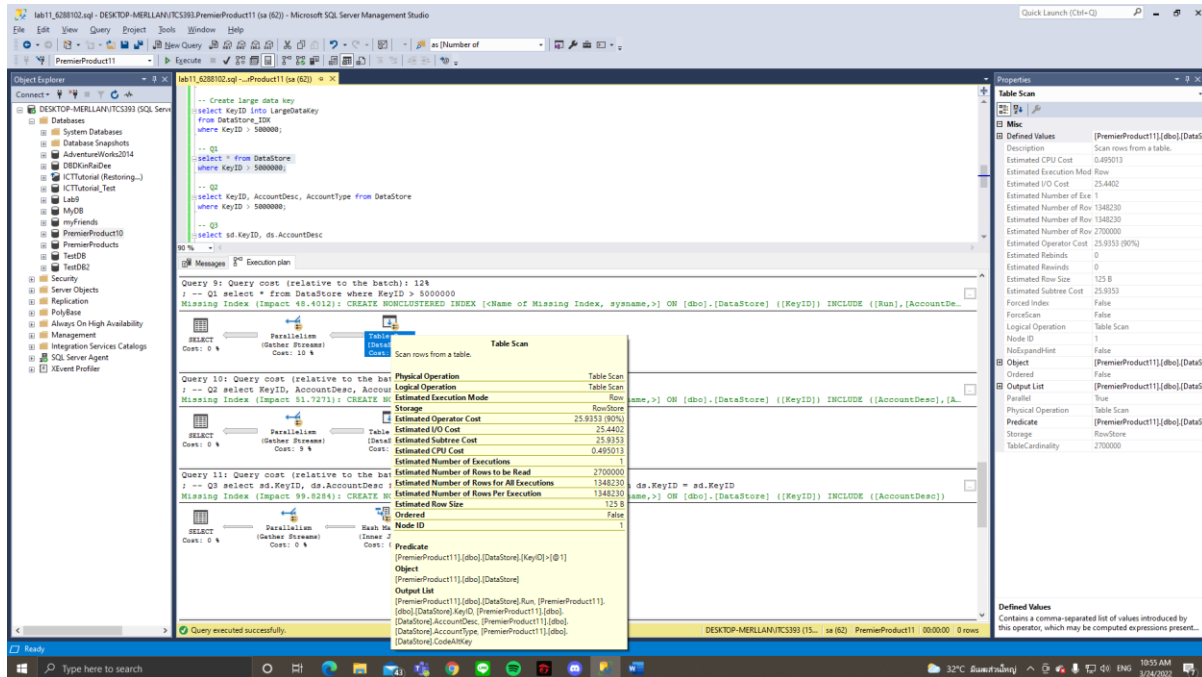


2. select KeyID into LargeDataKey
from DataStore_IDX
where KeyID > 500000;

