UNIT 2

ACCESS METHOD SERVICES

Objectives

- Define Cluster
- Invoking IDCAMS
- Functions Of REPRO
- LISTCAT Entries

Access Method Service (AMS)

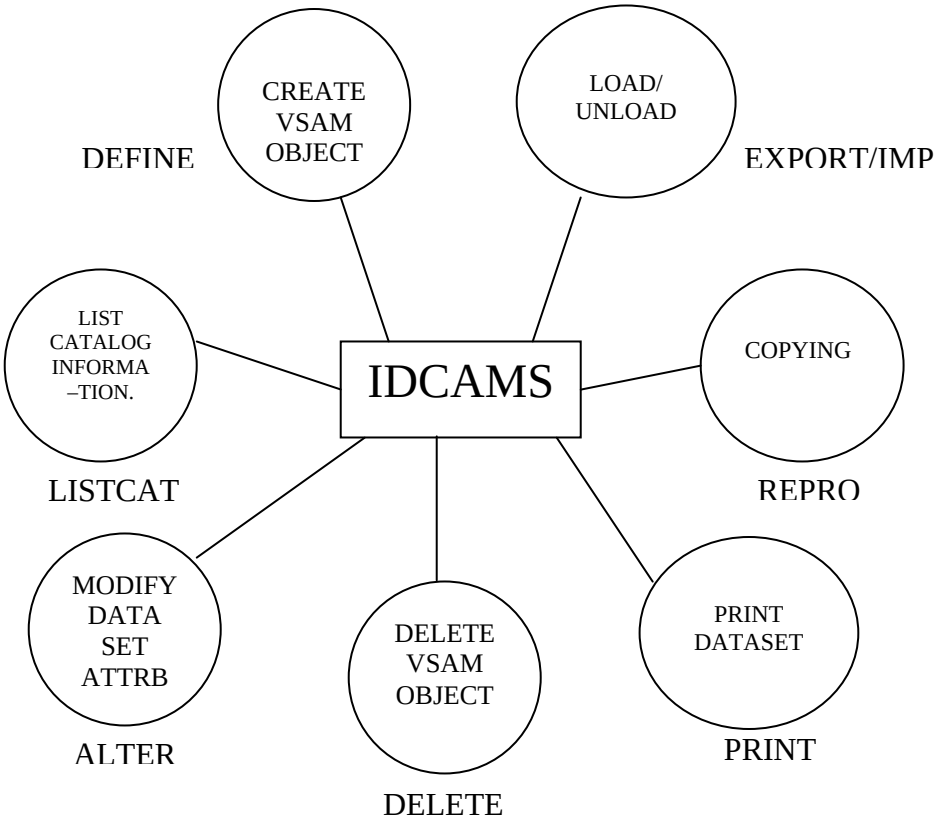


Figure 2-1.

- One of VSAM's strength is that a single set of data management facilities called Access Method Service (AMS) manages both VSAM and non-VSAM datasets.
- IDCAMS is a general-purpose utility program, used with VSAM, to establish and maintain catalogs and data sets. It provides the services described above, and more.
- AMS uses a command processor called IDCAMS to handle a variety of functions such as creating, reproducing, printing datasets and listing catalog contents

Invoking IDCAMS

```
//MYJOB    JOB……
//STEPA    EXEC  PGM = IDCAMS
//SYSPRINT DD SYSOUT = *
//SYSIN    DD  *
           DEFINE CLUSTER –

           .
           .
           .
```

- IDCAMS commands can be processed:
- As a job or jobstep (by specifying PGM=IDCAMS) on the EXEC card

IDCAMS Commands

- BUILDINDEX
- DEFINE
- IMPORT/EXPORT
- LISTCAT
- REPRO
- VERIFY

AMS Command Syntax

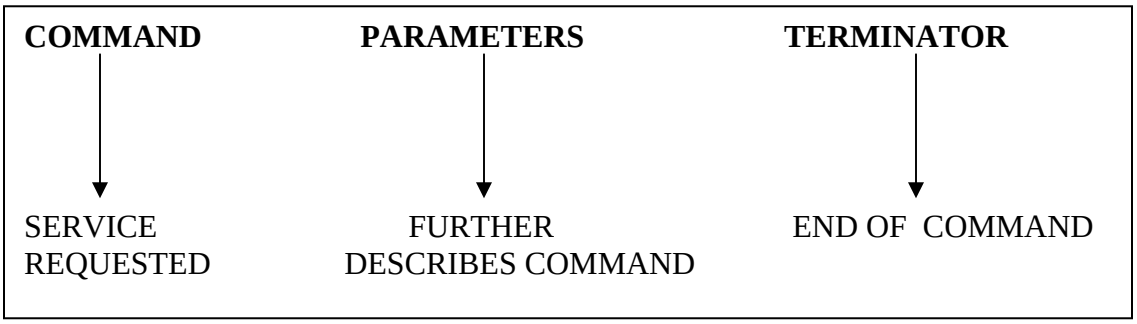


Figure 2-2.

Margins	Default to 2&72
Separators	BLANK,COMMA
Comments	/*----------*/
Continuation	HYPEN, PLUS SIGN
Terminator	SEMICOLON or Absence of Continuation mark

Many of the commands and keywords may be abbreviations acceptable under AMS are acceptable under TSO.

There are two possible continuation characters:

- The PLUS sign (+): ignores the leading blanks on the next line.
- The HYPEN sign (-): doesn't ignore the leading blanks on the next line.

DEFINE SPECIFICATONS

DEFINE CLUSTER.

- Data Set Name
- Data Set Type
- Space Allocation
  - Where?
  - How much?
- Data Set Attributes

Figure 2-3.

