LAPORAN TUGAS BESAR
PERGUDANGAN DATA
MISI 2

Oleh :

Kelompok 10

1. **Fadhil Fitra Wijaya - 122450082**
2. **Ali Aristo Muthahhari Parisi - 123450088**
3. **Benget Sidabutar - 123450047**
4. **Nobel Nizam Fathirizkii - 123450117**
5.

Misi 2 Pergudangan Data

Kelompok 8

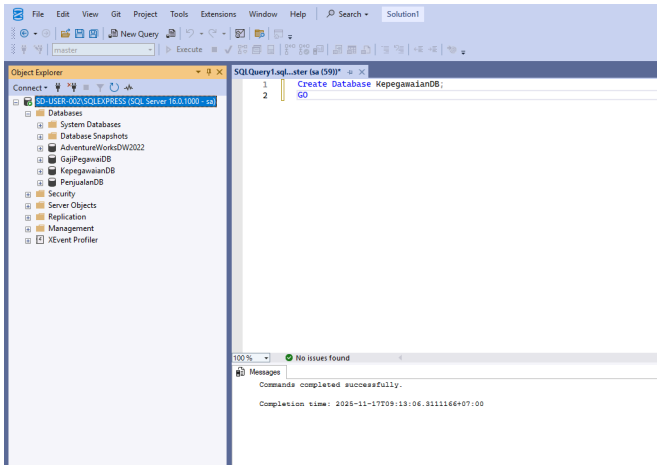
Anggota

- Fadhil Fitra Wijaya - 122450082
- Benget Sidabautar - 123450047
- Nobel Nizam - 123450117
- Ali Aristo Aristo Muthahhari Parisi - 123450088

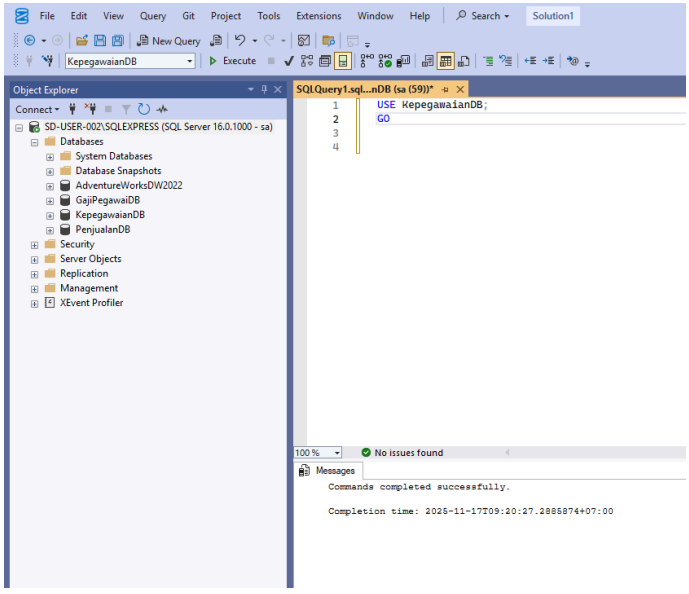
Progres Misi 2

A. DATABASE KEPEGAWAIAN

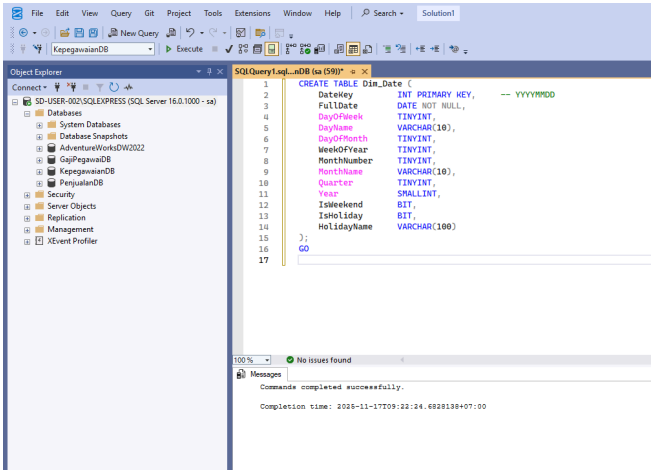
1. Membuat Database Kepegawaian



2. Menggunakan Database Kepegawaian



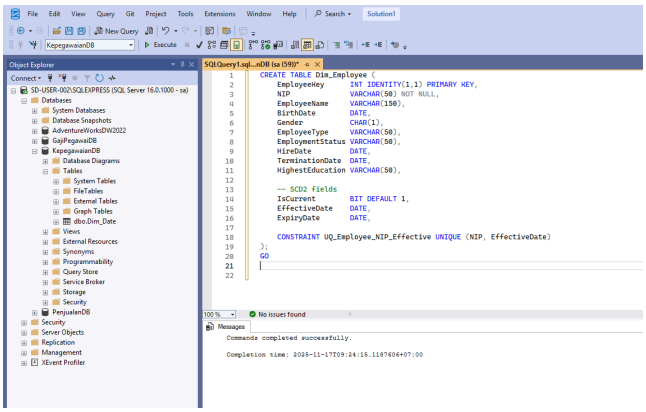
3. Membuat Dimensi Tabel
    - Tabel 1 (Dim_Date)



```
CREATE TABLE Dim_Date (
    DateKey         INT PRIMARY KEY,     -- YYYYMMDD
    FullDate        DATE NOT NULL,
    DayOfWeek       TINYINT,
    DayName         VARCHAR(10),
    DayOfMonth      TINYINT,
    WeekOfYear      TINYINT,
    MonthNumber     TINYINT,
    MonthName       VARCHAR(10),
    Quarter         TINYINT,
    Year            SMALLINT,
    IsWeekend       BIT,
    IsHoliday       BIT,
    HolidayName     VARCHAR(100)
);
GO
```

```
Commands completed successfully.

Completion time: 2025-11-17T09:22:24.6928138+07:00
```

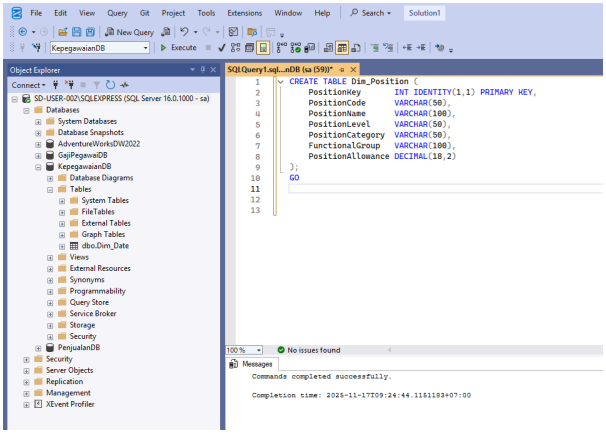
    - Tabel 2 (Dim_Employee)



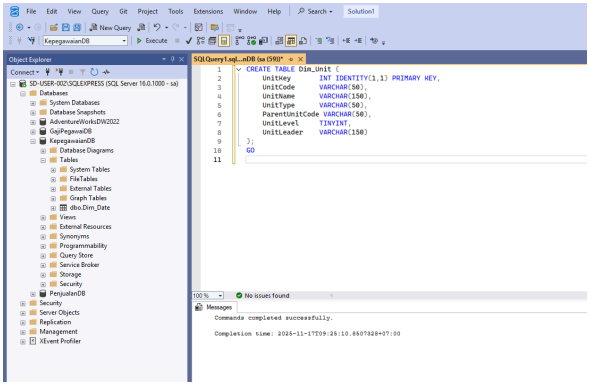
```
CREATE TABLE Dim_Employee (
    EmployeeKey     INT IDENTITY(1,1) PRIMARY KEY,
    NIP             VARCHAR(50) NOT NULL,
    EmployeeName    VARCHAR(150),
    BirthDate       DATE,
    Gender          CHAR(1),
    EmployeeType    VARCHAR(50),
    EmploymentStatus VARCHAR(50),
    HireDate        DATE,
    TerminationDate DATE,
    HighestEducation VARCHAR(50),

    -- SCD2 fields
    IsCurrent       BIT DEFAULT 1,
    EffectiveDate   DATE,
    ExpiryDate      DATE,

    CONSTRAINT UQ_Employee_NIP_Effective UNIQUE (NIP, EffectiveDate)
);
GO
```

```
Commands completed successfully.

Completion time: 2025-11-17T09:24:15.1187606+07:00
```

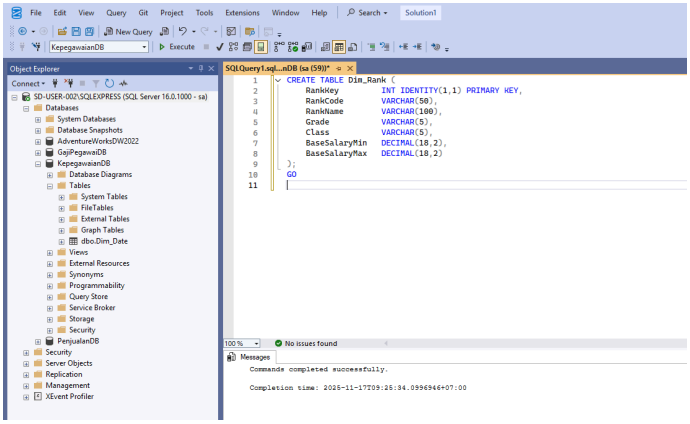
- Tabel 3 (Dim_Position)



