VSAM KSDS Performance and Tuning

Course Summary

Description

This course is designed for experienced programmers who are already using IDCAMS to create VSAM KDSD datasets and who are already coding COBOL or Assembler programs that access VSAM KDSD files. It covers VSAM KSDS architecture, coding of IDCAMS utility commands with performance in mind, maintenance of VSAM KSDS files, and techniques for improving COBOL or Assembler program access and updating of VSAM KSDS files.

Objectives

At the end of this course, students will be able to:

- Describe areas to focus on to create VSAM KSDS files that perform well, and areas to consider when tuning a VSAM KSDS.
- Create VSAM KSDS datasets with high performance.
- Maintain VSAM KSDS datasets to keep high performance.
- Write COBOL or Assembler programs that access and update VSAM files using sequential, dynamic, and random access techniques that perform well.

Topics

- VSAM KSDS Architecture (An understanding of VSAM architecture leads to better understanding for how to improve VSAM performance.)
- Types of Access (Defining high-performing VSAM files depends on how they will be accessed.)
- Defining for Performance
- Maintaining for Performance
- Programming for Performance in COBOL and Assembler Programs
- Running for Performance

Audience

This course is designed for application developers and analysts.

Prerequisites

Participants must be able to create simple VSAM KSDS datasets using IDCAMS and appropriate control statements, code basic JCL statements use the edit and submit facilities of TSO, and code simple COBOL or Assembler programs that access or update VSAM KSDS files.

Duration

Three days

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Course Outline

I. VSAM KSDS Architecture (An understanding of VSAM architecture leads to better understanding for how to improve VSAM performance.)

A. VSAM Components
B. Cluster
C. Index, Multi-level indexes, Sequence Set
D. Data
E. Record Storage
F. Control Interval
G. Control Area
H. Freespace
I. Terminology
J. Brief Comparison with ESDS and RRDS

II. Types of Access (Defining high-performing VSAM files depends on how they will be accessed.)

A. Dynamic
B. Random
C. Sequential
D. Skip-sequential
E. Forwards and Backwards
F. Update, Delete vs. Access
G. CICS vs. Batch Access
H. How big is the batch window?

III. Defining for Performance

A. IDCAMS DEFINE and JCL for IDCAM - Review
B. Estimating Size
C. SPACE Allocation - Cylinders, Tracks, Records
D. VOLUME
E. 3380 vs. 3390
F. CI Size for Index - Formulas, Recommendations
G. CI Size for Data - Formulas, Recommendations
H. Blocksize
I. BUFFERSPACE, BUFND, and BUFNI
J. CA Size
K. Free Space
L. For Index
M. For Data
N. Uneven Free Space Distribution
O. ERASE/NOERASE - Performance vs. Security
P. SPEED/RECOVERY - Performance for Load
Q. REUSE
R. WRITECHECK/NOWRITECHECK
S. Cache and RAID vs. Older Disk Storage
T. IMBED/NOIMBED - Impact of Newer Disk Technology
U. REPLICATE/NOREPLICATE - Impact of Newer Disk Technology
V. Condition Codes
W. Modal Commands and Examples
X. Alternate Indexes
Y. DEFINE ALTERNATEINDEX
Z. Data Record Layout
AA. DEFINE PATH
BB. BLDINDEX
CC. SMS DATACLASS Definitions
DD. Variable Blocked
EE. SPANNED - Yes for ESDS, No for KSDS
FF. Files That Are Completely Empty Most of the Time
GG. EXTENDED ADDRESSING
HH. SMB (System Managed Buffering)
II. SHAREOPTIONS and Locking
JJ. Compression

IV. Maintaining for Performance

A. LISTCAT
B. CI and CA Splits
C. Extents
D. Reorganization
E. Recognizing When Frequent Reorgs Are a Reflection of a Freespace Problem
F. When Reorgs Are Not Needed
G. REPRO
H. ALTER
I. VERIFY

V. Programming for Performance in COBOL and Assembler Programs

A. COBOL View of VSAM
B. VSAM Comparison
C. Coding COBOL/Assembler to Use VSAM
D. File-Control Phrases

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VSAM KSDS Performance and Tuning

Course Outline (cont'd)

E. ASSIGN Clause
F. Organization Clause
G. Record Key Clause
H. Relative Key
I. Access Mode
J. File Status
K. Procedure Division Verbs
L. Open Statement
M. Read Statement
N. Start
O. Current Record Pointer
P. Write
Q. Rewrite
R. Delete
S. Common VSAM File Status Codes
T. Generic Keys
U. Using Alternate Indexes
V. Coding to Take Advantage of Indexes
W. Coding to Efficiently Access/Update a VSAM File
X. Choosing and Alternating Between Access Options
Y. RLS - Record Level Sharing
Z. Lock Considerations
AA. Concurrent Positioning for Multiple Requests; NSR Dataset
BB. Buffering - LSR (Local Shared Resources), NSR (Non-shared Resources)
CC. VSAM Examples

VI. Running for Performance

A. Backups / Broken Catalog Entries
B. Obtaining Diagnostic Information
C. Sysplex

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