



# Teradata Utilities

## Class Outline

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Description: In this course, students will learn traditional utilities at the perfect level with detailed examples and explanations so they're clear to understand. It covers traditional utilities, BTEQ, FastLoad, MultiLoad, TPump, and FastExport.

Objectives: At the end of the course, students will have a grasp of all traditional utilities.

Topics:

- Teradata Utilities Introduction
- Collect Statistics
- Table Create and Data Types
- Temporary Tables
- BTEQ – Batch Teradata Query
- FastLoad
- MultiLoad
- TPump
- FastExport
- Teradata Parallel Transport (TPT)
- Top SQL Commands Cheat Sheet

Audience: This course is designed for IT professionals, Developers, and DBAs who have a desire to learn Teradata Utilities.

Prerequisites: None

Duration: 1-2 Days

Course Outline:

## **Chapter 1 - Teradata Utilities Introduction**

The Teradata Utilities

Block Level Utilities

Row Level Utilities

Fast Path Inserts Using Insert/Select

Fast Path Deletes

Freespace Percent

Referential Integrity and Load Utility Solutions

Teradata has a No Primary Index Table called a NoPI Table

This is NOT Necessarily a NoPI Table

NoPI Tables Spread rows across all-AMPs Evenly

NoPI Tables used as Staging Tables for Data Loads

NoPI Table Capabilities

NoPI Table Restrictions

Why Would a NoPI Table have a Row-ID?

## **Chapter 2 – Collect Statistics**

The Teradata Parsing Engine (Optimizer) is Cost Based

The Purpose of Collect Statistics

When Teradata Collects Statistics, it creates a Histogram

The Interval of the Collect Statistics Histogram

Histogram Quiz

Answers to Histogram Quiz

What to COLLECT STATISTICS On?

Why Collect Statistics?

How do you know if Statistics were collected on a Table?

A Huge Hint that No Statistics Have Been Collected

The Basic Syntax for COLLECT STATISTICS

COLLECT STATISTICS Examples for a better Understanding

The New Teradata V14 Way to Collect Statistics

COLLECT STATISTICS Directly From another Table

Where Does Teradata Keep the Collected Statistics?

The Official Syntax for COLLECT STATISTICS

How to Recollect STATISTICS on a Table

Teradata Always Does a Random AMP Sample

Random Sample is Kept in the Table Header in FSG Cache

Multiple Random AMP Samplings

How a Random AMP gets a Table Row count

Random AMP Estimates for NUSI Secondary Indexes

USI Random AMP Samples are Not Considered

There's No Random AMP Estimate for Non-Indexed Columns

A Summary of the PE Plan if No Statistics Were Collected

Stale Statistics Detection and Extrapolation

Extrapolation for Future Dates

How to Copy a Table with Data and the Statistics

How to Copy a Table with NO Data and the Statistics

When to COLLECT STATISTICS Using only a SAMPLE  
Examples of COLLECT STATISTICS Using only a SAMPLE  
Examples of COLLECT STATISTICS for V14  
How to Collect Statistics on a PPI Table on the Partition  
Teradata V12 and V13 Statistics Enhancements  
Teradata V14 Statistics Enhancements  
Teradata V14 Summary Statistics  
Teradata V14 MaxValueLength  
Teradata V14 MaxIntervals  
Teradata V14 Sample N Percent  
Teradata Statistics Wizard

## **Chapter 3 – Table Create and Data Types**

Creating a Table with a Unique Primary Index  
Creating a Table with a Non-Unique Primary Index  
Creating a Table and forgetting to put in a Primary Index Clause  
Creating a Set Table  
Creating a Multiset Table  
Creating a Set Table that won't have a Duplicate Row Check  
Set Table with a Unique Constraint Eliminates the Duplicate Row Check  
Creating a Table with a Unique Secondary Index  
Creating a Table with a Multi-Column Primary Index  
Data Types  
Data Types Continued  
Data Types Continued  
Major Data Types and the number of Bytes they take up  
Making an exact copy a Table