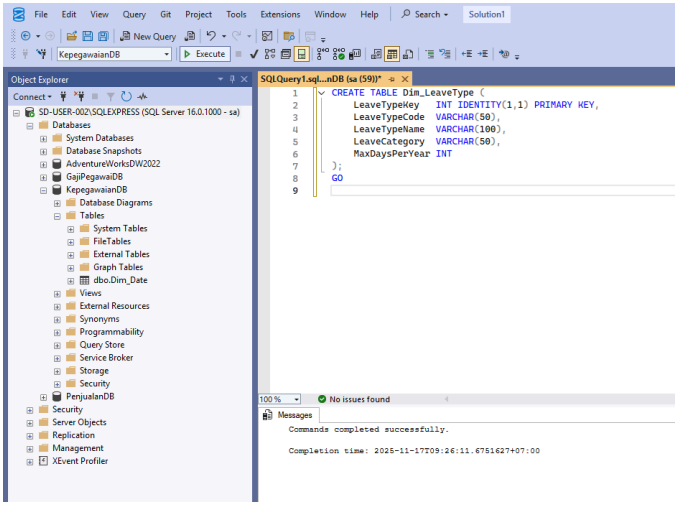
- Tabel 4 (Dim_Unit)



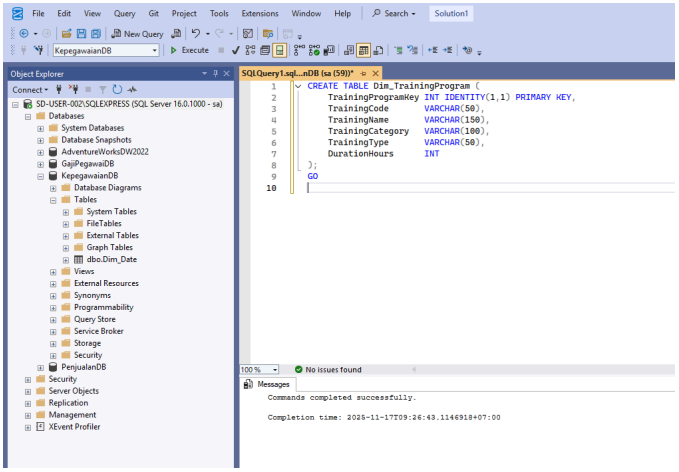
- Tabel 5 (Dim_Rank)



- Tabel 6 (Dim_LeaveType)

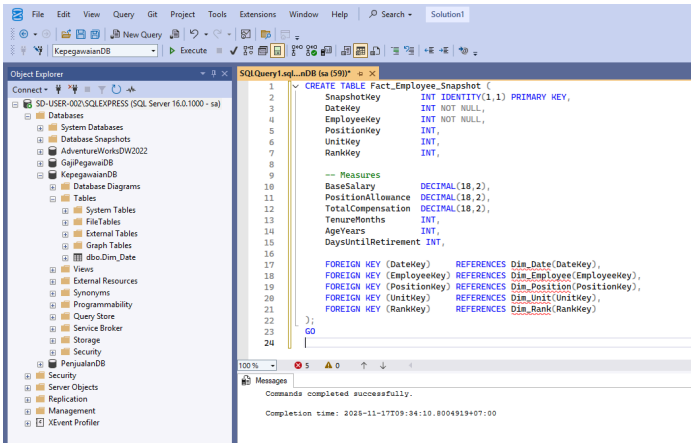


- Tabel 7 (Dim_Training Program)

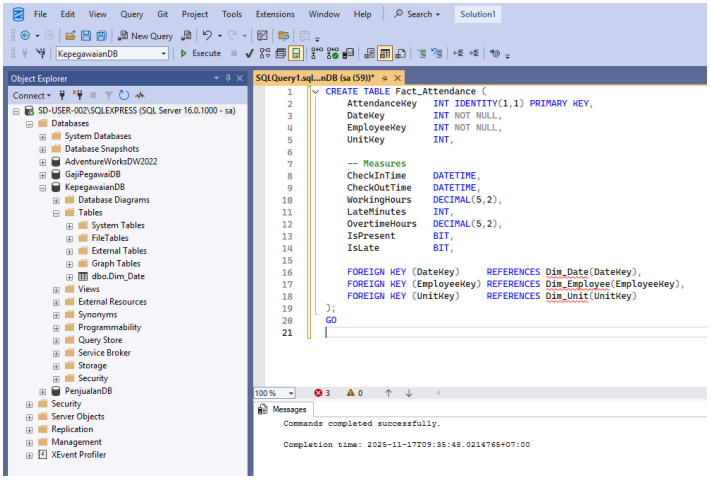


4. Tabel Fact

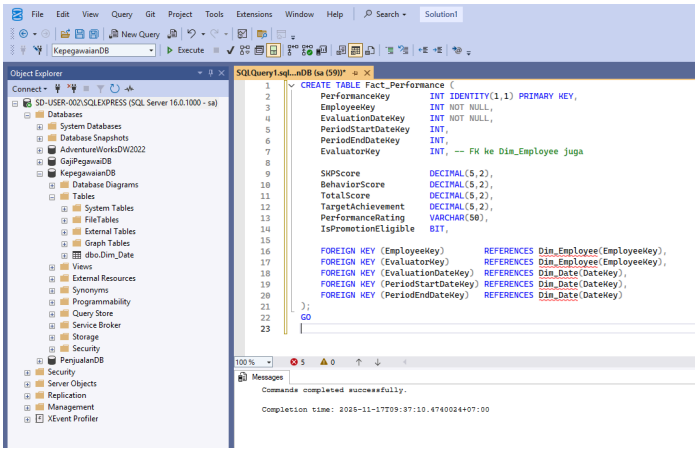
- Fact_Employee_Snapshot



- Fact_Attendance

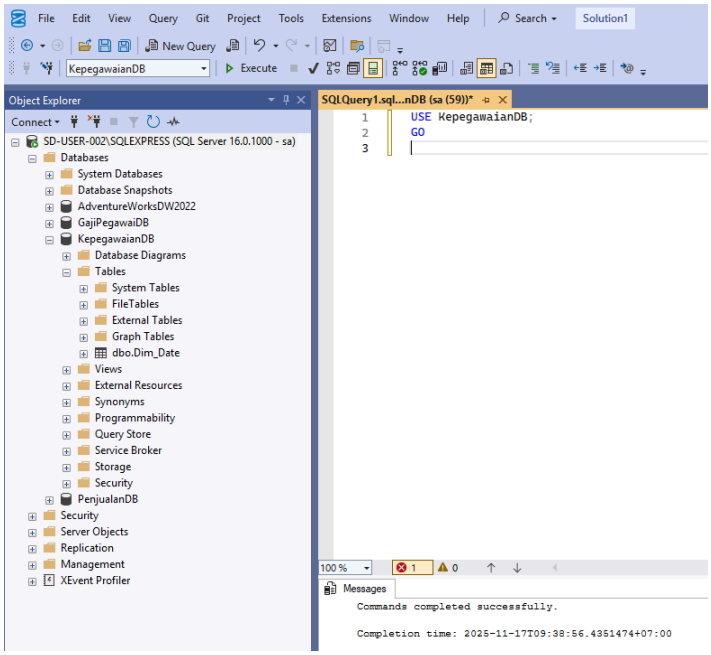


- Fact_Performance


File Edit View Query Git Project Tools Extensions Window Help Search Solution1
New Query
KepegawaianDB
Execute
Object Explorer
Connect
SD-USER-002\SQLEXPRESS (SQL Server 16.0.1000 - sa)
Databases
System Databases
Database Snapshots
AdventureWorksDW2022
GajiPegawaiDB
KepegawaianDB
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.Dim_Date
Views
External Resources
Synonyms
Programmability
Query Store
Service Broker
Storage
Security
PenjualanDB
Security
Server Objects
Replication
Management
XEvent Profiler
SQLQuery1.sql...nDB (sa (59))*
1 CREATE TABLE Fact_Performance (
2 PerformanceKey INT IDENTITY(1,1) PRIMARY KEY,
3 EmployeeKey INT NOT NULL,
4 EvaluationDateKey INT NOT NULL,
5 PeriodStartDateKey INT,
6 PeriodEndDateKey INT,
7 EvaluatorKey INT, -- FK ke Dim_Employee juga
8
9 SKPScore DECIMAL(5,2),
10 BehaviorScore DECIMAL(5,2),
11 TotalScore DECIMAL(5,2),
12 TargetAchievement DECIMAL(5,2),
13 PerformanceRating VARCHAR(50),
14 IsPromotionEligible BIT,
15
16 FOREIGN KEY (EmployeeKey) REFERENCES Dim_Employee(EmployeeKey),
17 FOREIGN KEY (EvaluatorKey) REFERENCES Dim_Employee(EmployeeKey),
18 FOREIGN KEY (EvaluationDateKey) REFERENCES Dim_Date(DateKey),
19 FOREIGN KEY (PeriodStartDateKey) REFERENCES Dim_Date(DateKey),
20 FOREIGN KEY (PeriodEndDateKey) REFERENCES Dim_Date(DateKey)
21);
22 GO
23
100 %
5
0
Messages
Commands completed successfully.
Completion time: 2025-11-17T09:37:10.4740024+07:00