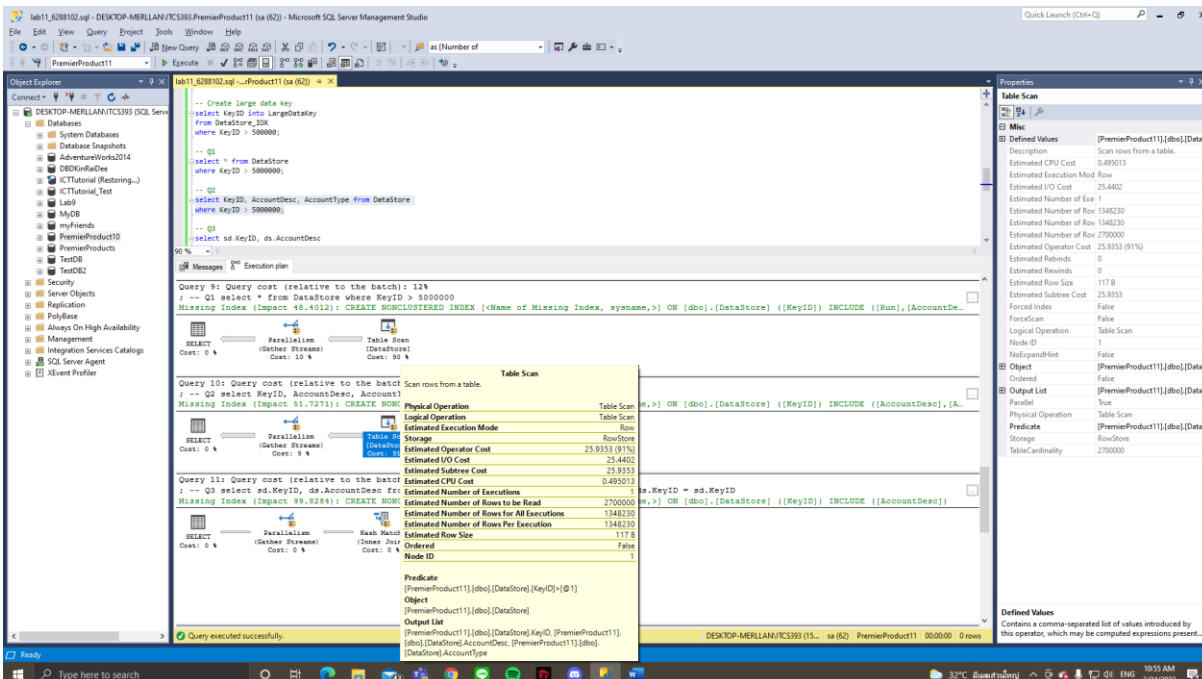


Query question

1. select * from DataStore
where KeyID > 5000000;



2. select KeyID, AccountDesc, AccountType from DataStore
where KeyID > 5000000;



```
3. select sd.KeyID, ds.AccountDesc
```

from DataStore ds
inner join SmallDataKey sd on ds.KeyID = sd.KeyID;

Query 11: Query cost (relative to the batch): 11%

```
-- Q1 select KeyID, AccountDesc, AccountType from DataStore
where KeyID > 5000000;
-- Q2 select sd.KeyID, ds.AccountDesc
from DataStore ds
inner join SmallDataKey sd on ds.KeyID = sd.KeyID;
-- Q3 select id.KeyID, ds.AccountDesc
from DataStore ds
inner join LargeDataKey ld on ds.KeyID = ld.KeyID;
```

Missing Index (Impact 99.8284): CREATE NONCLUSTERED INDEX [Name of Missing Index, synonym, >] ON (dbo).[DataStore] ((KeyID)) INCLUDE ((AccountDesc))

Table Scan (Heap) Properties:

| Property | Value |
|-----------------------------|---|
| Description | Scan rows from a table. |
| Estimated CPU Cost | 0.0000507 |
| Estimated Execution Mode | Batch |
| Estimated I/O Cost | 0.0120139 |
| Estimated Number of Exe 1 | 1 |
| Estimated Number of Row 134 | 134 |
| Estimated Number of Row 134 | 134 |
| Estimated Operator Cost | 0.0120646 (9%) |
| Estimated Subtree Cost | 0.0000507 |
| Estimated Rebinds | 0 |
| Estimated Row Size | 11 B |
| Estimated Row Size | 0.0120646 |
| Forced Index | False |
| ForceScan | False |
| ForceSeek | False |
| Logical Operation | Table Scan |
| Node ID | 2 |
| NoExpandHint | False |
| Object | [PremierProduct11].[dbo].[SmallDataKey] |
| Ordered | False |
| Output List | [PremierProduct11].[dbo].[SmallDataKey] |
| Parallel | True |
| Physical Operation | Table Scan |
| Storage | RowStore |
| Table Cardinality | 134 |

Query 12: Query cost (relative to the batch): 14%

```
-- Q1 select KeyID, AccountDesc, AccountType from DataStore
where KeyID > 5000000;
-- Q2 select sd.KeyID, ds.AccountDesc
from DataStore ds
inner join SmallDataKey sd on ds.KeyID = sd.KeyID;
-- Q3 select id.KeyID, ds.AccountDesc
from DataStore ds
inner join LargeDataKey ld on ds.KeyID = ld.KeyID;
```

Missing Index (Impact 81.2559): CREATE NONCLUSTERED INDEX [Name of Missing Index, synonym, >] ON (dbo).[DataStore] ((KeyID)) INCLUDE ((AccountDesc))

Table Scan (Heap) Properties:

| Property | Value |
|--------------------------------|--------------------------------------|
| Description | Scan rows from a table. |
| Estimated CPU Cost | 0.484576 |
| Estimated Execution Mode | Batch |
| Estimated I/O Cost | 25.4802 |
| Estimated Number of Exe 1 | 1 |
| Estimated Number of Row 270 | 270 |
| Estimated Number of Row 270000 | 270000 |
| Estimated Operator Cost | 25.9347 (100%) |
| Estimated Subtree Cost | 0 |
| Estimated Rebinds | 0 |
| Estimated Row Size | 65 B |
| Estimated Row Size | 25.9347 |
| Forced Index | False |
| ForceScan | False |
| ForceSeek | False |
| Logical Operation | Table Scan |
| Node ID | 4 |
| NoExpandHint | False |
| Object | [PremierProduct11].[dbo].[DataStore] |
| Ordered | False |
| Output List | [PremierProduct11].[dbo].[DataStore] |
| Parallel | True |
| Physical Operation | Table Scan |
| Storage | RowStore |
| Table Cardinality | 270000 |

