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**Description:** This class teaches everything a Teradata DBA needs to know. This class covers everything from Teradata DBA fundamentals, TASM and Viewpoint, and Teradata Internals.

**Objective:** At the completion of this course, all students will have the skills and knowledge to perform their DBA jobs at a very high level.

**Topics:**

- Introduction and Good Advice
- Teradata Architecture Fundamentals the DBA must know
- The Primary Index is the Axis of all Teradata Systems
- A DBA’s best friend - The Data Dictionary
- How Teradata Tracks Objects
- Creating Users and Databases
- Profiles
- Roles
- Access Rights
- Collect Statistics
- Locking
- Protection Features
- Viewpoint
- TASM
- Designing and Implementing Workloads
- Top SQL Commands Cheat Sheet
Audience: This course is designed for Teradata DBAs or anyone who has interest in learning more about how to perform the role of a Teradata DBA.

Prerequisites: None

Duration: 3-5 Days

Course Outline:
Chapter 1 – Introduction and Good Advice
What is Parallel Processing?
Start Small and Think Big
Give your Enterprise the Tools they need
Model the Business with ERwin
Educate the Business on the Business by Sharing the Model
Load Your Models and have the SQL Built Automatically
Five Brilliant Pieces of Teradata (1 of 5) is MPP
Five Brilliant Pieces (2 of 5) are Tactical Queries
Five Brilliant Pieces (3 of 5) Is a Traffic System
Five Brilliant Pieces (4 of 5) Is Viewpoint
Five Brilliant Pieces (5 of 5) Are Data Processing Options
Support Large Queries, but Monitor them closely
Experiment and Improve Loading Data Strategies
Compress Your Data with Multi-Value Compression
Separate your Production System from Your Test System

Chapter 2 - Teradata Architecture Fundamentals the DBA must know
Parallel Architecture
The Teradata Architecture
All Teradata Tables are spread across ALL AMPS
Teradata Systems can Add AMPS for Linear Scalability
AMPs and Parsing Engines (PE’s) live inside SMP Nodes
Each Node is Attached via a Network to a Disk Farm
Two SMP Nodes Connected Become One MPP System
There are Many Nodes in a Teradata Cabinet
This is the Visual You Want to Understand Teradata
Responsibilities of the DBA

Chapter 3 – The Primary Index is the Axis of all Teradata Systems
The Primary Index is defined when the table is CREATED
A Unique Primary Index (UPI)
Primary Index in the WHERE Clause - Single-AMP Retrieve
A Non-Unique Primary Index (NUPI)
Primary Index in the WHERE Clause - Single-AMP Retrieve
A conceptual example of a Multi-Column Primary Index
Primary Index in the WHERE Clause - Single-AMP Retrieve
A conceptual example of a Table with NO PRIMARY INDEX
A Full Table Scan is likely on a table with NO Primary Index
Table CREATE Examples with four different Primary Indexes
What happens when you forget the Primary Index?
Why create a table with No Primary Index (NoPI)?