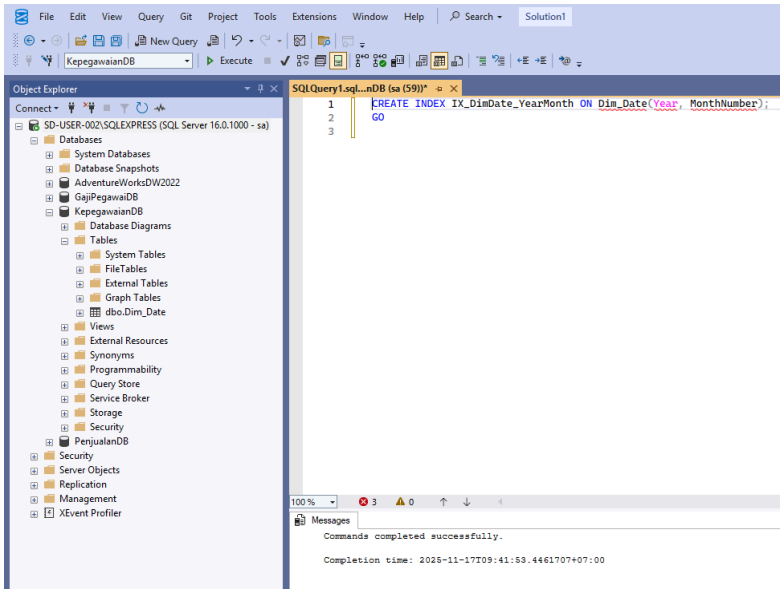
B. MELAKUKAN INDEXES

1. INDEXES FOR KepegawaianDB

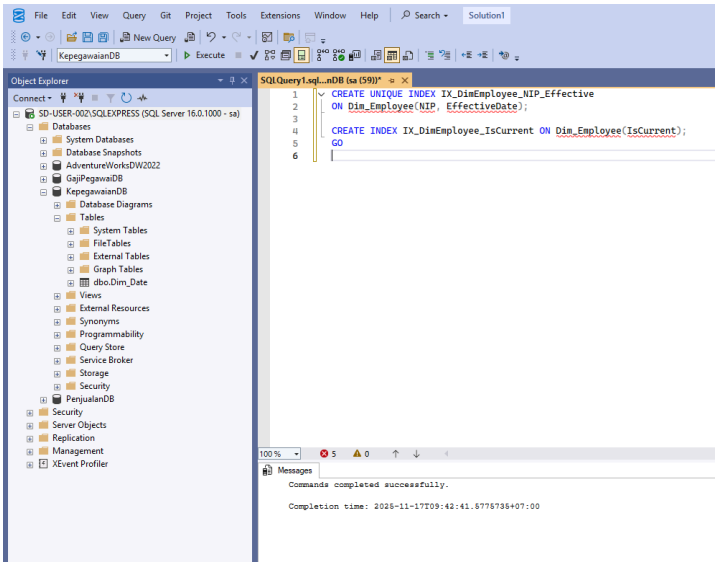


A. INDEX UNTUK DIMENSION TABLES

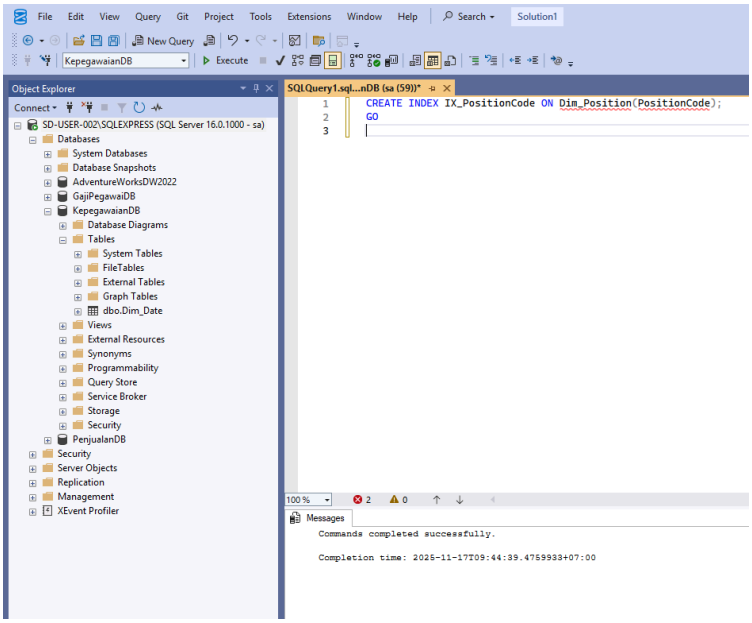
- Dim_Date



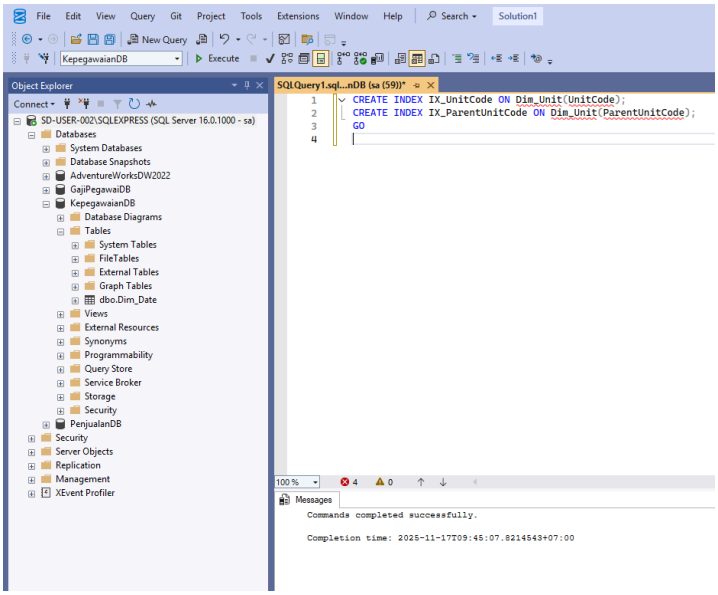
- Dim_Employee



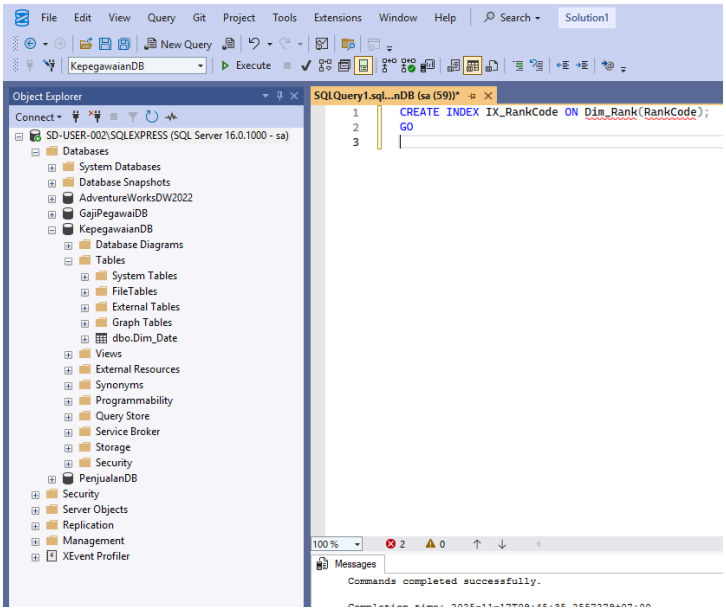
- Dim_Position



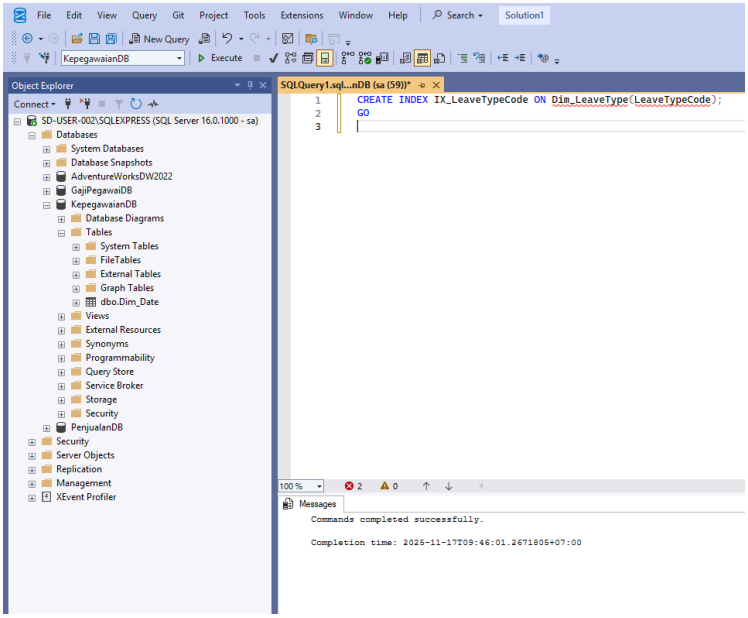
- Dim_Unit



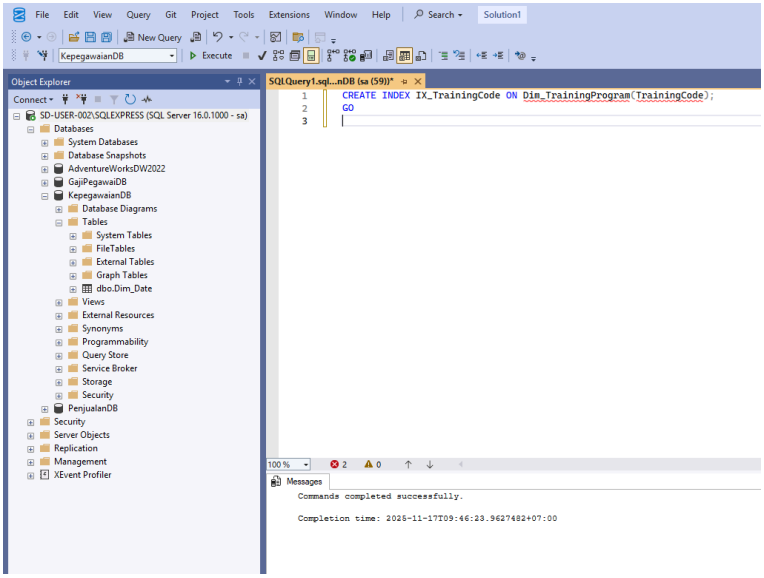
- Dim_Rank



- Dim_LeaveType

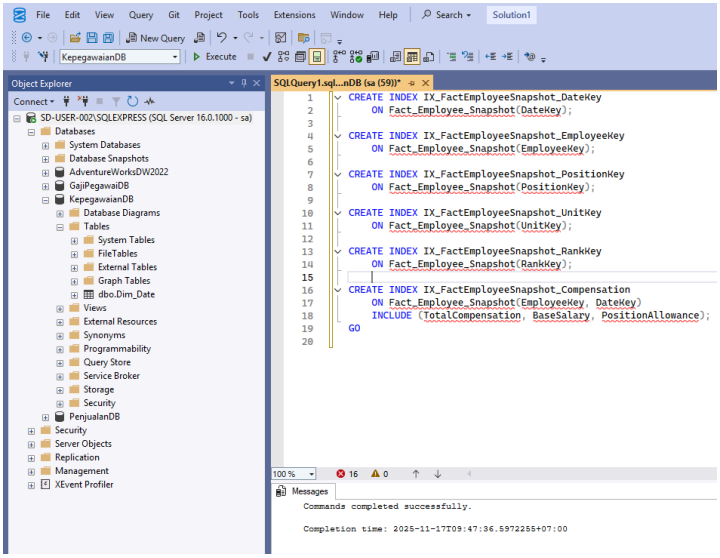


- Dim_TrainingProgram

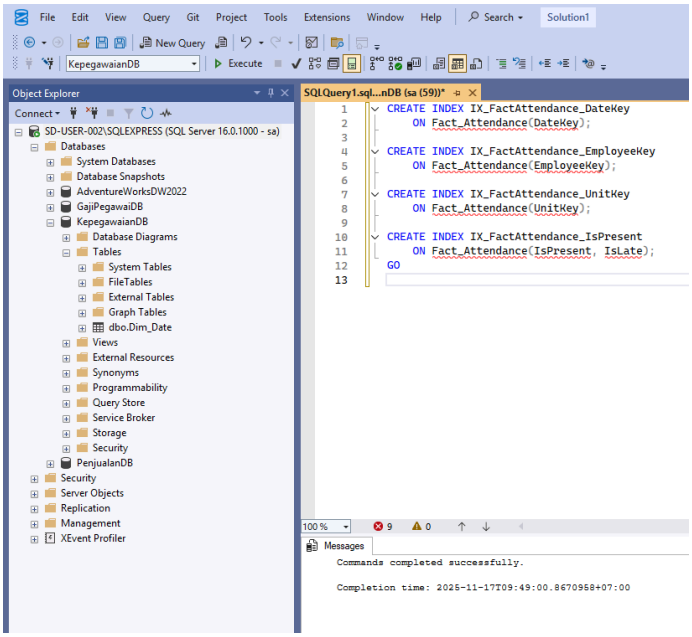


B. INDEX UNTUK FACT TABLES (FK + Query Fields)

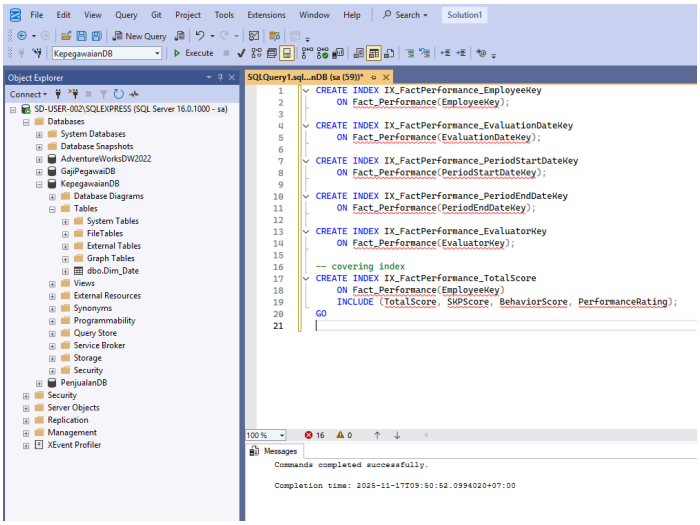
- Fact_Employee_Snapshot



- Fact_Attendance

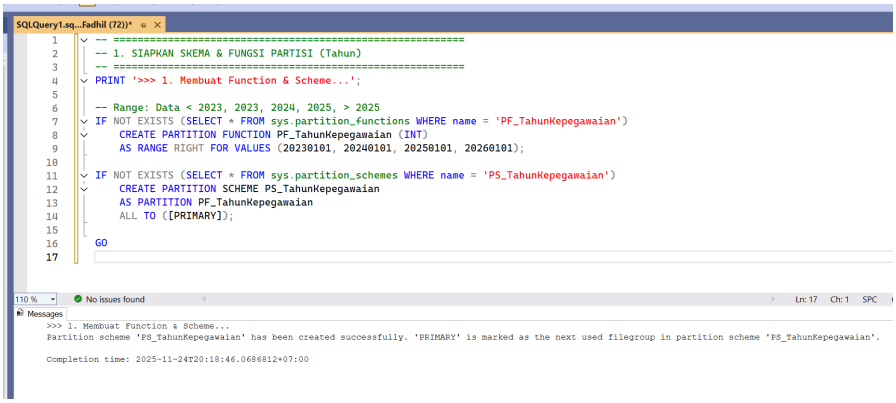


- Fact_Performance

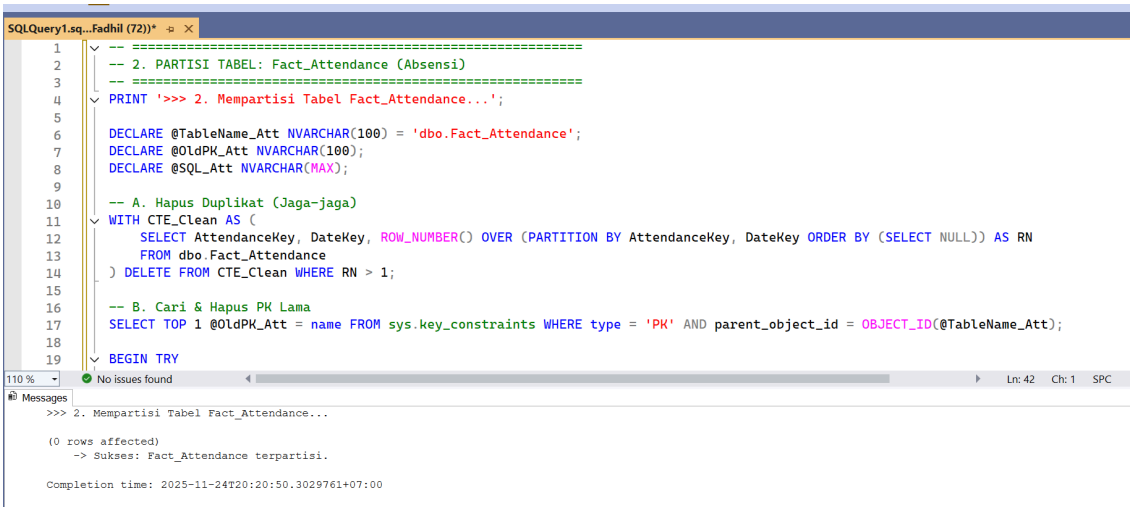


C. MELAKUKAN PARTITIONING

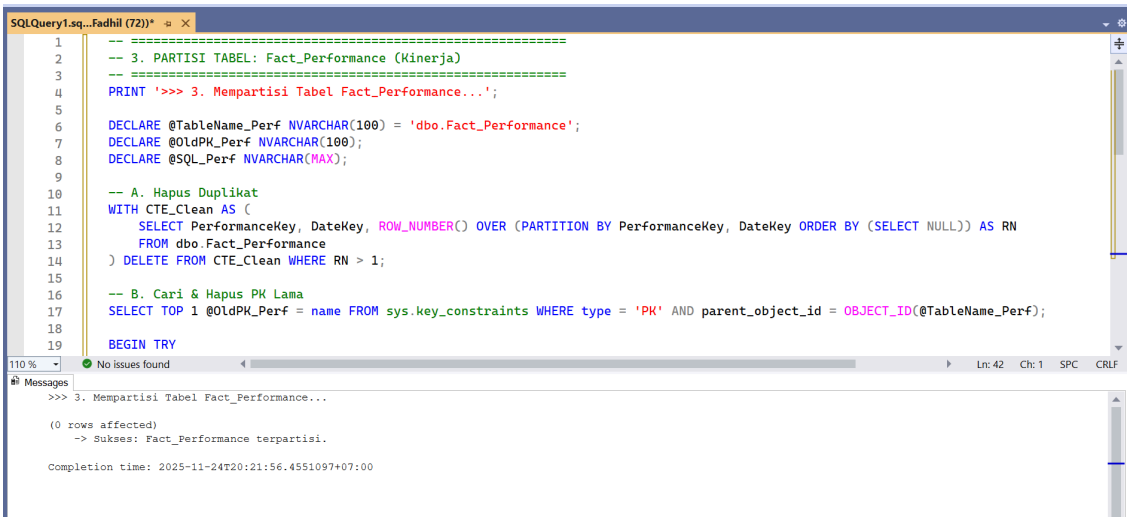
a. Memuat Skema dan Fungsi Partisi



b. Partisi Tabel Fakta

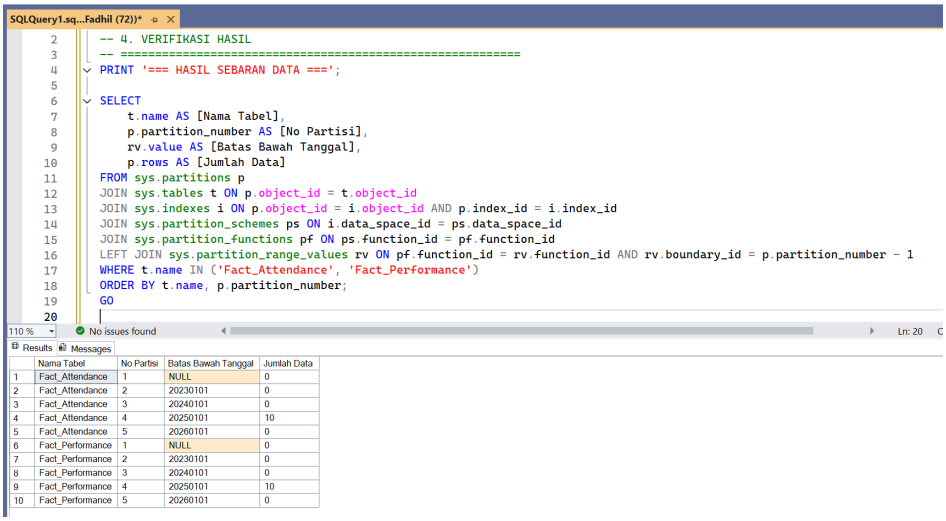


```
SQLQuery1.sq...Fadhil (72))*
-- ============================================================
-- 2. PARTISI TABEL: Fact_Attendance (Absensi)
-- ============================================================
PRINT '>>> 2. Mempartisi Tabel Fact_Attendance...';

DECLARE @TableName_Att NVARCHAR(100) = 'dbo.Fact_Attendance';
DECLARE @OldPK_Att NVARCHAR(100);
DECLARE @SQL_Att NVARCHAR(MAX);

-- A. Hapus Duplikat (Jaga-jaga)
WITH CTE_Clean AS (
