Stored Procedures for SCD Types (SQL Server)

# SCD Type 0

-- SCD Type 0 (Fixed): No updates allowed; only insert if new.  
CREATE PROCEDURE dbo.sp\_SCD\_Type0  
 @ID INT,  
 @Name NVARCHAR(100),  
 @Address NVARCHAR(255)  
AS  
BEGIN  
 IF NOT EXISTS (SELECT 1 FROM dbo.DimCustomer WHERE ID = @ID)  
 BEGIN  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, GETDATE(), '9999-12-31', 1, 1);  
 END  
END;

# SCD Type 1

-- SCD Type 1 (Overwrite): Update existing record or insert new, no history retained.  
CREATE PROCEDURE dbo.sp\_SCD\_Type1  
 @ID INT,  
 @Name NVARCHAR(100),  
 @Address NVARCHAR(255)  
AS  
BEGIN  
 IF EXISTS (SELECT 1 FROM dbo.DimCustomer WHERE ID = @ID)  
 BEGIN  
 UPDATE dbo.DimCustomer  
 SET Name = @Name,  
 Address = @Address,  
 EffectiveDate = GETDATE(),  
 Version = Version + 1  
 WHERE ID = @ID;  
 END  
 ELSE  
 BEGIN  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, GETDATE(), '9999-12-31', 1, 1);  
 END  
END;

# SCD Type 2

-- SCD Type 2 (Historical Tracking): New row for changed values, keep history.  
CREATE PROCEDURE dbo.sp\_SCD\_Type2  
 @ID INT,  
 @Name NVARCHAR(100),  
 @Address NVARCHAR(255)  
AS  
BEGIN  
 DECLARE @CurrentName NVARCHAR(100), @CurrentAddress NVARCHAR(255), @CurrentVersion INT;  
 SELECT @CurrentName = Name, @CurrentAddress = Address, @CurrentVersion = Version  
 FROM dbo.DimCustomer  
 WHERE ID = @ID AND IsCurrent = 1;  
  
 IF @@ROWCOUNT = 0  
 BEGIN  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, GETDATE(), '9999-12-31', 1, 1);  
 END  
 ELSE  
 BEGIN  
 IF @Name <> @CurrentName OR @Address <> @CurrentAddress  
 BEGIN  
 UPDATE dbo.DimCustomer  
 SET EndDate = GETDATE(), IsCurrent = 0  
 WHERE ID = @ID AND IsCurrent = 1;  
  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, GETDATE(), '9999-12-31', 1, @CurrentVersion + 1);  
 END  
 END  
END;

# SCD Type 3

-- SCD Type 3 (Add Attribute): Track previous Address in a dedicated column.  
CREATE PROCEDURE dbo.sp\_SCD\_Type3  
 @ID INT,  
 @Name NVARCHAR(100),  
 @Address NVARCHAR(255)  
AS  
BEGIN  
 IF NOT EXISTS (SELECT 1 FROM dbo.DimCustomer WHERE ID = @ID)  
 BEGIN  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, PreviousAddress, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, NULL, GETDATE(), '9999-12-31', 1, 1);  
 END  
 ELSE  
 BEGIN  
 DECLARE @CurrentAddress NVARCHAR(255);  
 SELECT @CurrentAddress = Address  
 FROM dbo.DimCustomer  
 WHERE ID = @ID;  
  
 IF @Address <> @CurrentAddress  
 BEGIN  
 UPDATE dbo.DimCustomer  
 SET PreviousAddress = @CurrentAddress,  
 Address = @Address,  
 EffectiveDate = GETDATE(),  
 Version = Version + 1  
 WHERE ID = @ID;  
 END  
 END  
END;

# SCD Type 4

-- SCD Type 4 (History Table): Main table for current, separate history table for past.  
CREATE PROCEDURE dbo.sp\_SCD\_Type4  
 @ID INT,  
 @Name NVARCHAR(100),  
 @Address NVARCHAR(255)  
AS  
BEGIN  
 DECLARE @CurrentName NVARCHAR(100), @CurrentAddress NVARCHAR(255), @CurrentEffective DATETIME;  
  
 SELECT @CurrentName = Name, @CurrentAddress = Address, @CurrentEffective = EffectiveDate  
 FROM dbo.DimCustomer  
 WHERE ID = @ID;  
  
 IF @@ROWCOUNT = 0  
 BEGIN  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, GETDATE(), '9999-12-31', 1, 1);  
 INSERT INTO dbo.DimCustomer\_History (ID, Name, Address, EffectiveDate, EndDate)  
 VALUES (@ID, @Name, @Address, GETDATE(), '9999-12-31');  
 END  
 ELSE  
 BEGIN  
 IF @Name <> @CurrentName OR @Address <> @CurrentAddress  
 BEGIN  
 UPDATE dbo.DimCustomer\_History  
 SET EndDate = GETDATE()  
 WHERE ID = @ID AND EndDate = '9999-12-31';  
  
 INSERT INTO dbo.DimCustomer\_History (ID, Name, Address, EffectiveDate, EndDate)  
 VALUES (@ID, @CurrentName, @CurrentAddress, @CurrentEffective, GETDATE());  
  
 UPDATE dbo.DimCustomer  
 SET Name = @Name,  
 Address = @Address,  
 EffectiveDate = GETDATE(),  
 Version = Version + 1  
 WHERE ID = @ID;  
 END  
 END  
END;

# SCD Type 6

-- SCD Type 6 (Hybrid): Combined approach of Types 1, 2, and 3.  
CREATE PROCEDURE dbo.sp\_SCD\_Type6  
 @ID INT,  
 @Name NVARCHAR(100),  
 @Address NVARCHAR(255)  
AS  
BEGIN  
 DECLARE @CurrentName NVARCHAR(100), @CurrentAddress NVARCHAR(255), @CurrentVersion INT;  
  
 SELECT @CurrentName = Name, @CurrentAddress = Address, @CurrentVersion = Version  
 FROM dbo.DimCustomer  
 WHERE ID = @ID AND IsCurrent = 1;  
  
 IF @@ROWCOUNT = 0  
 BEGIN  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, PreviousAddress, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, NULL, GETDATE(), '9999-12-31', 1, 1);  
 END  
 ELSE  
 BEGIN  
 IF @Address <> @CurrentAddress  
 BEGIN  
 UPDATE dbo.DimCustomer  
 SET EndDate = GETDATE(), IsCurrent = 0  
 WHERE ID = @ID AND IsCurrent = 1;  
  
 INSERT INTO dbo.DimCustomer (ID, Name, Address, PreviousAddress, EffectiveDate, EndDate, IsCurrent, Version)  
 VALUES (@ID, @Name, @Address, @CurrentAddress, GETDATE(), '9999-12-31', 1, @CurrentVersion + 1);  
 END  
 ELSE IF @Name <> @CurrentName  
 BEGIN  
 UPDATE dbo.DimCustomer  
 SET Name = @Name,  
 EffectiveDate = GETDATE(),  
 Version = Version + 1  
 WHERE ID = @ID AND IsCurrent = 1;  
 END  
 END  
END;