Chapter 4 – A DBA’s best friend - The Data Dictionary
The Data Dictionary Resides in User DBC
The DBC.DBCInfoV View
Querying the Data Dictionary
Using the Keyword USER
Restricted Views have an X at the End of their Name
The V is New with Teradata V12
The V and the Restricted X are Now Often Combined
A Recap of What We Have Learned So Far
The DBC.DatabasesV View
The DBC.Users View
The DBC.Tables View
Using DBC.Tables to find out about Fallback
The DBC.Indices View
The DBC.Columns View
Clever Queries for the DBC.ColumnsV View
New V14 - The DBC.PartitioningConstraintsV View
The DBC.AccountInfo View
The DBC.AMPUsage View
Clearing Out the DBC.AMPUsage Data
The DBC.AllTempTables
The DBC.Triggers
The DBC.All_RI_ChildrenV
DBC.SessionInfoV Information
DBC.LogonOffV
AllRoleRights, AllRightsV, UserRightsV and UserGrantedRightsV
The DBC.Profiles View
RoleMembers, RoleInfo, UserRoleRights and ProfileInfoVX,
Understanding that Space is based on a Per-AMP Basis
Total Space for a Single Database or User
Using the Data Dictionary to see the Space for Everyone
Finding the Perm Percent Used
Finding the Perm Percent Used with a HAVING Clause
Finding the Perm Percent Left with a HAVING Clause
Creating a Macro for Perm Percent Used with a Dynamic %
Orphaned Spool Files That Need to be deleted
Finding Table Sizes
Finding Skew in the Tables in a Database
Finding Skew in a Table
Display the Distribution of a Column per AMP
Your Users and Databases
DBC Tables used in the Collect Statistics Process
The DBC Table DBC.Next
DBA Advice - ClearPeakDisk to Reset Peak Space
DBA Advice – Clean out these Tables Periodically
The DBC.AssociationV View
The DBC.JournalsV View
DBC.Databases2V is for Unresolved Reference Constraints
The DBC.All_RI_ChildrenV for Inconsistent RI
The DBC.ShowColChecksV View
The DBC.ShowTblChecksV View
The DBC.PartitioningConstraintsV View
The DBC.AccessLogV View
The DBC.AccessLogV View for Today’s Queries
The DBC.AccessLogV View Denials for Today
DBC.DBQLRulesV
DBC.QryLogV
DBC.QryLogSummaryV
ResUsage Macros
Executing the ResUsage Macro DBC.Resnode
The DBC.IdCol Table

Chapter 5 - How Teradata Tracks Objects
Teradata Assigns each Object a Unique Numeric ID
The Table ID
The Table ID in Greater Detail
Looking at the TableID inside the actual Cylinders
A More Detailed View of TableID inside the actual Cylinders
The Blocks Below are All Associated with the Same Table
Bits, Bytes and More
Cylinder Sizes

Chapter 6 - Creating Users and Databases
Creating Users and Databases
Password Security Meanings
Now we have Two Users in the Teradata System
A Grant Statement so others Create a Database or User
And so the Teradata Hierarchy Begins
Creating a Database
Users are Given Passwords While Database are Not
Teradata Administrator Can CREATE Users
The Modify User Statement
A Clever Way to Reset a User Password
Accounts and their Associated Priorities
Creating a User with Multiple Account Priorities
Self-Nicing to change Account Priorities
Account String Expansion (ASE)
The DBC.AccountInfo View
The DBC.AMPUsage View
Account String Expansion (ASE) in Action
Test – Run queries Under All Accounts for TeraTom
The DBC.AMPUsage View
Chapter 7 - Profiles

Profiles
Getting Started for Profile Creation
Creating A Profile and a User
Password Security
Password Security Meanings
Creating A Profile and then Modifying a User
Quiz – What are the Profile Values?
Answer to Quiz – What are the Profile Values?
Quiz – What are the Profile Values After Null?
Answer to Quiz – What Are the Profile Values After Null?
The DBC.ProfilesVX View
The DBC.ProfilesV View
The DBC.AccountInfoVX View
ProfileInfoVX, RoleMembers, RoleInfo and UserRoleRights
Teradata Administrator Can CREATE Profiles (1 of 2)
Teradata Administrator Can CREATE Profiles (2 of 2)
Dropping a Profile
The Effects of Dropping a Profile

Chapter 8 – Roles

Roles
Getting Started for Role Creation
Create A Role and then Assign that Role It’s Access Rights
Create a User and Assign them a Default Role
A Role vs. a Profile
Granting a Role to a Current User
Active Roles
Setting Your Active Role to ALL
Roles and Valid Objects
Roles and Invalid Commands
Nesting of Roles
Nesting of Roles in Action (1 of 3)
Nesting of Roles in Action (2 of 3)
Nesting of Roles in Action (3 of 3)
Quiz – What Databases Does Mandy Have Access To?
Answer – What Databases Does Mandy Have Access To?
GRANT WITH ADMIN OPTION Command
REVOKE ADMIN OPTION FOR Command
RoleMembers, RoleInfo, UserRoleRights and ProfileInfoVX,
DBC Tables for AllRoleRights, AllRightsV, UserRightsV and UserGrantedRightsV