    SELECT AttendanceKey, DateKey, ROW_NUMBER() OVER (PARTITION BY AttendanceKey, DateKey ORDER BY (SELECT NULL)) AS RN
    FROM dbo.Fact_Attendance
) DELETE FROM CTE_Clean WHERE RN > 1;

-- B. Cari & Hapus PK Lama
SELECT TOP 1 @OldPK_Att = name FROM sys.key_constraints WHERE type = 'PK' AND parent_object_id = OBJECT_ID(@TableName_Att);

BEGIN TRY
110 %   No issues found   Ln: 42   Ch: 1   SPC

Messages
>>> 2. Mempartisi Tabel Fact_Attendance...

(0 rows affected)
    -> Sukses: Fact_Attendance terpartisi.

Completion time: 2025-11-24T20:20:50.3029761+07:00
```



```
SQLQuery1.sq...Fadhil (72))*
-- ============================================================
-- 3. PARTISI TABEL: Fact_Performance (Kinerja)
-- ============================================================
PRINT '>>> 3. Mempartisi Tabel Fact_Performance...';

DECLARE @TableName_Perf NVARCHAR(100) = 'dbo.Fact_Performance';
DECLARE @OldPK_Perf NVARCHAR(100);
DECLARE @SQL_Perf NVARCHAR(MAX);

-- A. Hapus Duplikat
WITH CTE_Clean AS (
    SELECT PerformanceKey, DateKey, ROW_NUMBER() OVER (PARTITION BY PerformanceKey, DateKey ORDER BY (SELECT NULL)) AS RN
    FROM dbo.Fact_Performance
) DELETE FROM CTE_Clean WHERE RN > 1;

-- B. Cari & Hapus PK Lama
SELECT TOP 1 @OldPK_Perf = name FROM sys.key_constraints WHERE type = 'PK' AND parent_object_id = OBJECT_ID(@TableName_Perf);

BEGIN TRY
110 %   No issues found   Ln: 42   Ch: 1   SPC   CRLF

Messages
