



HPE NonStop SQL/MX Basics U4184S

HPE course number U4184S

Course length 5 days

Delivery mode ILT

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This course is an introduction to SQL, relational database principles, and the HPE NonStop SQL/MX product and serves as a prerequisite to more advanced NonStop SQL/MX courses. Hands-on lab sessions provide practical experience with generating SQL/MX queries to access data and creating database objects (catalogs, tables, indexes, views, and constraints).

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Audience

- Anyone requiring an introduction to SQL and working with the NonStop SQL/MX product

Prerequisites

- Concepts and Facilities course (U4147S)

Course objectives

- Describe relational database concepts and terminology
- Describe the HPE NonStop SQL/MX processes and objects
- Use a mxci session and reference ANSI names for SQL/MX database objects
- Describe the basic process to write queries and the tools to evaluate the query performance
- Use the mxci SELECT statement and predicates to retrieve data from single tables
- List the types of functions supported in SQL/MX

- Retrieve data from:
 - multiple tables using joins and union operations
 - derived tables using Query Expression by using subqueries
- Create a SQL/MX database (Catalog, Schema, Tables, Indexes, Views, and Constraints)
- Modify data in a table using SQL/MX INSERT, UPDATE, and DELETE statements
- Describe the SQL/MX access options and isolation levels
- Describe SQL/MX database management functions

Benefits to you

- Upon completion of this course, you will:
 - Understand key relational database concepts and terminology
 - Be able to use mxci commands to create SQL/MX objects
 - Be able to use SQL statements to retrieve or modify data in SQL/MX tables

Detailed course outline

Module 1: Introduction to SQL Relational Databases	<ul style="list-style-type: none"> • Definition of a relational database • Components of a relational database table • Forming relationships in a relational database • Types of relationships 	<ul style="list-style-type: none"> • Description of Structured Query Language: Data Definition Language, Data Manipulation Language, Data Control Language, and Transaction Control Language • Characteristics of a Relational Database Management System (RDBMS) • Lab exercise
Module: 2 Overview of SQL/MX Architecture	<ul style="list-style-type: none"> • SQL/MX Architecture • SQL/MX System Metadata • User Metadata (UMD) Tables • User Catalog and Schemas 	<ul style="list-style-type: none"> • SQL/MX User Tables, Objects, Tables, Indexes, Views, Constraints, Triggers, Object Namespaces–Object Type, Security Model, Process Architecture, Components, Catalog Manager, DDL Operations, Utilities • NSM/web Architecture • Lab exercise
Module: 3 Introduction to mxci	<ul style="list-style-type: none"> • SQL/MX Help Facilities • Starting an mxci session • mxci Prompts and Termination Character • SQL/MX Identifiers • Logical (ANSI) Names • Specifying ANSI • Using Logical Names in an mxci Session 	<ul style="list-style-type: none"> • mxci: <ul style="list-style-type: none"> – SET NAMETYPE Command (ANSI) – SET CATALOG Command – SET SCHEMA Command • mxci cd Command, ls Commands • mxci—LOG Command • Lab exercise
Module: 4 Query Writing Process	<ul style="list-style-type: none"> • Overview of query execution • Overview of query development process • Analyzing the query objective, Generating the query, Executing the query 	<ul style="list-style-type: none"> • Verifying the results, Assessing performance • Lab exercise
Module: 5 Retrieving Data from a Single Table	<ul style="list-style-type: none"> • Data Types, Character Data Types, Numeric Data Types–Exact and Approximate, Datetime Data Types, Interval Data Types • INVOKE Command • SELECT Statement–Clauses, Syntax, Select List • SELECT–Select List, ALL or DISTINCT Rows, [ANY N] or [FIRST N] • FROM and WHERE Clause • Predicates 	<ul style="list-style-type: none"> • Row-Value-Constructor • Comparison Predicates–Syntax, Examples • LIKE, BETWEEN, and IN Predicates • Boolean Operators and Compound Predicates • NULL Values • IS [NOT] Predicate • ORDER BY, GROUP By, HAVING Clause • Lab exercise
Module: 6 Functions and Expressions	<ul style="list-style-type: none"> • Aggregate functions • Character functions • Datetime functions • Mathematical functions 	<ul style="list-style-type: none"> • Types of expressions • Literal expressions • Numeric expressions • Lab exercise
Module: 7 Retrieving Data from Multiple Tables	<ul style="list-style-type: none"> • Generating the following types of joins: CROSS, NATURAL, INNER, EQUI, LEFT, RIGHT, Self • Correlation Names 	<ul style="list-style-type: none"> • Join with Additional Search Conditions • UNION Operation • Lab exercise
Module: 8 Query Expressions	<ul style="list-style-type: none"> • Query expression: Definition, Types, Joined Table, Syntax • Non-Joined Query Expression Table: VALUES Statement, TABLE Statement, SELECT Query Specification • Simple Table—SELECT expression • Subquery: Definition, Non-Correlated, Correlated, Evaluation of a Correlated Subquery, Classification, SELECT Form of a subquery 	<ul style="list-style-type: none"> • Predicates: Subquery, Comparison, BETWEEN, IN, and EXISTS, and EXISTS Examples • Subqueries using the Comparison, BETWEEN, and IN Predicates • Subquery key points • Lab exercise

