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/**** T-SQL for Presentation: Capture Changes with SQL Server's Change Data
Capture - Wylie Blanchard - GreatTechPros.com****/

/*Enable CDC at the Database Level*/

--Verify whether CDC is already enabled for a database
USE master
GO
SELECT [name], database_id, is_cdc_enabled
FROM sys.databases
GO

--Enable CDC for a database
USE AdventureWorks2014
GO
EXEC sys.sp_cdc_enable_db
GO

--Verify whether CDC is already enabled for a database
USE master
GO
SELECT [name], database_id, is_cdc_enabled
FROM sys.databases
GO

--Error Message 22830 with Error Message 15517 - Change the database owner
to a login with a SQL Login Password
USE AdventureWorks2014 -- Change the database name
GO
sp_changedbowner 'sa' --Change the valid login name
GO

/*Enable CDC at the Table Level*/

--Verify whether CDC is already enabled for a table
USE AdventureWorks2014
GO
SELECT [name], is_tracked_by_cdc
FROM sys.tables
GO

--Enable CDC for a table
USE AdventureWorks2014
GO
EXEC sys.sp_cdc_enable_table
@source_schema = N'HumanResources', @source_name = N'Shift',
@role_name = NULL
GO

--Verify whether CDC is already enabled for a table
USE AdventureWorks2014
GO
SELECT [name], is_tracked_by_cdc
FROM sys.tables
GO

```

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/*CDC System Tables*/

--cdc.captured_columns
--This table returns result for list of captured column.
USE AdventureWorks2014
GO
SELECT * FROM
[cdc].[captured_columns]

--cdc.change_tables
--This table returns list of all the tables which are enabled for capture.
USE AdventureWorks2014
GO
SELECT * FROM
[cdc].[change_tables]

--cdc.ddl_history
--This table contains history of all the DDL changes since capture data
enabled.
USE AdventureWorks2014
GO
SELECT * FROM
[cdc].[ddl_history]

--cdc.index_columns
--This table contains indexes associated with change table.
USE AdventureWorks2014
GO
SELECT * FROM
[cdc].[index_columns]

--cdc.lsn_time_mapping
--This table maps LSN number
USE AdventureWorks2014
GO
SELECT * FROM
[cdc].[lsn_time_mapping]

--Change Table
USE AdventureWorks2014
GO
SELECT * FROM
[cdc].[HumanResources_Shift_CT]

/* Note: The "__$operation" column records the type of change:
    1 = delete,
    2 = insert,
    3 = update (value before change),
    4 = update (value after change) */

--Enabled CDC to only capture specific set of columns
USE AdventureWorks2014;
GO
EXEC sys.sp_cdc_enable_table
@source_schema = N'HumanResources',

```

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@source_name = N'Employee',
@role_name = NULL, -- Role gating not enabled
@filegroup_name = N'PRIMARY', -- should consider writing audit date to
separate filegroup
@captured_column_list = N'BusinessEntityID,JobTitle,MaritalStatus';
GO

--Verify whether CDC is already enabled for a table
USE AdventureWorks2014
GO
SELECT [name], is_tracked_by_cdc
FROM sys.tables
GO

/* Change Data Capture w/ Insert Operation*/

--View Source and Change tables prior to change
USE AdventureWorks2014
GO
SELECT *
FROM HumanResources.Shift
GO
SELECT *
FROM cdc.HumanResources_Shift_CT
GO

--Insert Operation
USE AdventureWorks2014
GO
INSERT INTO [HumanResources].[Shift]
([Name], [StartTime], [EndTime], [ModifiedDate])
VALUES ('Tracked Shift', GETDATE(), GETDATE(), GETDATE())
GO
USE AdventureWorks2014
GO

--View Source and Change tables after to change
USE AdventureWorks2014
GO
SELECT *
FROM HumanResources.Shift
GO
SELECT *
FROM cdc.HumanResources_Shift_CT
GO

/* Note: The "__$operation" column records the type of change:
1 = delete,
2 = insert,
3 = update (value before change),
4 = update (value after change) */

/* Change Data Capture w/ Update Operation*/

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--View Source and Change tables prior to change
USE AdventureWorks2014
GO
SELECT *
FROM HumanResources.Shift
GO
SELECT *
FROM cdc.HumanResources_Shift_CT
GO

--Update Operation
USE AdventureWorks2014
GO
UPDATE [HumanResources].[Shift]
SET Name = 'New Name',
    ModifiedDate = GETDATE()
WHERE ShiftID >= 4
GO

--View Source and Change tables after to change
USE AdventureWorks2014
GO
SELECT *
FROM HumanResources.Shift
GO
SELECT *
FROM cdc.HumanResources_Shift_CT
GO
/* Note: The "__$operation" column records the type of change:
    1 = delete,
    2 = insert,
    3 = update (value before change),
    4 = update (value after change) */

/* Change Data Capture w/ Delete Operation*/

--View Source and Change tables prior to change
USE AdventureWorks2014
GO
SELECT *
FROM HumanResources.Shift
GO
SELECT *
FROM cdc.HumanResources_Shift_CT
GO