Making a NOT-So-Exact Copy a Table

Copying a Table with a new Default Primary Index

Troubleshooting Copying and Changing the Primary Index

Copying only specific columns of a table

Copying a Table with Data and Keeping the Statistics

Copying a Table with No Data and Statistics

Copying a table Structure with Zeroed Statistics

Creating a Table with Fallback

Creating a Table with No Fallback

Creating a Table with a Before Journal

Creating a table with a Dual Before Journal

Creating a Table with an After Journal

Creating a Table with a Dual After Journal

Creating a Table with the Journal Keyword Alone

Why use a Before Journal?

Why Use an After Journal?

Creating a Table with Customization of the Data Block Size

Creating a Table with Customization on FREESPACE Percent

Creating a QUEUE Table

Example of how a Queue Table Works

Example of how a Queue Table Works

The Concept behind Partitioning a Table

Creating a PPI Table with Simple Partitioning

Creating a PPI Table with RANGE\_N Partitioning per Month

A Visual of One Year of Data with Range\_N per Month

An SQL Example explaining Range\_N Partitioning per Month

Creating a PPI Table with RANGE\_N Partitioning per Day

Creating a PPI Table with RANGE\_N Partitioning per Week

A Clever Range\_N Option

Creating a PPI Table with CASE\_N

NO CASE and UNKNOWN Partitions Together

Combining Older Data and Newer Data in PPI

Multi-Level Partitioning Combining Range\_N and Case\_N

NON-Unique Primary Indexes (NUPI) in PPI

PPI Table with a Unique Primary Index (UPI)

Tricks for Non-Unique Primary Indexes (NUPI)

Character Based PPI for RANGE\_N

Character-Based PPI for CASE\_N

Dates and Character-Based Multi-Level PPI

TIMESTAMP Partitioning

Using CURRENT\_DATE to define a PPI

ALTER to CURRENT\_DATE the next year

ALTER to CURRENT\_DATE with Save

Altering a PPI Table to Add or Drop Partitions

Deleting a Partition

Deleting a Partition and saving its contents

Using the PARTITION Keyword in your SQL

SQL for RANGE\_N

SQL for CASE\_N

## **Chapter 4 - Temporary Tables**

There are three types of Temporary Tables

CREATING A Derived Table

Naming the Derived Table

Aliasing the Column Names in the Derived Table

Most Derived Tables Are Used To Join To Other Tables

Multiple Ways to Alias the Columns in a Derived Table

Our Join Example with a Different Column Aliasing Style

Column Aliasing Can Default for Normal Columns

CREATING A Derived Table using the WITH Command

Our Join Example With the WITH Syntax

The Same Derived Query shown Three Different Ways

Quiz - Answer the Questions

Answer to Quiz - Answer the Questions

Clever Tricks on Aliasing Columns in a Derived Table

A Derived Table lives only for the lifetime of a single query

An Example of Two Derived Tables in a Single Query

WITH RECURSIVE Derived Table

Defining the WITH Recursive Derived Table

Looping Through the Recursive Derived Table

Looping Through a Second Time

Looping Through a Third Time

Looping Through and Adding Nothing Ends the Loop

Looping Through the WITH Recursive Derived Table

Creating a Volatile Table

You Populate a Volatile Table with an INSERT/SELECT

The Three Steps to Use a Volatile Table

Why Would You Use the ON COMMIT DELETE ROWS?