>>> 3. Mempartisi Tabel Fact_Performance...

(0 rows affected)
    -> Sukses: Fact_Performance terpartisi.

Completion time: 2025-11-24T20:21:56.4551097+07:00
```

c. Cek Validasi



```sql
-- 4. VERIFIKASI HASIL
-- ============================================================
PRINT '=== HASIL SEBARAN DATA ===';

SELECT
    t.name AS [Nama Tabel],
    p.partition_number AS [No Partisi],
    rv.value AS [Batas Bawah Tanggal],
    p.rows AS [Jumlah Data]
FROM sys.partitions p
JOIN sys.tables t ON p.object_id = t.object_id
JOIN sys.indexes i ON p.object_id = i.object_id AND p.index_id = i.index_id
JOIN sys.partition_schemes ps ON i.data_space_id = ps.data_space_id
JOIN sys.partition_functions pf ON ps.function_id = pf.function_id
LEFT JOIN sys.partition_range_values rv ON pf.function_id = rv.function_id AND rv.boundary_id = p.partition_number - 1
WHERE t.name IN ('Fact_Attendance', 'Fact_Performance')
ORDER BY t.name, p.partition_number;
GO
```

No issues found

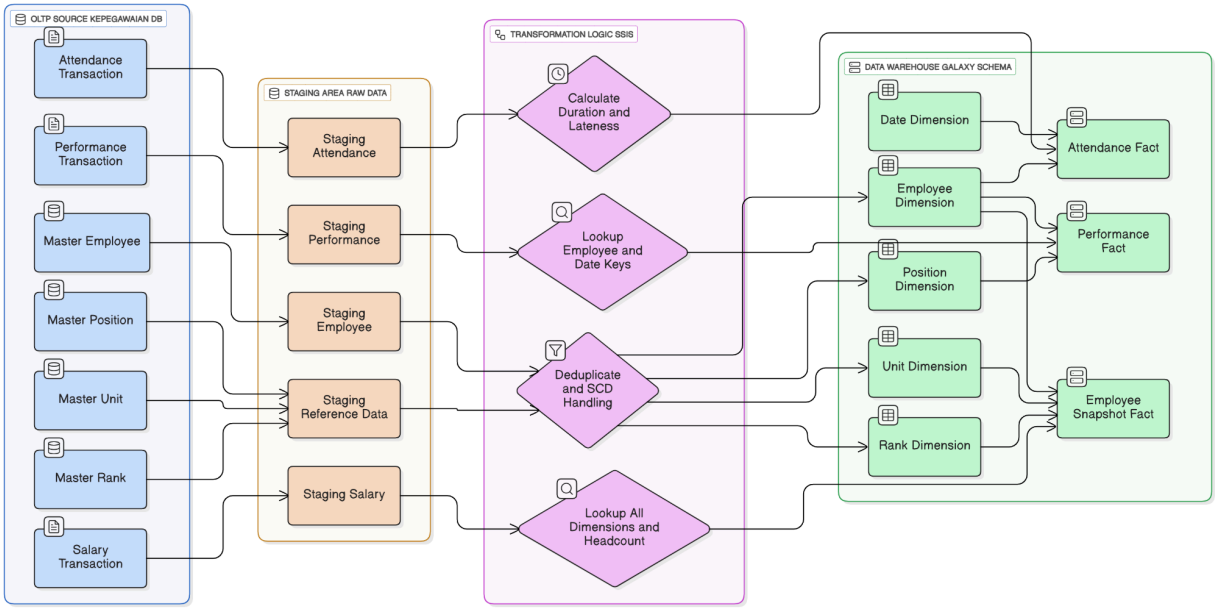
	Nama Tabel	No Partisi	Batas Bawah Tanggal	Jumlah Data
1	Fact_Attendance	1	NULL	0
2	Fact_Attendance	2	20230101	0
3	Fact_Attendance	3	20240101	0
4	Fact_Attendance	4	20250101	10
5	Fact_Attendance	5	20260101	0
6	Fact_Performance	1	NULL	0
7	Fact_Performance	2	20230101	0
8	Fact_Performance	3	20240101	0
9	Fact_Performance	4	20250101	10
10	Fact_Performance	5	20260101	0

Data masih banyak yang null karena masih menggunakan data dummy.