--Delete Operation
USE AdventureWorks2014
GO
DELETE FROM [HumanResources].[Shift]
WHERE ShiftID >= 4
GO

--View Source and Change tables after to change
USE AdventureWorks2014
GO
SELECT *

```

```

FROM HumanResources.Shift
GO
SELECT *
FROM cdc.HumanResources_Shift_CT
GO
/* Note: The "__$operation" column records the type of change:
    1 = delete,
    2 = insert,
    3 = update (value before change),
    4 = update (value after change) */

--IMPORTANT NOTE
/* Note:The "$update_mask" provides a hexadecimal
value that when converted to binary code informs you
which columns were updated */
--www.hexadecimaldictionary.com/hexadecimal

/*Reading interval change capture data*/

--Example 1: Reading changed columns
USE AdventureWorks2014
DECLARE @from_lsn binary (10), @to_lsn binary (10)
SET @from_lsn = sys.fn_cdc_get_min_lsn('HumanResources_Shift')
SET @to_lsn = sys.fn_cdc_get_max_lsn()
SELECT *
FROM cdc.fn_cdc_get_all_changes_HumanResources_Shift(@from_lsn, @to_lsn,
'all')
ORDER BY __$seqval

--Example 2: Reading changed columns
DECLARE @from_lsn binary (10) ,@to_lsn binary (10)
DECLARE @ShiftIDPosition INT
DECLARE @NamePosition INT
DECLARE @StartTimePosition INT
DECLARE @EndTimePosition INT
DECLARE @ModifiedDatePos INT
SET @from_lsn = sys.fn_cdc_get_min_lsn('HumanResources_Shift')
SET @to_lsn = sys.fn_cdc_get_max_lsn()
SET @ShiftIDPosition = sys.fn_cdc_get_column_ordinal('HumanResources_Shift',
'ShiftID')
SET @NamePosition = sys.fn_cdc_get_column_ordinal('HumanResources_Shift',
'Name')
SET @StartTimePosition =
sys.fn_cdc_get_column_ordinal('HumanResources_Shift', 'StartTime')
SET @EndTimePosition = sys.fn_cdc_get_column_ordinal('HumanResources_Shift',
'EndTime')
SET @ModifiedDatePos = sys.fn_cdc_get_column_ordinal('HumanResources_Shift',
'ModifiedDate')
SELECT *
,sys.fn_cdc_is_bit_set(@ShiftIDPosition, __$update_mask) as 'UpdatedShiftID'
,sys.fn_cdc_is_bit_set(@NamePosition, __$update_mask) as 'UpdatedName'
,sys.fn_cdc_is_bit_set(@StartTimePosition, __$update_mask) as
'UpdatedStartTime'
,sys.fn_cdc_is_bit_set(@EndTimePosition, __$update_mask) as 'UpdatedEndTime'
,sys.fn_cdc_is_bit_set(@ModifiedDatePos, __$update_mask) as 'ModifiedDate'

```

```
FROM cdc.fn_cdc_get_all_changes_HumanResources_Shift(@from_lsn, @to_lsn,
'all') ORDER BY __$seqval
```

```
/*Viewing and Changing the Default Data Capture Configuration*/
```

```
--View CDC Job Configurations
```

```
USE AdventureWorks2014
```

```
GO
```

```
EXEC sys.sp_cdc_help_jobs
```

```
GO
```

```
--Change CDC Job Settings
```

```
USE AdventureWorks2014;
```

```
GO
```

```
EXECUTE sys.sp_cdc_change_job @job_type = 'cleanup',
```

```
@retention = 86400; --86400 minutes = 60 days --4320 minutes = 3 days
```

```
/*Disable Change Data Capture*/
```

```
--Get Capture_Instance Name
```

```
USE AdventureWorks2014;
```

```
GO
```

```
EXEC sys.sp_cdc_help_change_data_capture
```

```
GO
```

```
--Deactivate CDC at table level
```

```
USE AdventureWorks2014;
```

```
GO
```

```
EXECUTE sys.sp_cdc_disable_table
```

```
    @source_schema = N'HumanResources',
```

```
    @source_name = N'Shift',
```

```
    @capture_instance = N'HumanResources_Shift';
```

```
GO
```

```
--Verify whether CDC is already enable/disable for a table
```

```
USE AdventureWorks2014
```

```
GO
```

```
SELECT [name], is_tracked_by_cdc
```

```
FROM sys.tables
```

```
GO
```

```
/*Disable Change Data Capture Feature on Database*/
```

```
--The Following T-SQL query will disable CDC on the entire database
```

```
USE AdventureWorks2014
```

```
GO
```

```
EXEC sys.sp_cdc_disable_db
```

```
GO
```

```
--Verify whether CDC is already enable/disable for a database
```

```
USE master
```

```
GO
```

```
SELECT [name], database_id, is_cdc_enabled
```

```
FROM sys.databases
```

```
GO
```

```
/*Change Data Capture with SSIS - Demo*/

--Verify whether CDC is already enabled for a database
USE master
GO
SELECT [name], database_id, is_cdc_enabled
FROM sys.databases
GO

--If the enabled then disable the databse
USE AdventureWorks2008
GO
EXEC sys.sp_cdc_disable_db
GO
```