4. select id.KeyID, ds.AccountDesc

from DataStore ds
inner join LargeDataKey ld on ds.KeyID = ld.KeyID;

lab11_6288102.sql - DESKTOP-MERLAN\JCS393\PremierProduct11 (sa (62)) - Microsoft SQL Server Enterprise Manager

Object Explorer: Connect to DESKTOP-MERLAN\JCS393 (SQL Serv) | Databases | AdventureWorks2014 | AdventureWorks2014 | DataStore | LargeDataKey

Query 12: Query cost (relative to the batch): 144
-- Q2 select KeyID, AccountDesc, AccountType from DataStore where KeyID > 5000000
-- Q3 select sd.KeyID, ds.AccountDesc from DataStore ds inner join LargeDataKey ld on ds.KeyID = ld.KeyID
-- Q4 select Id.KeyID, ds.AccountDesc from DataStore ds inner join LargeDataKey ld on ds.KeyID = ld.KeyID
-- Q5

Execution plan: Table Scan (Heap) (DataStore) [ds] | Hash Match (Inner Join) | Table Scan (Heap) (LargeDataKey) [ld]

Properties: Table Scan (Heap) | Defined Values: [PremierProduct11].[dbo].[LargeDataKey] | Description: Scan rows from a table. | Estimated CPU Cost: 0.470295 | Estimated Execution Mod: Batch | Estimated I/O Cost: 3.53268 | Estimated Number of Exe: 1 | Estimated Number of Row: 2565100 | Estimated Number of Row: 2565100 | Estimated Number of Row: 2565100 | Estimated Operator Cost: 3.53268 (11%) | Estimated Rebinds: 0 | Estimated Row Size: 11 B | Estimated Subtree Cost: 3.53268 | Forced Index: False | ForceScan: False | Logical Operation: Table Scan | Node ID: 2 | NoExpandHint: False | Object: [PremierProduct11].[dbo].[LargeDataKey] | Output List: [PremierProduct11].[dbo].[LargeDataKey] | Parallel: True | Physical Operation: Table Scan | Storage: RowStore | TableCardinality: 2565100

lab11_6288102.sql - DESKTOP-MERLAN\JCS393\PremierProduct11 (sa (62)) - Microsoft SQL Server Enterprise Manager

Object Explorer: Connect to DESKTOP-MERLAN\JCS393 (SQL Serv) | Databases | AdventureWorks2014 | AdventureWorks2014 | DataStore | LargeDataKey

Query 12: Query cost (relative to the batch): 144
-- Q2 select KeyID, AccountDesc, AccountType from DataStore where KeyID > 5000000
-- Q3 select sd.KeyID, ds.AccountDesc from DataStore ds inner join LargeDataKey ld on ds.KeyID = ld.KeyID
-- Q4 select Id.KeyID, ds.AccountDesc from DataStore ds inner join LargeDataKey ld on ds.KeyID = ld.KeyID
-- Q5

Execution plan: Table Scan (Heap) (DataStore) [ds] | Hash Match (Inner Join) | Table Scan (Heap) (LargeDataKey) [ld]

Properties: Table Scan (Heap) | Defined Values: [PremierProduct11].[dbo].[DataStore] | Description: Scan rows from a table. | Estimated CPU Cost: 0.490206 | Estimated Execution Mod: Batch | Estimated I/O Cost: 25.4402 | Estimated Number of Exe: 1 | Estimated Number of Row: 2700000 | Estimated Number of Row: 2700000 | Estimated Number of Row: 2700000 | Estimated Operator Cost: 25.9352 (79%) | Estimated Rebinds: 0 | Estimated Row Size: 65 B | Estimated Subtree Cost: 25.9352 | Forced Index: False | ForceScan: False | Logical Operation: Table Scan | Node ID: 3 | NoExpandHint: False | Object: [PremierProduct11].[dbo].[DataStore] | Output List: [PremierProduct11].[dbo].[DataStore].[KeyID], [PremierProduct11].[dbo].[DataStore].[AccountDesc] | Parallel: True | Physical Operation: Table Scan | Storage: RowStore | TableCardinality: 2700000