Chapter 9 - Access Rights
The Objects That Require Access Rights
Objects and Available Access Rights
A Few Examples to Get You Started
There are Three Types of Access Rights
There are Three Types of Access Rights
There are Three Types of Access Rights
A Dinner Invitation of Access Rights
One of the Problems with Access Rights
The Rights for SysDBA and TeraTom
The GRANT Statement
Create A Role and then Assign that Role It’s Access Rights
GRANT to PUBLIC
GRANT To ALL DBC
GRANT Using the ALL Keyword
GRANT Database Strategy for Users, Views and Tables
Inheriting Access Rights
GRANT at the Column Level
GRANT for the Ability to CREATE Secondary Indexes
Access Rights to CREATE Triggers
The REVOKE Command
DBC Tables for AllRoleRights, AllRightsV, UserRightsV and UserGrantedRightsV
The GIVE Statement
A DROP User can be Better than a GIVE Statement
Removing a Level in the Teradata Hierarchy

Chapter 10 - 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
Chapter 11 – Locking
The Four Major Locks of Teradata
The Read Lock
The Read Lock and Joins
The Write Lock
The Exclusive Lock
The Three Levels of Locking
Locking at the Row Hash Level
Locking at the Table Level
Locking at the Database Level
The Ongoing Battle between Read and Write Locks
Compatibility between Read Locks
Why Read Locks Wait on Write Locks
Why Write Locks Wait on Read Locks
The Access Lock is Different from the Other Locks
What is the Purpose of an Access Lock?
Locking Modifiers - Locking Row, Table or Database
All Views should consider the Locking for Access Statement
What is a Dead Lock or a Deadly Embrace?
Pseudo Tables are designed to minimize Dead Locks
Pseudo Tables are referenced in the Explain Plan
Incompatible Locks Wait on each Other
The Checksum Lock of Teradata
The Nowait Option for Locking
The Automatic Locking for Access Button inside Nexus
Viewpoint Lock Viewer
Viewpoint Lock Viewer Lets You Configure Your View
What is a Host Utility (HUT) Lock?

**Chapter 12 – Protection Features**

A List of the Protection Features
Transient Journal Protects the Transaction Integrity
The Transient Journal in Action
A Single Transaction could Involve All AMPs
The Secret to turning off the Transient Journal
The Transient Journal’s Write Ahead Logging (WAL)
A Node with 40 AMPs and 40 Dedicated FSG Caches
The Transient Journal’s Write Ahead Logging (WAL)
Working Example of the Write Ahead Log (WAL)
The First Step in our Example of the Write Ahead Log (WAL)
The Second Step in our Example of the Write Ahead Log
The Third Step in our Example of the Write Ahead Log
The Fourth Step in our Example of the Write Ahead Log
The Last Step in our Example of the Write Ahead Log
Fallback to Protect against an AMP Failure
Fallback Clusters
AMPs in a Cluster are Physically Separated
The Reason AMPs in a Cluster are Physically Separated
The Price you pay for Fallback
How to Create a Table with Fallback
How to Create a Table with No Fallback
How to Alter a Table to Add or Drop Fallback
What is a Virtual Disk?
Why do AMPs each have Four Physical Disks?
Is a Mirror just like Looking into a Mirror?
RAID 1 Mirroring – Redundant Array of Independent Disks
What does RAID Protect?
How Does RAID Fail?
Do RAID and Fallback have a Connection?
What is a Clique?
If a Node goes down the AMPs migrate within the Clique?
Does Teradata Reset during a Node Failure?
Four Node Cliques
Migrating AMPs in Four Node Cliques
The Hot Spare Node
The Hot Spare Node in Action
With a Hot Spare a Second Teradata Reset isn’t Needed
A Node, It’s AMPs and their Disks
How Cliques are Physically Defined
Cliques are cabled so Migrating AMPs can access their Disks
A Review of Fallback and Clusters
An Example of Fallback and Clusters
Quiz 1 – How Many Clusters do you see?
Quiz 1 Answer – How Many Clusters do you see?
Quiz 2 – How Many Cliques do you see?
Quiz 2 Answer – How Many Cliques do you see?
Quiz 3 – What have we lost? Multiple Choice Answer
Quiz 3 Answer – What have we lost? Multiple Choice Answer
Quiz 4 – What have we lost? Multiple Choice Answer
Quiz 4 Answer – What have we lost? Multiple Choice Answer
Quiz 5 – What have we lost? Which Answer is False?
Quiz 5 Answer – What have we lost? Which Answer is False?
Quiz 6 – What have we lost? Pick Two True Answers
Quiz 6 Answer – What have we lost? Pick Two True Answers
Summary of the facts for Fallback, Clusters, and Cliques
Quiz 7 – How Many Virtual Disks (Vdisks) are in this System?
Quiz 7 Answer – How Many Virtual Disks are in this System?
Quiz 8 – How Many Physical Disks are in this System?
Quiz 8 Answer – How Many Physical Disks are in this System?
Quiz 9 – How Many Transient Journals in this System?
Quiz 9 Answer – How Many Transient Journals in this System?
Quiz 10 – How Many Transient Journals are Open?
Quiz 10 Answer – How Many Transient Journals are Open?
Quiz 11 – How Much Space?
Quiz 11 Answers – How Much Space?
Quiz 12 – How Much Space with Fallback?
Quiz 12 Answers – How Much Space with Fallback?
Quiz 13 – How Many Disks could we lose with RAID 1?
Quiz 13 Answer – How Many Disks could we lose?
Quiz 14 – How Many Disk losses could Kill Us?
Quiz 14 Answer – How Many Disk losses could Kill Us?
Quiz 15 – How Many AMPs could we lose if Lucky?
Quiz 15 Answer – How Many AMPs could we lose if Lucky?
Quiz 16 – How Many AMPs could we lose if Unlucky?
Quiz 16 Answer – How Many AMPs could we lose Unlucky?