D. MEMBUAT STAGING TABLES

```sql
-- ============================================================
-- MEMBUAT STAGING TABLES
-- ============================================================

-- Buat Schema khusus Staging agar rapi
CREATE SCHEMA Staging;
GO

-- Buat tabel Staging (Strukturnya mirip OLTP tapi tidak ada FK/Constraint ketat)
CREATE TABLE Staging.MsPegawai (
    NIP VARCHAR(20),
    NamaLengkap VARCHAR(150),
    TglLahir DATE,
    JenisKelamin VARCHAR(10),
    StatusPegawai VARCHAR(50),
    KodeUnit VARCHAR(10),
    KodeJabatan VARCHAR(10),
    KodeGolongan VARCHAR(10)
);

CREATE TABLE Staging.TrAbsensi (
    NIP VARCHAR(20),
    Tanggal DATE,
    JamMasuk TIME(0),
    JamKeluar TIME(0),
    StatusKehadiran VARCHAR(20)
);

CREATE TABLE Staging.TrGaji (
    NIP VARCHAR(20),
    Bulan INT,
    Tahun INT,
    GajiPokok DECIMAL(18,2)
);

CREATE TABLE Staging.TrPenilaian (
    NIP VARCHAR(20),
    TglEvaluasi DATE,
    TotalSkor DECIMAL(5,2),
    Grade VARCHAR(5)
);
GO
```

E. ETL DESIGN



Strategi ETL menggunakan Script, menggunakan bahasa **T-SQL (Transact-SQL)** yang spesifik untuk lingkungan **Microsoft SQL Server** Berikut adalah rincian perintah dan logika kunci yang digunakan dalam *script*:

a. **Control Flow:**
   i. **CREATE OR ALTER PROCEDURE**: Membungkus seluruh logika dalam satu objek yang mudah dieksekusi ulang atau diperbarui.
   ii. **SET NOCOUNT ON**: Mengoptimalkan kinerja jaringan dengan mencegah pengiriman pesan "x rows affected" yang tidak perlu.
   iii. **DECLARE ... GETDATE()**: Digunakan untuk *logging* durasi proses.

b. **Data Manipulation (DML):**
   i. **TRUNCATE TABLE**: Membersihkan tabel *Staging* dengan cepat sebelum data baru dimuat (Reset log).
   ii. **INSERT INTO ... SELECT**: Memindahkan data secara massal (*bulk insert*).
   iii. **MERGE**: Digunakan pada **Dim_Employee** untuk menangani logika *Upsert* (Update jika ada, Insert jika baru).
   iv. **DELETE**: Menghapus data spesifik pada Fact Table sebelum insert ulang untuk mencegah duplikasi.

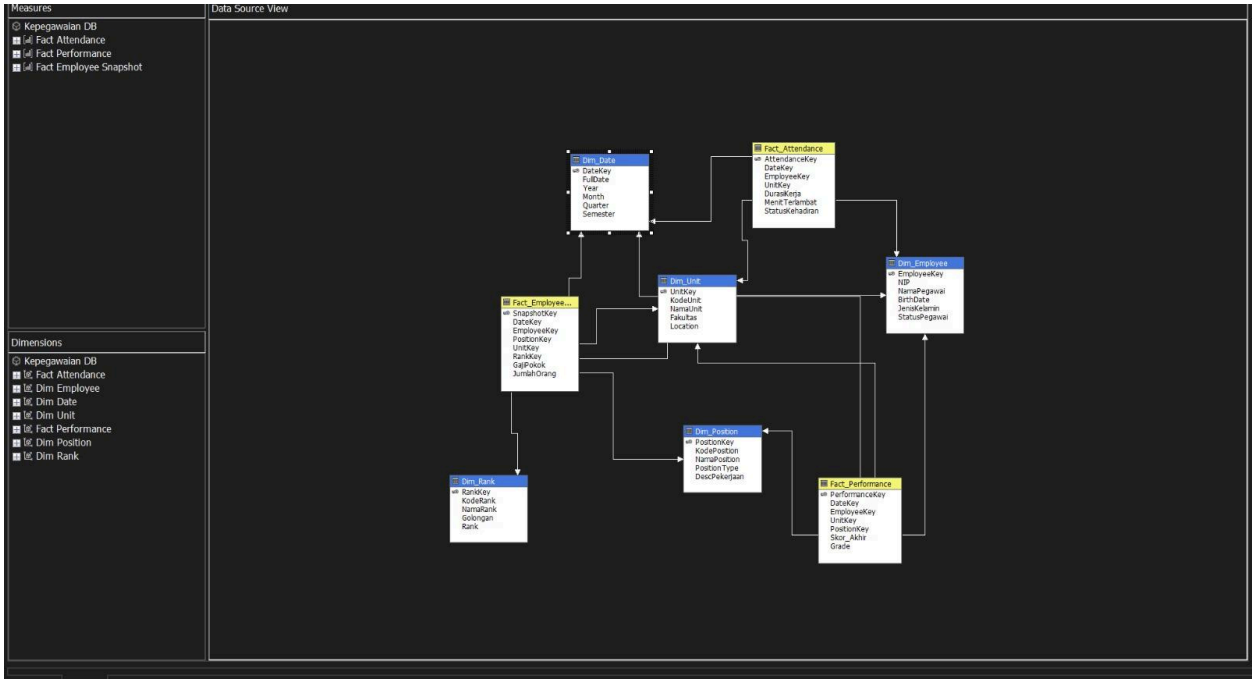
c. **Transformasi & Fungsi:**
   i. **DATEDIFF**: Menghitung durasi kerja dan keterlambatan (dalam menit).

ii. **CAST/CONVERT**: Mengubah format tanggal menjadi **DateKey** (format integer **YYYYMMDD**).
iii. **ISNULL**: Menangani nilai *NULL* dengan memberikan nilai *default* (biasanya -1 untuk *Unknown Member*).
iv. **CASE WHEN**: Logika bisnis untuk menentukan apakah pegawai terlambat (setelah 07:30).

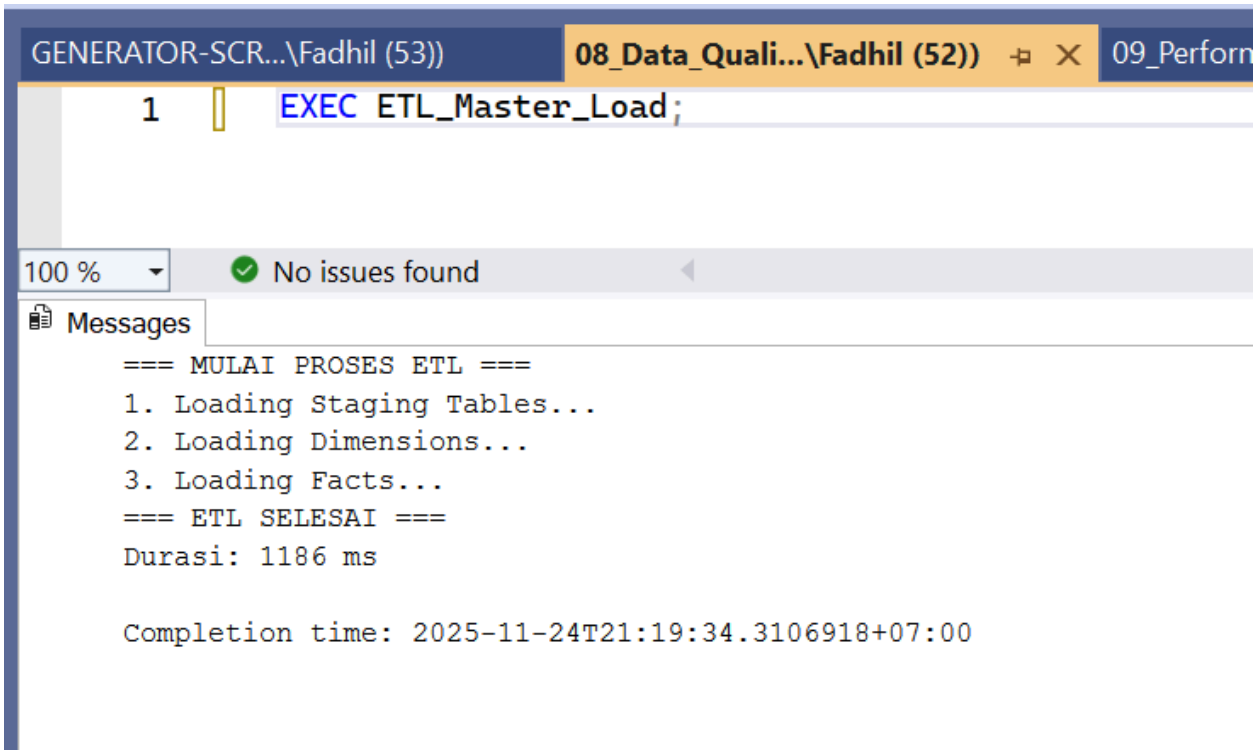
Alur Data (Data Flow):

1. **Source (OLTP):** Data transaksional mentah (tabel **Ms...** dan **Tr...**).
2. **Staging Area:** Tempat pendaratan sementara (**Staging.MsPegawai**, dll). Data di sini adalah salinan persis dari Source tetapi di-*truncate* setiap kali proses berjalan.
3. **Data Warehouse (OLAP):** Tujuan akhir dengan skema **Galaxy Schema**.
    - **Dimensions:** Tabel referensi (**Dim_Unit**, **Dim_Employee**).
    - **Facts:** Tabel transaksi bisnis yang berisi metrik (**Fact_Attendance**, **Fact_Performance, Fact_Employee_Snapshot**).

