Create and populate a time dimension table

Note:

You are not required to complete the processes, tasks, activities, or steps presented in this example. The various samples provided are for illustrative purposes only and it's likely that if you try this out you will encounter issues in your system.

You can populate time dimension tables in one of many ways, including T-SQL scripts using date/time functions, Microsoft Excel functions, importing from a flat file, or auto-generation by BI (business intelligence) tools. In this exercise, you will review a script that could populate the time dimension table using T-SQL but can be slow on an MPP system like Synapse Analytics. Then you will load the pre-computed results from a flat file which is a much faster process.

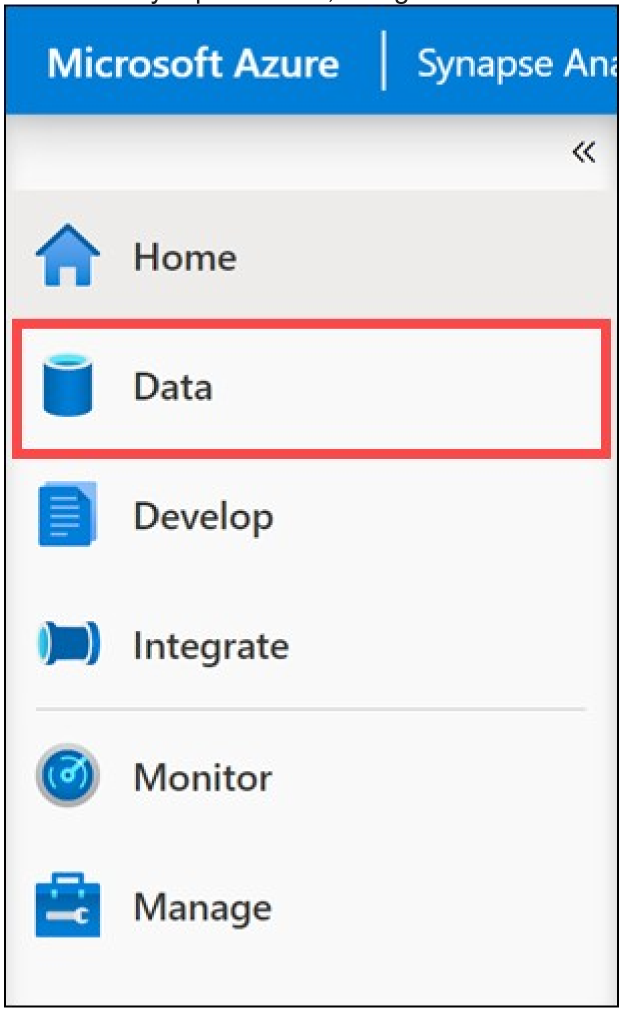
Review this code **without running it** to see how we could generate the data directly on Synapse Analytics dedicated SQL pool:

```
IF OBJECT_ID('tempdb..#DateTmp') IS NOT NULL
BEGIN
    DROP TABLE #DateTmp
END

CREATE TABLE #DateTmp (DateKey datetime NOT NULL)

-- Create temp table with all the dates we will use
DECLARE @StartDate datetime
DECLARE @EndDate datetime
SET @StartDate = '01/01/2005'
SET @EndDate = getdate()
DECLARE @LoopDate datetime
SET @LoopDate = @StartDate
WHILE @LoopDate <= @EndDate
BEGIN
INSERT INTO #DateTmp VALUES
    (
        @LoopDate
    )
    SET @LoopDate = DateAdd(dd, 1, @LoopDate)
END

INSERT INTO dbo.DimDate
SELECT
CAST(CONVERT(VARCHAR(8), DateKey, 112) AS int) , -- date key
        DateKey, -- date alt key
        Year(DateKey), -- calendar year
        datepart(qq, DateKey), -- calendar quarter
        Month(DateKey), -- month number of year
        datename(mm, DateKey), -- month name
        Day(DateKey),  -- day number of month
        datepart(dw, DateKey), -- day number of week
        datename(dw, DateKey), -- day name of week
        CASE
            WHEN Month(DateKey) < 7 THEN Year(DateKey)
            ELSE Year(DateKey) + 1
        END, -- Fiscal year (assuming fiscal year runs from Jul to June)
        CASE
            WHEN Month(DateKey) IN (1, 2, 3) THEN 3
```