The Permanent Journal

Difference between the Transient and the Permanent Journal
Difference Between the Before and After Permanent Journal
Full System Backup compared to an After Journal
How Full System Backups work with the After Journal
The Many Different Permanent Journal Options
Where is the Permanent Journal Stored?
Using Common Sense about Journal Locations
After Journals are Never stored in the Same Node or Clique
What is a Dual After Journal?
What is a Dual Before Journal?
What is a Journal?
Creating a Table with Fallback and a Before and After Journal
Does Fallback Affect a Permanent Journal?
Permanent Journal Rules
Example 1: Permanent Journal Scenarios to Test the Rules
Example 2: Permanent Journal Scenarios to Test the Rules
Example 3: Permanent Journal Scenarios to Test the Rules
How to Create Database with a Permanent Journal
Creating Tables under different Journal Circumstances
Permanent Journal’s Three Main Areas
The Current Journal consists of the Active and Saved Areas
Permanent Journal Commands
Deleting a Permanent Journal
Some Great Advice for Maintaining the Permanent Journals
Recovery Using the Permanent Journals
The Journals View in DBC (DBC.Journals)
Archive Recovery Console (ARC)
Reasons You Might Utilize ARC
ARC raising the BAR (Backup Archive Restore)
ARC Commands in Alphabetical Order
An ARC Example of an Archive and then a Restore

**Chapter 13 - Viewpoint**
Database Administration (DBA) on Teradata
Viewpoint
Logging into Viewpoint
The First Time you Login to Viewpoint
The Add Content Menu for Monitoring
The Add Content Menu for TASM
The Add Content Menu for Tools
The Add Content Menu for Trend Reporting
Adding your first Content
How the Page looks after you add your first Content
Adding Additional Pages
The Fundamentals of Viewpoint Pages and Portals
Adding Multiple Portals to a Single Page
All Portals to Their Individual Tab
Portlet Controls
The Rewind Control
Query Monitor Overview
Query Monitor Details View
Query Monitor Actions
My Queries
Calendar
Calendar Details
Add an Event to the Calendar
Getting a Weekly View
System Health
System Health Drilldown
System Health Preferences
ALERT
Setting up an ALERT Configuration
Setting up an ALERT Configuration Continued
SQL Scratchpad
SQL Scratchpad Query Results
SQL Scratchpad Object Loader
Space Usage
Space Usage Preferences
Investigating Space to See Dynamic Reports
Space by Vproc (AMP)
How to Obtain a Detailed View of Space
Detailed View of Space
Adding PERM Space to a Database or User
External Content
Lock Viewer
Lock Viewer Lets You Configure Your View
Canary Queries
Multiple Systems Need Multiple Canary Query Portlets
What Canary Queries Measure
Remote Console
Capacity Heatmap
Capacity Heatmap Preferences
Capacity Heatmap Example
Metrics Analysis
My Queries
My Queries Preferences
Today's Statistics Using System Metrics
Today's Statistics Using Query Metrics
Today's Statistics Using Performance Metrics
Today's Statistics Preferences for System Metrics
Today's Statistics Preferences for Query Metrics
Today's Statistics Preferences for Performance Metrics
Today's Statistics Preferences for Sampling Intervals