The HELP Volatile Table Command Shows your Volatiles

A Volatile Table with a Primary Index

The Joining of Two Tables Using a Volatile Table



You Can Collect Statistics on Volatile Tables

The New Teradata V14 Way to Collect Statistics

Four Examples of Creating a Volatile Table Quickly

Four Advanced Examples of Creating a Volatile Table Quickly

Creating Partitioned Primary Index (PPI) Volatile Tables

Using a Volatile Table to Get Rid of Duplicate Rows

Using a Simple Global Temporary Table

Two Brilliant Techniques for Global Temporary Tables

The Joining of Two Tables Using a Global Temporary Table

CREATING A Global Temporary Table

## **Chapter 5 - BTEQ – Batch Teradata Query**

BTEQ – Batch Teradata Query Tool

How to Logon to BTEQ in Interactive Mode

Running Queries in BTEQ in Interactive Mode

BTEQ Commands vs BTEQ SQL Statements

WITH BY Command for Subtotals

WITH Command for a Grand Total

WITH and WITH BY Together for Subtotals and Grand Totals

How to Logon to BTEQ in a SCRIPT

Running Queries in BTEQ through a Batch Script

Running a BTEQ Batch Script through the Command Prompt

Running a BTEQ Batch Script through the Run Command

Using Nexus to Build Your BTEQ Scripts

Using Nexus to Build Your BTEQ Scripts

Using BTEQ Scripts to IMPORT Data

What Keywords Mean in a BTEQ Script

Creating a BTEQ IMPORT for a Comma Separated Value File  
Four Great Examples/Ways to Run a Teradata BTEQ Script  
BTEQ Export – Four types of Export Variations  
Creating a BTEQ Export Script in Record Mode  
Creating a BTEQ Export Script in Report Mode  
The Appearance of Record Mode vs Report Mode Data  
Using Report Mode to Create a Comma Separated Report  
Creating a BTEQ IMPORT for a Comma Separated Value File  
Using Multiple Sessions in BTEQ  
BTEQ Fast Path Inserts  
BTEQ Can Use Conditional Logic  
Using a BTEQ Export and Setting a Limit in a UNIX System

## **Chapter 6 - FastLoad**

FastLoad  
Block Level Utility Limits  
FastLoad has Two Phases  
FastLoad Phase 1  
FastLoad Phase 2  
A Sample FastLoad Script Created by Nexus SmartScript  
Executing the FastLoad Script  
The Nexus SmartScript Easily Builds Your Utilities  
The Nexus SmartScript FastLoad Builder  
Create and Execute Your FastLoad Scripts with Nexus  
FastLoad to a NoPI Table  
FastLoad and CHECKPOINT  
Loading Multiple Input Files with FastLoad

Valid Data Types That Can Be Used in a FastLoad

A FastLoad that Converts Data Types

A FastLoad that Uses the NULLIF Statement

FastLoad and Referential Integrity Solutions

The Output Report from FastLoad

Recovering a FastLoad that has failed

A BTEQ Export and then a FastLoad

A FastExport and then a FastLoad Needs Indicators

## **Chapter 7 - MultiLoad**

MultiLoad

Block Level Utility Limits

MultiLoad has Five Phases

MultiLoad has IMPORT and DELETE Tasks

A Sample MultiLoad Script Created by Nexus SmartScript

Referential Integrity and Load Utility Solutions

MultiLoad That Inserts and Updates from Two Different Files

A MultiLoad Example That UPSERTs

A MultiLoad DELETE MODE Example

MultiLoad DELETE Rules

Five Formats of MultiLoad Files

A NoPI Table Does Not Work with MultiLoad

Executing a MultiLoad Script

The Output Report from MultiLoad

Host Utility Locks (HUT Locks)

Troubleshooting MultiLoad

## **Chapter 8 - TPump**

TPump

TPump is NOT a Block Level Utility and has No Limits

Limitations of TPump

A Sample TPump Script Created by Nexus SmartScript

Executing a TPump Script

TPump Begin Load Statement Options

Five Formats of TPump Files

TPump Script with Error Treatment Options

TPump UPSERT Script

The Output Report from TPump

Did you know Tera-Tom was a world-class athlete?