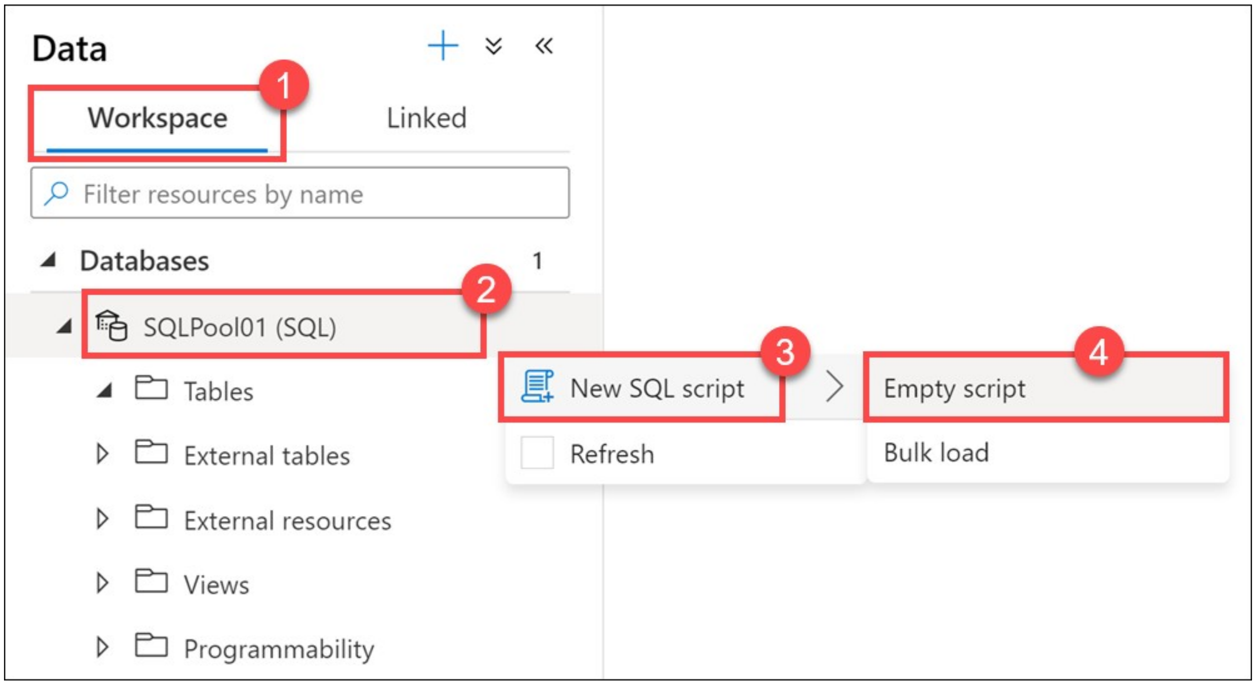
This looping method is not efficient for Synapse. This script took about 6 minutes on the smallest size dedicated pool. It is a case that is faster to use SQL Server, but it would only need generated one time.

Run the following to create and populate your time dimension:

1. In Synapse Studio, navigate to the **Data** hub.



2. Select the **Workspace** tab **(1)**, expand Databases, then right-click on **SQLPool01 (2)**. Select **New SQL script (3)**, then select **Empty script (4)**.



3. Paste **and execute** the following in the query window to create the time dimension table.

```
CREATE TABLE [dbo].[DimDate]
(
    [DateKey] [int]  NOT NULL,
    [DateAltKey] [datetime]  NOT NULL,
    [CalendarYear] [int]  NOT NULL,
    [CalendarQuarter] [int]  NOT NULL,
    [MonthOfYear] [int]  NOT NULL,
    [MonthName] [nvarchar](15)  NOT NULL,
    [DayOfMonth] [int]  NOT NULL,
    [DayOfWeek] [int]  NOT NULL,
    [DayName] [nvarchar](15)  NOT NULL,
    [FiscalYear] [int]  NOT NULL,
    [FiscalQuarter] [int]  NOT NULL
)
WITH
(
    DISTRIBUTION = REPLICATE,
    CLUSTERED COLUMNSTORE INDEX
);
GO
```

4. To populate the time dimension table in Azure Synapse, it is fastest to load the data from a delimited file. Replace **and execute** the following in the query window:

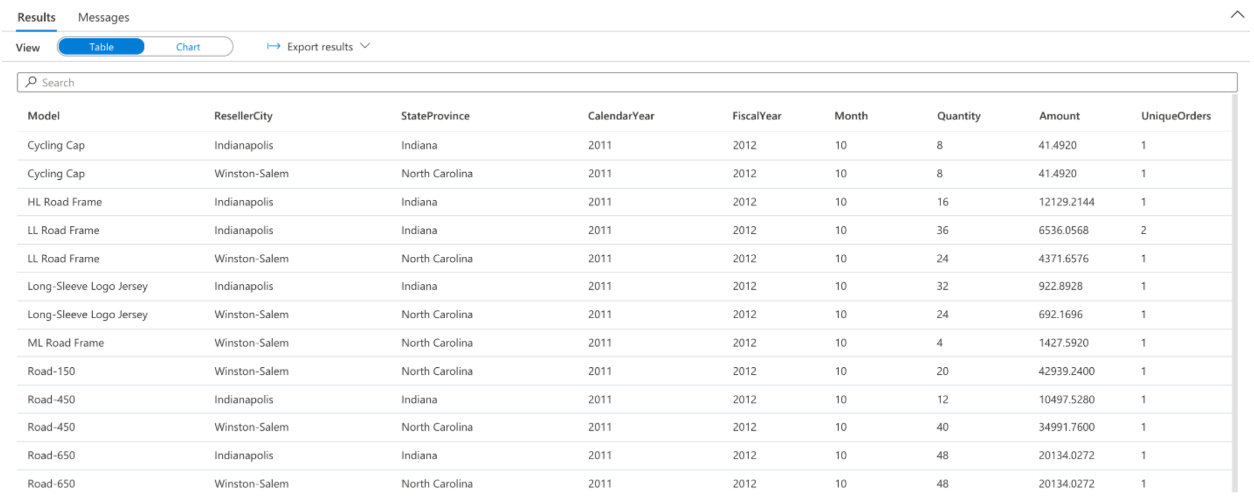
```
COPY INTO [dbo].[DimDate]
FROM 'https://solliancepublicdata.blob.core.windows.net/dataengineering/dp-203/awdata/DimDate.csv'
WITH (
    FILE_TYPE='CSV',
    FIELDTERMINATOR='|',
    FIELDQUOTE='',
    ROWTERMINATOR='0x0a',
    ENCODING = 'UTF16'
);
GO
```

5. Now we can use temporal attributes in our query. Replace **and execute** the query with the following to limit the results to October sales between the 2012 and 2013 fiscal years:

```sql
SELECT
    Coalesce(p.[ModelName], p.[EnglishProductName]) AS [Model]
    ,g.City AS ResellerCity
    ,g.StateProvinceName AS StateProvince
    ,d.[CalendarYear]
    ,d.[FiscalYear]
    ,d.[MonthOfYear] AS [Month]
    ,sum(f.OrderQuantity) AS Quantity
    ,sum(f.ExtendedAmount) AS Amount
    ,approx_count_distinct(f.SalesOrderNumber) AS UniqueOrders
FROM
    [dbo].[FactResellerSales] f
INNER JOIN [dbo].[DimReseller] r
    ON f.ResellerKey = r.ResellerKey
INNER JOIN [dbo].[DimGeography] g
    ON r.GeographyKey = g.GeographyKey
INNER JOIN [dbo].[DimDate] d
    ON f.[OrderDateKey] = d.[DateKey]
```

```
INNER JOIN [dbo].[DimProduct] p
    ON f.[ProductKey] = p.[ProductKey]
WHERE d.[MonthOfYear] = 10 AND d.[FiscalYear] IN (2012, 2013)
GROUP BY
    Coalesce(p.[ModelName], p.[EnglishProductName])
    ,g.City
    ,g.StateProvinceName
    ,d.[CalendarYear]
    ,d.[FiscalYear]
    ,d.[MonthOfYear]
ORDER BY d.[FiscalYear]
```

You should see an output similar to the following:



Model	ResellerCity	StateProvince	CalendarYear	FiscalYear	Month	Quantity	Amount	UniqueOrders
Cycling Cap	Indianapolis	Indiana	2011	2012	10	8	41.4920	1
Cycling Cap	Winston-Salem	North Carolina	2011	2012	10	8	41.4920	1
HL Road Frame	Indianapolis	Indiana	2011	2012	10	16	12129.2144	1
LL Road Frame	Indianapolis	Indiana	2011	2012	10	36	6536.0568	2
LL Road Frame	Winston-Salem	North Carolina	2011	2012	10	24	4371.6576	1
Long-Sleeve Logo Jersey	Indianapolis	Indiana	2011	2012	10	32	922.8928	1
Long-Sleeve Logo Jersey	Winston-Salem	North Carolina	2011	2012	10	24	692.1696	1
ML Road Frame	Winston-Salem	North Carolina	2011	2012	10	4	1427.5920	1
Road-150	Winston-Salem	North Carolina	2011	2012	10	20	42939.2400	1
Road-450	Indianapolis	Indiana	2011	2012	10	12	10497.5280	1
Road-450	Winston-Salem	North Carolina	2011	2012	10	40	34991.7600	1
Road-650	Indianapolis	Indiana	2011	2012	10	48	20134.0272	1
Road-650	Winston-Salem	North Carolina	2011	2012	10	48	20134.0272	1