**Chapter 14 - TASM**

Three Levels of Workload Management
Pre-execution, Query Execution, and Post-execution
What is TASM?
Query Management compared to Workload Management
What is the Secret Sauce for Query Management?
The life of a Query
What is a Workload?
Workload Examples
There are Four Types of Query Rules
Common Sense Examples of Filters and Throttles
Performance Period Examples
The Scoop on Object Throttles
Load Utility Throttles
Creating Workloads
When Creating Workloads the “WHO” is your Foundation
After the “WHO” comes the “WHERE”
After the “WHO” and the “WHERE” comes the “WHAT”
Exception Actions
When and How Teradata checks for Exceptions
DBC.TDWMExceptionLog
Teradata Workload Analyzer
Teradata Workload Analyzer
Pre-execution, Query Execution, and Post-execution
Why use Priority Scheduler?
The Concept of a Resource Partition
Resource Partitions
The Clever Idea behind Resource Partitioning
The Brilliant Idea behind Resource Partitioning
The Concept of Resource Partitions and Weights?
The Concept of a Workload in a Resource Partition
Calculating your CPU Percentage 1
Answers to Calculating your CPU Percentage 1
Calculating your CPU Percentage 2
Answers to Calculating your CPU Percentage 2
Chapter 15 – Designing and Implementing Workloads

How to Configure Priority Scheduler

Workload Designer

The Three Areas of the Workload Designer
How the Area of Workload Designer are Used

How to Create a Ruleset

The First Step to Creating a Ruleset

Returning to the Workload Designer Main Screen

A Basic Ruleset in the Working Area

Editing a Ruleset

The States

States – Adding Another Planned Environment

Editing the Name of the NewEnv Planned Environment

Changing the Planned Environment Name to a Good Name

Adding a New State

A New State is Born

Editing the Default State Name of newState

We Now have a New State named DayState

Drag a State (DayState) to a Planned Environment (WorkDay)

Drag a State (DayState) to a Planned Environment (WorkDay)