## **Chapter 9- FastExport**

FastExport

New Rules for Block Utilities

A Sample FastExport Script Created by Nexus SmartScript

FastExport by Default places Null Indicators in Output

A Sample FastExport Script Created by Nexus SmartScript

No Spool Options with FastExport

FastExport with No Spool

FastExport that Joins Two Tables

FastExport Modes

How to Eliminate Indicators in your FastExport Script

Executing a FastExport Script

## **Chapter 10- Teradata Parallel Transport (TPT)**

What is TPT?

TPT Producers Create Streams and Consumers Write Them

The Four Major Operators of TPT

TPT can read from multiple source files in Parallel

TPT can have more Operators than Consumers

TPT Operators and their Equivalent Load Utility

How to Run a TPT Script

Six Syntax Rules when Creating TPT Scripts

TPT Scripts are divided into two major sections

Three Required Define Statements in the Declarative Section

The Major Keys to Building TPT Scripts

Schemas

The DDL Operator

DDL Operator Example

The SQL Selector Operator

SQL\_Selector Operator Export to Delimited File (1 of 3)

SQL\_Selector Operator Export to Delimited File (2 of 3)

SQL\_Selector Operator Export to Delimited File (3 of 3)

Another SQL\_Selector Operator Export (1 of 3)

Another SQL\_Selector Operator Export (2 of 3)

Another SQL\_Selector Operator Export (3 of 3)

SQL Selector Example (1 of 3)

SQL Selector Example (2 of 3)

SQL Selector Example (3 of 3)

Another SQL Selector Example (1 of 3)

Another SQL Selector Example (2 of 3)

Another SQL Selector Example (3 of 3)

The Export Operator

Export Operator to Formatted Flat File Example (1 of 3)

Export Operator to Formatted Flat File Example (2 of 3)

Export a Table to a Formatted Flat File with Indicators (3 of 3)

Deferred Schema

Export a Table to a Binary Flat File (1 of 2)

Export a Table to a Binary Flat File (2 of 2)

The Load Operator

Load from Binary File (1 of 3)

Load from Binary File (2 of 3)

Load from Binary File (3 of 3)

Data Connectors

Another Import to Table from Binary File (1 of 3)

Another Import to Table from Binary File (2 of 3)

Another Import to Table from Binary File (3 of 3)

Load Table from Flat File (1 of 2)

Load Table from Flat File (2 of 2)

Load another Table from a Flat File

Update Operator

Teradata V14.10 Extended MultiLoad Protocol (MLOADX)

Update Operator Example (1 of 3)

Update Operator Example (2 of 3)

Update Operator Example (3 of 3)

Another Update Operator Example (1 of 3)

Another Update Operator Example (2 of 3)

Another Update Operator Example (3 of 3)

Stream Operator

Stream Operator Example (1 of 3)

Stream Operator Example (2 of 3)

Stream Operator Example (3 of 3)

Another Stream Operator Example (1 of 3)

Another Stream Operator Example (2 of 3)

Another Stream Operator Example (3 of 3)

Easy Loader Example (tdload)

TPT Utility Commands

OS Command Operator

Job Variables Example

Include Statement (1 of 2)

Include Statement (2 of 2)

Operator Templates

Using Operator Templates

Operator Template Example

Moving Data from Netezza to Teradata (1 of 2)

Moving Data from Netezza to Teradata (2 of 2)

## **Chapter 11 – Top SQL Commands Cheat Sheet**

SELECT All Columns from a Table and Sort

Select Specific Columns and Limiting the Rows

Changing your Default Database

Keywords that describe you

Select TOP Rows in a Rank Order

A Sample number of rows

Getting a Sample Percentage of rows

Find Information about a Database  
Find information about a Table  
Using Aggregates  
Performing a Join  
Performing a Join using ANSI Syntax  
Using Date, Time and Timestamp  
Using Date Functions  
Using the System Calendar  
Using the System Calendar in a Query  
Formatting Data  
Using Rank  
Using a Derived Table  
Using a Subquery  
Correlated Subquery  
Using Substring  
Basic CASE Statement  
Advanced CASE Statement  
Using an Access Lock in your SQL