**Objective:**

Develop an SSIS package to perform an incremental load from various source files (Excel, CSV, TXT) into a SQL Server table, implementing Slowly Changing Dimension (SCD) Type 2 logic. This approach will insert new records for any changes in existing rows, maintaining historical data, and utilize an IsActive flag to indicate the current active record.

**Requirements:**

1. **Source Data:**
   * **File Types:** Excel, CSV, and TXT files containing student registration information.
   * **Data Consistency:** Ensure uniform structure across all files for seamless processing.
2. **Destination:**
   * **SQL Server Table:** dbo.Students
   * **Table Schema:**
     + StudentID (Primary Key)
     + FirstName
     + LastName
     + DateOfBirth
     + Gender
     + Course
     + RegistrationDate
     + Email
     + IsActive (BIT)
     + StartDate (DATETIME)
     + EndDate (DATETIME)
3. **SSIS Package Design:**
   * **Control Flow:**
     + Use a **Foreach Loop Container** to iterate through the source files.
     + Within the loop, implement a **Data Flow Task** to process each file.
   * **Data Flow Components:**
     + Utilize appropriate **Source Components** for Excel, CSV, and TXT files.
     + Apply a **Derived Column Transformation** to add a LoadDate column with the current timestamp.
     + Employ a **Lookup Transformation** to match incoming records with existing records in dbo.Students based on StudentID.
     + Use a **Conditional Split Transformation** to determine if a record is new, existing with changes, or unchanged.
     + **For Existing Records with Changes:**
       - Use an **OLE DB Command Transformation** to update the existing record's IsActive flag to 0 and set the EndDate to the current date.
       - Insert a new record with the updated information, setting IsActive to 1, StartDate to the current date, and EndDate to a default high date (e.g., '9999-12-31').
     + **For New Records:**
       - Insert into dbo.Students with IsActive set to 1, StartDate to the current date, and EndDate to a default high date.
4. **Data Handling Logic:**
   * **New Records:** Insert into dbo.Students with IsActive set to 1, StartDate to the current date, and EndDate to a default high date.
   * **Existing Records with Changes:** Update the existing record's IsActive to 0 and EndDate to the current date; insert a new record with updated information, IsActive set to 1, StartDate to the current date, and EndDate to a default high date.
   * **Unchanged Records:** No action required.
5. **Error Handling and Logging:**
   * Capture and log any data flow errors.
   * Maintain logs for successful inserts, updates, and errors for auditing purposes.
6. **Performance Considerations:**
   * Implement batch inserts and updates to optimize performance.
   * Ensure appropriate indexing on StudentID, IsActive, StartDate, and EndDate columns in dbo.Students.
7. **Testing and Validation:**
   * Develop test cases to validate the SSIS package against various scenarios, including new records, updated records, and unchanged records.
   * Verify data integrity post-load to ensure accuracy.

**References:**

* For a practical demonstration of implementing Slowly Changing Dimensions in SSIS, refer to the following tutorial:

[SSIS Tutorial - Incremental Data Load - Slowly Changing Dimension](https://www.youtube.com/watch?v=YnqAtF4cda0)

* For a detailed explanation of Slowly Changing Dimension (SCD) Type 2, consult this resource:

[Implementing Slowly Changing Dimensions (SCDs) in Data Warehouses](https://www.sqlshack.com/implementing-slowly-changing-dimensions-scds-in-data-warehouses/)

**Note:** This document outlines the requirements and design considerations for the SSIS package implementing SCD Type 2 logic. Ensure that all components are configured correctly, and thorough testing is conducted to achieve the desired outcomes.

Sources

4o

**You said:**

you are doing type 0 again

**ChatGPT said:**

ChatGPT

Apologies for the earlier confusion.

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