Module: 9 Creating SQL/MX Objects

- Creating SQL/MX Objects
- SQL/MX Object Naming
- CREATE CATALOG Command—Syntax, REGISTER CATALOG Command—Syntax, UNREGISTER CATALOG Command—Syntax, Catalog Considerations
- CREATE SCHEMA Command—Syntax
- Rules for Naming SQL/MX Schema Subvolumes, Schema Considerations, Creating a User Schema
- Creating a SQL/MX Table—Topics
- Column Definitions, Column Name Rules, Character Sets, Default Value, ISO88591 Character Set Examples
- SYSTEM_DEFAULTS Table—NOT_NULL_CONSTRAINT_DROPPABLE_OPTION
- Constraints, Constraints Names, Table Constraints
- Specifying Physical Location and Name for the Underlying Guardian File
- Specifying a Clustering Key, Specifying a Clustering Key—STORE BY Clause, Terminology
- Clustering Key—No STORE BY Clause and No Primary Key Specified, Clustering Key—STORE BY PRIMARY KEY: Primary Key Specified As DROPPABLE
- Specifying Guardian File Attributes
- CREATE INDEX—Syntax, CREATE VIEW—Syntax, CREATE VIEW—Example, Considerations for Creating a View
- Lab exercise

Module: 10 Inserting Data and Updating Statistics

- Methods for Loading Multiple Rows of Data
- Inserting Data into the Database, INSERT Statement—Syntax, Inserting a Single Row, Inserting Multiple Rows, INSERT Considerations
- SQL/MX Histogram Statistics, Statistics Tables, mxci UPDATE STATISTICS Utility, Examples of mxci UPDATE STATISTICS
- Lab exercise

Module: 11 Modifying Data

- Maintaining Database Consistency
- Transaction Management Statements
- Explicit Transaction: User-Defined Transaction, INSERT, UPDATE, DELETE
- Implicit Transaction: System-Defined Transactions, SELECT, INSERT, UPDATE, DELETE
- Modifying Existing Data
- UPDATE Statement—Syntax, Updating a Single Row, Updating Multiple Rows, UPDATE Statement—Scalar Subquery, UPDATE Considerations
- Removing Data from the Database
- DELETE Statement—Syntax, Deleting Data, DELETE Considerations
- Lab exercise

Module: 12 Access Options and Isolation Levels

- Concurrency Control and Contention
- Locking Considerations, Dirty Reads, Non-Repeatable Reads, Phantoms
- Access Options and Isolation Levels, READ UNCOMMITTED Access Option, READ COMMITTED Access Option, READ COMMITTED Considerations, SERIALIZABLE or REPEATABLE READ Access Option
- Lock Modes, Access Options and Lock Modes
- SET TRANSACTION Statement, SET TRANSACTION Statement—Example, Transaction Isolation-Level Rules
- DEADLOCK, Viewing Locks on a Table
- Lab exercise

Module: 13 Management Functions

- SQL/MX Object Dependencies
- SQL Authorization ID
- Object Ownership and Security Rules
- Granting Privileges to Users—Example
- Altering SQL/MX Objects in a SQL/MX Database
- Authorization Requirements for Altering Database Object
- Altering TABLE or INDEX FILE Attributes, Adding Columns to a Table, Altering Considerations
- Removing SQL/MX Database Objects, Dropping SQL/MX Objects From a SQL/MX Database, Removing Your Database Objects
- Managing Data
- mxtool VERIFY Utility, mxtool VERIFY Utility—Security Considerations, mxtool VERIFY Utility—Syntax
- Performance, Monitoring Performance
- Using the EXPLAIN Function with a Prepared Query
- EXPLAIN statement with OPTIONS 'f'
- NSM/web Connectivity Services, Visual Query Planner DISPLAY STATISTICS
- Lab exercise

Module: 14 Advanced Topics

- Referential Integrity (RI)
- Trigger Definition
- Partitioning—Range Partitioning, Hash Partitioning
- Publish and Subscribe Services
- Rowsets
- Compound Statements
- SELECT statement—TRANSPOSE Clause, SAMPLE Clause
- Sequence Function

Module: 15 MXDM

- Features and requirements of MXDM
- Installing and Uninstalling MXDM
- Example screens

Course data sheet

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