Do NOT Forget to Hit Save

We now Need to Create a Planned Event

Create a Planned Event to Define the Timeframes

The Planned Event Screen

Your Event is now in the Available Events Tab

Drag and Drop your Event to your Planned Environment

You have a Timeframe for the Planned Environment DayState

Creating a Degraded Condition with our Normal Condition

Creating a Degraded Condition with our Normal Condition

Editing your New Condition to become a Degraded Condition

Edit Health Conditions Screen
Our New Edited Health Condition named Degraded
We Now have a New Degraded Condition
Don’t Forget to Now Hit the Save Button
Let’s Define our Degraded Health when CPU hits 100%
The Available Events Screen
The Create Event Screen
The Available Events Screen Now Shows our Event
After we Drag and Drop the Event into the Degraded Events
Drag the Base State to the Degraded/Always Environment
Our Default of BASE is Set in the Degraded Environment
Let’s Create a New State for our Degraded Workday
Let’s Create a New State for our Degraded Workday
Let’s Create a New State for our Degraded Workday
Drag the new state DayDegraded to our Planned Environment
Hit Save to keep your Changes
Limiting the Sessions
When you First come to the Sessions Screen
Query Session Limit – The General Tab
Creating a Session Limit for the WorkDay when DayDegraded
Creating a Session Limit for the WorkDay when DayDegraded
A Successful Creation of a Session Limit on DayDegraded
Creating Filters
When you First come to the Filters Screen
Creating a New Filter – The General Tab
Creating a New Filter – The Classification Tab
Edit Query Characteristics Criteria
Creating a New Filter – The General Tab
Edit the Filter for the WorkDay when DayDegraded
Creating a New Filter – The Classification Tab
Utilizing Throttles
Throttles – The Throttles Tab
Throttles – New Throttles Tab
Throttles – New Throttles Tab
Edit the Throttle for the WorkDay when DayDegraded
Throttles – New Throttles Tab
Throttles – The Throttles Tab
Let’s Go Back and Activate our Rule Set
To Prepare for Activation, Move the Ruleset to the Ready
The Ruleset is in the Ready and now we can Activate
The Ruleset is in the Ready and now we can Activate
When you First come to the Workloads Screen
Workloads – New Workload General Tab
Workloads – New Workload Classification Tab
Edit the Request Source Criteria
Workloads – New Workload Classification Tab
Workloads – Throttles in a Workload
Edit the DayDegraded Settings
Workloads – Throttles are now Set for the State DayDegraded
Workloads – Service Level Goals
Service Level Goals for the WorkDay
Workloads – Service Level Goals
Workloads – Exceptions
Workloads – The Exceptions Screen
Workloads – The New Exceptions Screen
Chapter 16 - The Cold, Hard Teradata Facts

What is Parallel Processing?
The Basics of a Single Computer
Teradata Parallel Processes Data
Parallel Architecture
The Teradata Architecture
All Teradata Tables are spread across ALL AMPS
Teradata Systems can Add AMPs for Linear Scalability
Understand that Teradata can scale to incredible size
AMPs and Parsing Engines (PEs) live inside SMP Nodes
Each Node is attached via a Network to a Disk Farm
Two SMP Nodes Connected Become One MPP System
There are Many Nodes in a Teradata Cabinet
Inside a Teradata Node
The Boardless BYNET and the Physical BYNET
The Parsing Engine
The AMPs Responsibilities
Teradata Parallel Processing
Each Table has a Primary Index that is Unique or Non-Unique
The Hash Map Determines which AMP will own the Row
A Unique Primary Index Spreads the Data Evenly
The AMP Adds a Uniqueness Value to Create the Row-ID
Each AMP Sorts Their Tables by the Row-ID
A Non-Unique Primary Index Skews the Data
Comparing the Same Table with Different Primary Indexes
Unique Primary Index Queries are a Single AMP Retrieve
A Non-Unique Primary Index is also a Single AMP Retrieve
Teradata has a No Primary Index Table called a NoPI Table
There are Normal Tables and then there are Partitioned Tables
A Visual of One Year of Data with Range_N Per Month
Partitioning is designed to eliminate the Full Table Scan
A Partition # and Row-ID = Row Key
An AMP Stores its Rows Sorted in only Two Different Ways
AMPs Moves Their Data Blocks into Memory to Read/Write
The Most Taxing thing for an AMP is Moving Blocks into Memory
Rows are Stored in Data Blocks which are stored in Cylinders
Rows for an AMP Stored Inside a Data Block in a Cylinder
An AMP’s Master Index is Used to Find the Right Cylinder
The Row Reference Array (RRA) Does the Binary Search
A Block Splits into Two Blocks at Maximum Block Size
Data Blocks Maximum Block Size has Changed (V14.10)
The New Block Split with Teradata V14.10
The Block Split with Even More Detail in Teradata V14.10
There is One Master Index and Thousands of Cylinder Indexes
Each Table has a 48-bit TableID

Chapter 17 - How Teradata Tracks Objects
Teradata Assigns each Object a Unique Numeric ID
The Table ID
The Table ID in Greater Detail
Looking at the TableID inside the actual Cylinders
A More Detailed View of TableID inside the actual Cylinders
The Blocks Below are All Associated with the Same Table
Bits, Bytes, and More
Chapter 18 – AMP Worker Tasks
Teradata is a Message Passing System
The Parsing Engine Parses the SQL and comes up with a Plan
What is an AMP Worker Task (AWT)?
Each AMP has 80 AMP Worker Tasks (AWTs)
Each Query Takes Up One or More AMP Worker Tasks
An All-AMP Query Usually Won’t Use More Than 4 AWTs
A Live Example of AWTs in Action
There are 24 AWTs Reserved for Internal Work
How Utilities Use AWTs
Monitoring AMP Worker Tasks with ResAMPCpuByGroup