5. select ld.KeyID, ds.AccountDesc

from DataStore_IDX ds
left join LargeDataKey ld on ds.KeyID = ld.KeyID;

lab11_6288102.sql - DESKTOP-MERLANN\JCS393\PremierProduct11 (sa (RZ)) - Microsoft SQL Server Enterprise Manager

Object Explorer: Connect to DESKTOP-MERLANN\JCS393 (SQL Serv) | Databases | PremierProduct11

Query 13: Query cost (relative to the batch): 14%

```

-- Q5 select ld.KeyID, ds.AccountDesc
from DataStore ds
inner join SmallDataKey sd on ds.KeyID = sd.KeyID;

-- Q6 select ld.KeyID, ds.AccountDesc
from DataStore_IDX ds
left join LargeDataKey ld on ds.KeyID = ld.KeyID;

-- Q7 select ld.KeyID, ds.AccountDesc
from DataStore ds
left join LargeDataKey ld on ds.KeyID = ld.KeyID;

```

Execution plan: Query 13: Query cost (relative to the batch): 14%

Table Scan (Heap) [DataStore] (ds) Cost: 79 %

Table Scan (Heap) [PremierProduct11] [dbo] [LargeDataKey] (ld) Cost: 3 %

Hash Match (Right Outer Join) Cost: 3 %

Table Scan (Heap) [DataStore_IDX] (ds) Cost: 3 %

Properties window: Table Scan (Heap) [PremierProduct11] [dbo] [LargeDataKey] (ld)

- Defined Values: [PremierProduct11] [dbo] [LargeDataKey] (ld)
- Description: Scan rows from a table.
- Estimated CPU Cost: 0.470295
- Estimated Execution Mod: Batch
- Estimated I/O Cost: 3.96238
- Estimated Number of Exe: 1
- Estimated Number of Row: 2565100
- Estimated Number of Row: 2565100
- Estimated Number of Row: 2565100
- Estimated Operator Cost: 3.53268 (11%)
- Estimated Rebinds: 0
- Estimated Rewinds: 0
- Estimated Row Size: 11 B
- Estimated Subtree Cost: 3.53268
- Forced Index: False
- ForceScan: False
- ForceSeek: False
- Logical Operation: Table Scan
- Node ID: 2
- NoExpandHint: False
- Object: [PremierProduct11] [dbo] [LargeDataKey] (ld)
- Ordered: True
- Physical Operation: Table Scan
- Storage: RowStore
- Table Cardinality: 2565100

lab11_6288102.sql - DESKTOP-MERLANN\JCS393\PremierProduct11 (sa (RZ)) - Microsoft SQL Server Enterprise Manager

Object Explorer: Connect to DESKTOP-MERLANN\JCS393 (SQL Serv) | Databases | PremierProduct11

Query 13: Query cost (relative to the batch): 14%

```

-- Q5 select ld.KeyID, ds.AccountDesc
from DataStore ds
inner join SmallDataKey sd on ds.KeyID = sd.KeyID;

-- Q6 select ld.KeyID, ds.AccountDesc
from DataStore_IDX ds
left join LargeDataKey ld on ds.KeyID = ld.KeyID;

-- Q7 select ld.KeyID, ds.AccountDesc
from DataStore ds
left join LargeDataKey ld on ds.KeyID = ld.KeyID;

```

Execution plan: Query 13: Query cost (relative to the batch): 14%

Table Scan (Heap) [DataStore_IDX] (ds) Cost: 3 %

Table Scan (Heap) [PremierProduct11] [dbo] [LargeDataKey] (ld) Cost: 3 %

Hash Match (Right Outer Join) Cost: 3 %

Table Scan (Heap) [DataStore] (ds) Cost: 79 %

Properties window: Table Scan (Heap) [PremierProduct11] [dbo] [LargeDataKey] (ld)

- Defined Values: [PremierProduct11] [dbo] [LargeDataKey] (ld)
- Description: Scan rows from a table.
- Estimated CPU Cost: 0.470295
- Estimated Execution Mod: Batch
- Estimated I/O Cost: 3.96238
- Estimated Number of Exe: 1
- Estimated Number of Row: 2565100
- Estimated Number of Row: 2565100
- Estimated Number of Row: 2565100
- Estimated Operator Cost: 3.53268 (11%)
- Estimated Rebinds: 0
- Estimated Rewinds: 0
- Estimated Row Size: 11 B
- Estimated Subtree Cost: 3.53268
- Forced Index: False
- ForceScan: False
- ForceSeek: False
- Logical Operation: Table Scan
- Node ID: 2
- NoExpandHint: False
- Object: [PremierProduct11] [dbo] [LargeDataKey] (ld)
- Ordered: True
- Physical Operation: Table Scan
- Storage: RowStore
- Table Cardinality: 2565100