F. ETL DESIGN TERIMPLEMENTASI



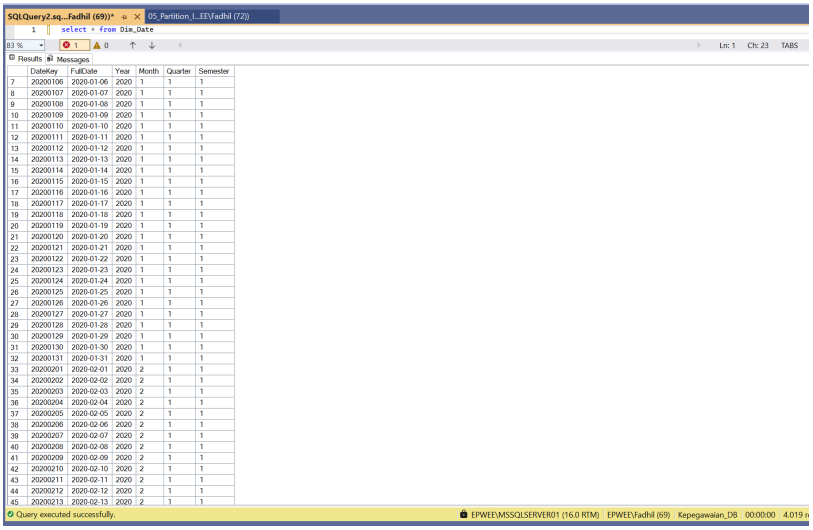
Design ETL terimplementasi menggunakan SSIS Datacube Visual Studio, walaupun ETL yang kami gunakan menggunakan Script untuk Proses ETL nya.



ETL Berjalan dengan lancar menggunakan Script T-Sql + Staging.

G. DATA LOADED SUCCESFULLY

a. Dim_Date

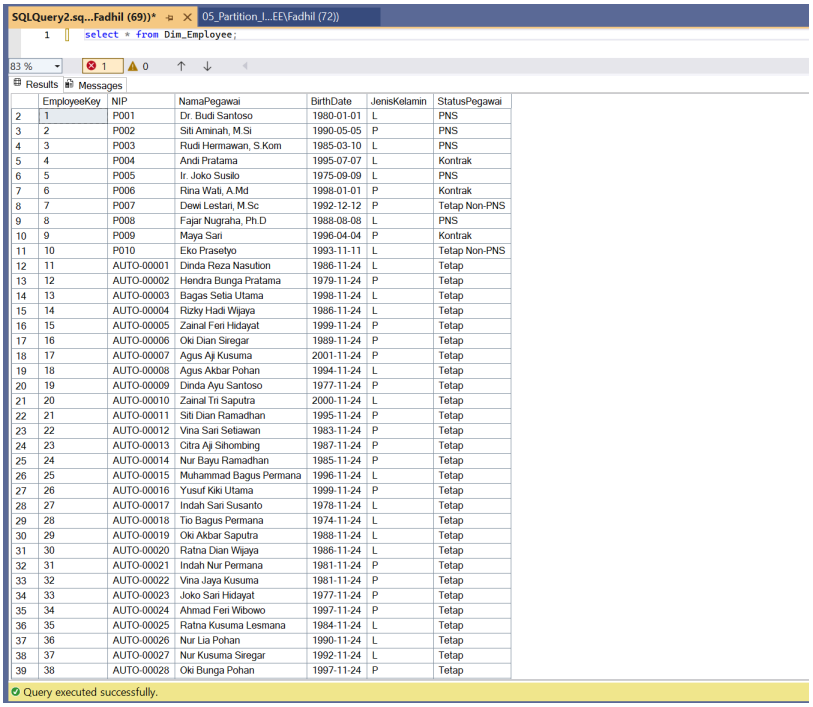


```
select * from Dim_Date
```

	DateKey	FullDate	Year	Month	Quarter	Semester
7	20200106	2020-01-06	2020	1	1	1
8	20200107	2020-01-07	2020	1	1	1
9	20200108	2020-01-08	2020	1	1	1
10	20200109	2020-01-09	2020	1	1	1
11	20200110	2020-01-10	2020	1	1	1
12	20200111	2020-01-11	2020	1	1	1
13	20200112	2020-01-12	2020	1	1	1
14	20200113	2020-01-13	2020	1	1	1
15	20200114	2020-01-14	2020	1	1	1
16	20200115	2020-01-15	2020	1	1	1
17	20200116	2020-01-16	2020	1	1	1
18	20200117	2020-01-17	2020	1	1	1
19	20200118	2020-01-18	2020	1	1	1
20	20200119	2020-01-19	2020	1	1	1
21	20200120	2020-01-20	2020	1	1	1
22	20200121	2020-01-21	2020	1	1	1
23	20200122	2020-01-22	2020	1	1	1
24	20200123	2020-01-23	2020	1	1	1
25	20200124	2020-01-24	2020	1	1	1
26	20200125	2020-01-25	2020	1	1	1
27	20200126	2020-01-26	2020	1	1	1
28	20200127	2020-01-27	2020	1	1	1
29	20200128	2020-01-28	2020	1	1	1
30	20200129	2020-01-29	2020	1	1	1
31	20200130	2020-01-30	2020	1	1	1
32	20200131	2020-01-31	2020	1	1	1
33	20200201	2020-02-01	2020	2	1	1
34	20200202	2020-02-02	2020	2	1	1
35	20200203	2020-02-03	2020	2	1	1
36	20200204	2020-02-04	2020	2	1	1
37	20200205	2020-02-05	2020	2	1	1
38	20200206	2020-02-06	2020	2	1	1
39	20200207	2020-02-07	2020	2	1	1
40	20200208	2020-02-08	2020	2	1	1
41	20200209	2020-02-09	2020	2	1	1
42	20200210	2020-02-10	2020	2	1	1
43	20200211	2020-02-11	2020	2	1	1
44	20200212	2020-02-12	2020	2	1	1
45	20200213	2020-02-13	2020	2	1	1

Query executed successfully.

b. Dim_Employee

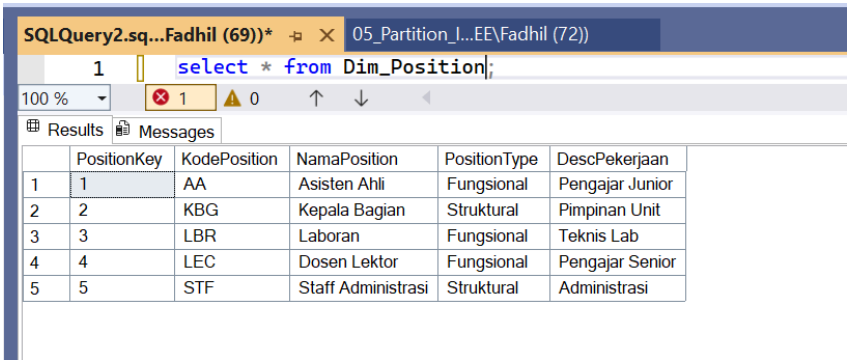


```
select * from Dim_Employee;
```

	EmployeeKey	NIP	NamaPegawai	BirthDate	JenisKelamin	StatusPegawai
2	1	P001	Dr. Budi Santoso	1980-01-01	L	PNS
3	2	P002	Siti Aminah, M.Si	1990-05-05	P	PNS
4	3	P003	Rudi Hermawan, S.Kom	1985-03-10	L	PNS
5	4	P004	Andi Pratama	1995-07-07	L	Kontrak
6	5	P005	Ir. Joko Susilo	1975-09-09	L	PNS
7	6	P006	Rina Wati, A.Md	1998-01-01	P	Kontrak
8	7	P007	Dewi Lestari, M.Sc	1992-12-12	P	Tetap Non-PNS
9	8	P008	Fajar Nugraha, Ph.D	1988-08-08	L	PNS
10	9	P009	Maya Sari	1996-04-04	P	Kontrak
11	10	P010	Eko Praseltyo	1993-11-11	L	Tetap Non-PNS
12	11	AUTO-00001	Dinda Reza Nasution	1986-11-24	L	Tetap
13	12	AUTO-00002	Hendra Bunga Pratama	1979-11-24	P	Tetap
14	13	AUTO-00003	Bagas Setia Utama	1998-11-24	L	Tetap
15	14	AUTO-00004	Rizky Hadi Wijaya	1986-11-24	L	Tetap
16	15	AUTO-00005	Zainal Feri Hidayat	1999-11-24	P	Tetap
17	16	AUTO-00006	Oki Dian Siregar	1989-11-24	P	Tetap
18	17	AUTO-00007	Agus Aji Kusuma	2001-11-24	P	Tetap
19	18	AUTO-00008	Agus Akbar Pohan	1994-11-24	L	Tetap
20	19	AUTO-00009	Dinda Ayu Santoso	1977-11-24	P	Tetap
21	20	AUTO-00010	Zainal Tri Saputra	2000-11-24	L	Tetap
22	21	AUTO-00011	Siti Dian Ramadhan	1995-11-24	P	Tetap
23	22	AUTO-00012	Vina Sari Setiawan	1983-11-24	P	Tetap
24	23	AUTO-00013	Citra Aji Sihombing	1987-11-24	P	Tetap
25	24	AUTO-00014	Nur Bayu Ramadhan	1985-11-24	P	Tetap
26	25	AUTO-00015	Muhammad Bagus Permana	1996-11-24	L	Tetap
27	26	AUTO-00016	Yusuf Kiki Utama	1999-11-24	P	Tetap
28	27	AUTO-00017	Indah Sari Susanto	1978-11-24	L	Tetap
29	28	AUTO-00018	Tio Bagus Permana	1974-11-24	L	Tetap
30	29	AUTO-00019	Oki Akbar Saputra	1988-11-24	L	Tetap
31	30	AUTO-00020	Ratna Dian Wijaya	1986-11-24	L	Tetap
32	31	AUTO-00021	Indah Nur Permana	1981-11-24	P	Tetap
33	32	AUTO-00022	Vina Jaya Kusuma	1981-11-24	P	Tetap
34	33	AUTO-00023	Joko Sari Hidayat	1977-11-24	P	Tetap
35	34	AUTO-00024	Ahmad Feri Wibowo	1997-11-24	P	Tetap
36	35	AUTO-00025	Ratna Kusuma Lesmana	1984-11-24	L	Tetap
37	36	AUTO-00026	Nur Lia Pohan	1990-11-24	L	Tetap
38	37	AUTO-00027	Nur Kusuma Siregar	1992-11-24	L	Tetap
39	38	AUTO-00028	Oki Bunga Pohan	1997-11-24	P	Tetap