Chapter 19 - Deep Dive Overhead for each Row
Why Go Deep inside the Overhead of a Row?
A Row Layout in Teradata
Row Length
Row ID
How The Row Hash is created for Each Row
Unique Primary Indexes have Even Distribution
The AMP adds a Uniqueness Value to Its Rows
The Row-Hash is 32-bits and so is the Uniqueness Value
Non-Unique Primary Indexes have Skewed Data
Flag Byte
Presence Byte
Presence Byte is used to show Null Values in each Row
A Close-up look at the Presence Byte for Nulls
An Extreme example to look at the Presence Byte for Nulls
Quiz – How Many Presence Bits used for these Columns?
Answer – How Many Presence Bits used for these Columns?
Quiz – How Many Presence Bits used with NOT NULL?
Answer – How Many Presence Bits used with NOT NULL?
Quiz – Which bit will be Set to a One?
Answer – Which bit will be Set to a One?
Quiz – How Many Presence Bits Needed Now?
Answer – How Many Presence Bits Needed Now?
What Happens when we need more than One Presence Byte?
An Example that must use a 2nd Presence Byte
An Example that must use a 2nd Presence Byte
Quiz – Answer the Presence Bit/Byte Questions?
Answers to the – Answer the Presence Bit/Byte Questions?
Quiz - How Many Nullable Columns are Possible?
Answer - How Many Nullable Columns are Possible?

Chapter 20 - Compression
Important Information about Compression
Presence Bytes are also used for Compression
Why One Byte (8 bits) can represent up to 255 Values
Answers to One Byte (8 bits) can represent up to 255 Values
Now that you Understand that 8 Bits can Represent 0 – 255
A Compression Example that Compresses Two Values
A Compression Example that Compresses Three Values
Quiz – Name that Compression Value
The Next Important Concept in Compression
Quiz – Can you Fill in the Compression Values?
Answer – Can you Fill in the Compression Values?
The Last Major Concept in Compression
Quiz – Using One Presence Byte for Multiple Columns
Answer – Using One Presence Byte for Multiple Columns
Quiz – How Many Presence Bytes are Needed?
Answer – How Many Presence Bytes are Needed?
Advanced Quiz – Fill in the Presence Bits?
Answer to Advanced Quiz – Fill in the Presence Bits?
The Cost Vs. the Savings
The Cost List of Compression
A Deeper Dive Into NULL Values
Quiz - How Much Space Did We Just Save?
Answer - How Much Space Did We Just Save?
Advanced Quiz - How Much Space Did We Just Save?
Advanced Quiz - How Much Space Did We Just Save?
Using the DBC Tables in a Compression Experiment
A Compression Test
A Compression Test
We then moved all Eight Tables to another Database
Compression Reports with Nexus and SmartCompress
We Then Created Two Global Temporary Tables
We Then Created and Executed our Macro
Report Comparing Compressed and NonCompressed Tables

Chapter 21 - Data Stored in the Row
The Varchar Offset
An Example of a Varchar Offset
An Example of Two Varchar Columns
The Fixed Columns
An Example with Multiple Fixed Columns
Compressible Columns
An Example with Fixed Columns and A Compression Column
An Example with A Fixed Column and a Compressed Varchar
VARCHAR Columns
An Example of a Fixed Column and a Varchar
Teradata’s Maximum Row Size

Chapter 22 - How Data Rows are Stored in Blocks
Why Go Deep inside Data Blocks?
In The Beginning a Table is created
Every AMP has the Exact Same Tables
Rows are Stored in Blocks
Each Table Header and Data Block have the Same TableID
AMPs Moves Their Data Blocks into Memory to Read/Write
AMPs can Read/Write their Rows once they are in FSG Cache
Every Data Block Starts with a Data Block Header
Every Data Block Ends with a Data Block Trailer
Each Block has a Row Reference Array (RRA)
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Each Cylinder on an AMP has a Cylinder Index
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Answer – What Two Things Does and AMP Read?
Quiz – How Many Row Reference Arrays do you See?
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Review - Data deemed VeryHot stays in each AMP's Intelligent Memory

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