6. select ld.KeyID, ds.AccountDesc

from DataStore_IDX ds
right join LargeDataKey Id on ds.KeyID = Id.KeyID;

Query 13: Query cost (relative to the batch): 14%

```
-- Q5
select Id.KeyID, ds.AccountDesc
from DataStore_IDX ds
left join LargeDataKey Id on ds.KeyID = Id.KeyID;
```

Query 14: Query cost (relative to the batch): 14%

```
-- Q6
select Id.KeyID, ds.AccountDesc
from DataStore_IDX ds
right join LargeDataKey Id on ds.KeyID = Id.KeyID;
```

Execution Plan Details:

- Table Scan (Heap) [DataStore_IDX] [ds] Cost: 79 %
- Parallelism (Gather Streams) Cost: 0 %
- Hash Match (Right Outer Join) Cost: 0 %
- Table Scan (Heap) [LargeDataKey] [Id] Cost: 11 %
- Table Scan (Heap) [DataStore_IDX] [ds] Cost: 79 %

Properties: Table Scan (Heap)

- Defined Values: [PremierProduct11].[dbo].[LargeDataKey]
- Description: Scan rows from a table.
- Estimated CPU Cost: 0.470295
- Estimated Execution Mode: Batch
- Estimated I/O Cost: 3.96238
- Estimated Number of Exec: 1
- Estimated Number of Rows: 2585100
- Estimated Number of Rows Per Execution: 2585100
- Estimated Operator Cost: 3.53268 (11%)
- Estimated Subtree Cost: 3.53268
- Estimated CPU Cost: 0.470295
- Estimated Number of Executions: 1
- Estimated Number of Rows to be Read: 2585100
- Estimated Number of Rows Per Execution: 2585100
- Estimated Row Size: 11 B
- Ordered: False
- Node ID: 2
- NoExpandHint: False
- Object: [PremierProduct11].[dbo].[LargeDataKey]
- Output List: [PremierProduct11].[dbo].[LargeDataKey]
- Physical Operation: Table Scan
- Storage: RowStore
- Table Cardinality: 2585100

Query 13: Query cost (relative to the batch): 14%

```
-- Q5
select Id.KeyID, ds.AccountDesc
from DataStore_IDX ds
left join LargeDataKey Id on ds.KeyID = Id.KeyID;
```

Query 14: Query cost (relative to the batch): 14%

```
-- Q6
select Id.KeyID, ds.AccountDesc
from DataStore_IDX ds
right join LargeDataKey Id on ds.KeyID = Id.KeyID;
```

Execution Plan Details:

- Table Scan (Heap) [DataStore_IDX] [ds] Cost: 79 %
- Parallelism (Gather Streams) Cost: 0 %
- Hash Match (Right Outer Join) Cost: 0 %
- Table Scan (Heap) [LargeDataKey] [Id] Cost: 11 %
- Table Scan (Heap) [DataStore_IDX] [ds] Cost: 79 %

Properties: Table Scan (Heap)

- Defined Values: [PremierProduct11].[dbo].[DataStore_IDX]
- Description: Scan rows from a table.
- Estimated CPU Cost: 0.490208
- Estimated Execution Mode: Batch
- Estimated I/O Cost: 25.4402
- Estimated Number of Exec: 1
- Estimated Number of Rows: 2700000
- Estimated Number of Rows Per Execution: 2700000
- Estimated Operator Cost: 25.9352 (78%)
- Estimated Subtree Cost: 25.9352
- Estimated CPU Cost: 0.490208
- Estimated Number of Executions: 1
- Estimated Number of Rows to be Read: 2700000
- Estimated Number of Rows Per Execution: 2700000
- Estimated Row Size: 65 B
- Ordered: False
- Node ID: 3
- NoExpandHint: False
- Object: [PremierProduct11].[dbo].[DataStore_IDX]
- Output List: [PremierProduct11].[dbo].[DataStore_IDX]
- Physical Operation: Table Scan
- Storage: RowStore
- Table Cardinality: 2700000