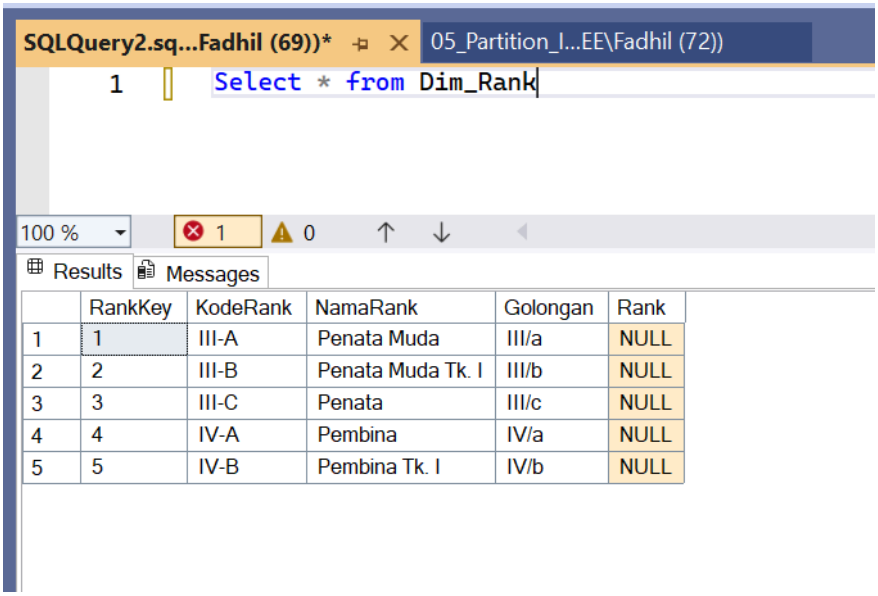
Query executed successfully.

c. Dim_Position



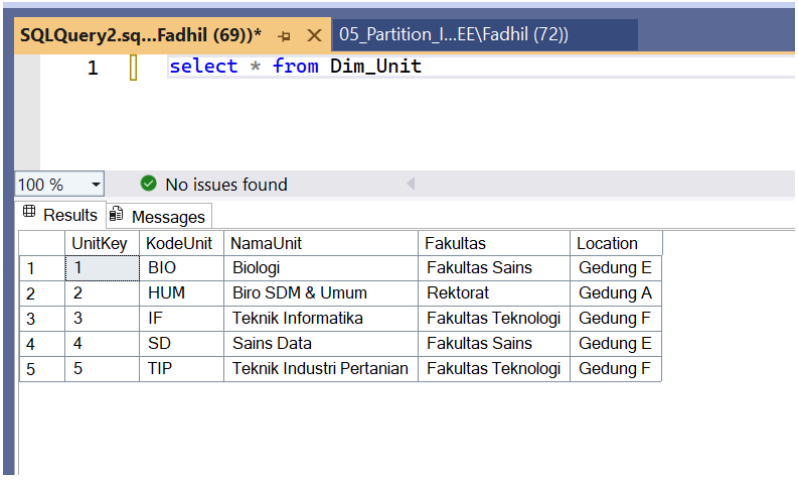
	PositionKey	KodePosition	NamaPosition	PositionType	DescPekerjaan
1	1	AA	Asisten Ahli	Fungsional	Pengajar Junior
2	2	KBG	Kepala Bagian	Struktural	Pimpinan Unit
3	3	LBR	Laboran	Fungsional	Teknis Lab
4	4	LEC	Dosen Lektor	Fungsional	Pengajar Senior
5	5	STF	Staff Administrasi	Struktural	Administrasi

d. Dim_Rank



	RankKey	KodeRank	NamaRank	Golongan	Rank
1	1	III-A	Penata Muda	III/a	NULL
2	2	III-B	Penata Muda Tk. I	III/b	NULL
3	3	III-C	Penata	III/c	NULL
4	4	IV-A	Pembina	IV/a	NULL
5	5	IV-B	Pembina Tk. I	IV/b	NULL

e. Dim_Unit



	UnitKey	KodeUnit	NamaUnit	Fakultas	Location
1	1	BIO	Biologi	Fakultas Sains	Gedung E
2	2	HUM	Biro SDM & Umum	Rektorat	Gedung A
3	3	IF	Teknik Informatika	Fakultas Teknologi	Gedung F
4	4	SD	Sains Data	Fakultas Sains	Gedung E
5	5	TIP	Teknik Industri Pertanian	Fakultas Teknologi	Gedung F

H. DATA QUALITY CHECK

a. Apakah jumlah baris di Source sama dengan Target?

b. Apakah ada EmployeeKey yang -1 (Unknown)? Jika ada, berarti NIP di transaksi tidak ada di Master Pegawai.

c. Validasi Perhitungan Measure Pastikan DurasiKerja masuk akal.

SQLQuery2.sq...Fadhil (69))* | 05_Partition_I...EE\Fadhil (72))

```sql
-- Cek 1: Apakah jumlah baris di Source sama dengan Target?
SELECT
    (SELECT COUNT(*) FROM TrAbsensi) AS Source_Absensi,
    (SELECT COUNT(*) FROM Fact_Attendance) AS Target_Absensi;

-- Cek 2: Apakah ada EmployeeKey yang -1 (Unknown)?
-- Jika ada, berarti NIP di transaksi tidak ada di Master Pegawai
SELECT * FROM Fact_Attendance WHERE EmployeeKey = -1;

-- Cek 3: Validasi Perhitungan Measure
-- Pastikan DurasiKerja masuk akal
SELECT TOP 5 * FROM Fact_Attendance ORDER BY DurasiKerja DESC;
```

100 % | 1 | 0

Results | Messages

	Source_Absensi	Target_Absensi
1	20000	20000

	AttendanceKey	DateKey	EmployeeKey	UnitKey	DurasiKerja	MenitTerlambat	StatusKehadiran
1	14	20251119	18	5	9.00	0	Hadir
2	22	20250917	18	5	9.00	0	Hadir
3	30	20250826	18	5	9.00	0	Hadir
4	35	20250801	18	5	9.00	0	Hadir
5	69	20250926	18	5	9.00	0	Hadir

I. PERFORMANCE TESTING

SQLQuery2.sq...Fadhil (69))* | 05_Partition_I...EE\Fadhil (72))

```
1  USE Kepegawaian_DB;
2  GO
3
4  PRINT '--- START PERFORMANCE TEST: ETL PROCESS ---';
5  DECLARE @StartTime DATETIME = GETDATE();
6
7  -- Jalankan Proses ETL Utama
8  EXEC ETL_Master_Load;
9
10 DECLARE @EndTime DATETIME = GETDATE();
11 DECLARE @DurationMs INT = DATEDIFF(MILLISECOND, @StartTime, @EndTime);
12
13 PRINT '-----------------------------------------';
14 PRINT 'Waktu Mulai   : ' + CONVERT(VARCHAR, @StartTime, 121);
15 PRINT 'Waktu Selesai : ' + CONVERT(VARCHAR, @EndTime, 121);
16 PRINT 'Total Durasi  : ' + CAST(@DurationMs AS VARCHAR) + ' milidetik';
17 PRINT '-----------------------------------------';
```

100 % | 1 | 0

Messages

```
--- START PERFORMANCE TEST: ETL PROCESS ---
=== MULAI PROSES ETL ===
1. Loading Staging Tables...
2. Loading Dimensions...
3. Loading Facts...
=== ETL SELESAI ===
Durasi: 1250 ms
-----------------------------------------
Waktu Mulai   : 2025-11-24 21:05:34.230
Waktu Selesai : 2025-11-24 21:05:35.600
Total Durasi  : 1370 milidetik
-----------------------------------------

Completion time: 2025-11-24T21:05:35.6308128+07:00
```