When defining a VSAM cluster using the DEFINE CLUSTER command, the following must or can be specified.

- The data set name:
  - The cluster name is required.
  - Component name(s) is/are optional.
- The type of the date set type: KSDS, ESDS, RRDS, LDS.
- The space allocation:
  - Which volume(s)?
  - Primary and secondary allocations.
- The data set attributes.
  - Record size and control interval size.
  - For a KSDS: key information and free space distribution.

DEFINE CLUSTER OVERVIEW

```
DEFINE CLUSTER   (              )      -
       [DATA     (              )      - ]
       [INDEX    (              )      - ]


   DEF   CL      (              )      -
         [DATA   (              )      - ]
         [IX     (              )      - ]
```

- The attributes for the cluster can be specified for the cluster as a whole or for the components of the cluster:

- Any parameters coded for the CLUSTER will also apply to the data and index components.

- Any parameter specified at the DATA or INDEX level apply only to the particular component.

DEFINE CLUSTER PARAMETERS, PART 1

DATA
ORGANIZATION

ALLOCATION

```
 NAME
CYLINDERS  | TRACKS  | RECORDS
         |  KILOBYTES  | MEGABYTES
VOLUMES
```

```
CONTROINTERVALSIZE
BUFFERSPACE
RECORDSIZE
```

```
FILE
REUSE  | NOREUSE
```

Figure 2-4.

Data Organization:

- INDEXED KSDS
- LI NEAR LDS
- NONINDEXED ESDS
- NUMBERED RRDS

DEFINE CLUSTER PARAMETERS, PART 2

DATA INTEGRITY	SPEED | RECOVERY WRITECHECK | NOWRITECHECK SHAREOPTIONS ERASE | NOERASE EXCEPTIONEXIT
PROTECTION	MASTERPW CONTROLPW UPDATEPW READPW AUTHORIZATION
RETENTION	FOR | TO
KSDS ONLY	KEYRANGES KEYS IMBED | NOIMBED REPLICATE | NOREPLICATE FREESPACE

Figure 2-5.

REQUIRED PARAMETERS FOR DEFINE CLUSTER

```
DEFINE CLUSTER –
(         -
NAME (                  )         -
CYLINDERS (          ) | RECORDS (          ) | TRACKS (            ) –
KILOBYTES (          ) | MEGABYTES  (              )  -
[ VOLUMES () ] –
)
```

Figure 2-6.

Most AMS parameters have defaults (and are optional). Some of them, however, are required

For non-SMS managed VSAM data sets following parameters are required.

- NAME
- Space parameter (CYLINDERS/TRACKS/RECORDS/KILOBYTES/MEGABYTES)
- VOLUMES

For SMS managed VSAM data sets only 1 parameter is required.

- NAME

RECORDSIZE PARAMETER

The Record size parameters tell VSAM what size records to expect the average and maximum values for variable-length records. If records are fixed length, avg and max should be the same.

FORMAT

```
RECORDSIZE (average  maximum)
```

EXAMPLES:

```
RECSZ (100 100)   /* Fixed length */

RECORDSIZE (72 150)  /* Variable length */
```

The RECORDSIZE parameter can be specified at either CLUSTER or DATA level

- A RRDS must be fixed length.
- This parameter cannot be coded for a LDS

CONTROL INTERVAL SIZE

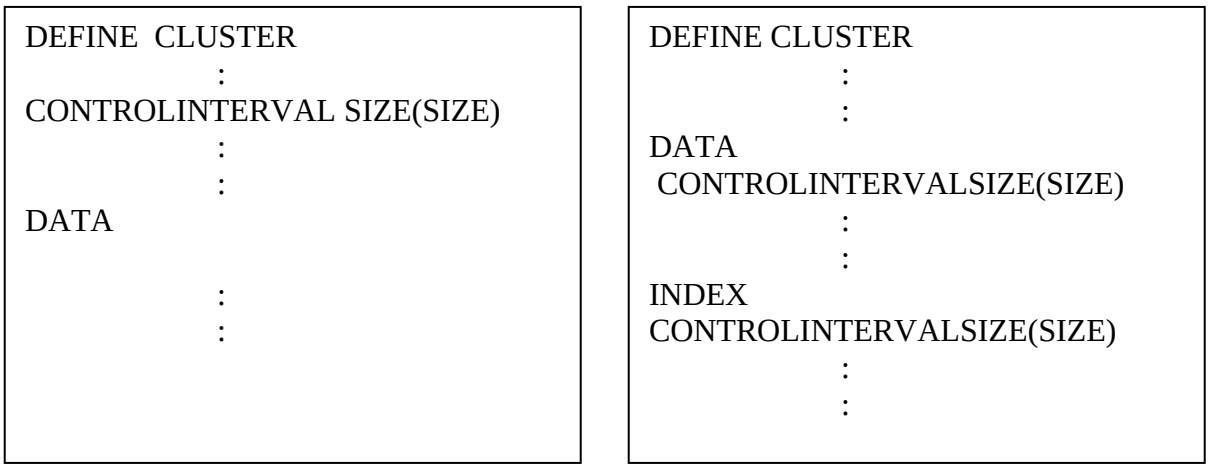


Figure 2-7.

VALID CONTROL INTERVAL SIZES:

- MULTIPLES OF .5K UP TO 8K
- MULTIPLES OF 2K UP TO 32K.

- A CISZ (control interval size) specified only at CLUSTER level applies to both data and index control interval.

- If the CISZ is not valid, VSAM increases the number to the next valid CISZ (not exceeding 32768).

Valid values for control interval sizes are:

CISZ = (n * 0.5K) 0R (n * 2k) with n =1,……..,16

VOLUMES PARAMETER

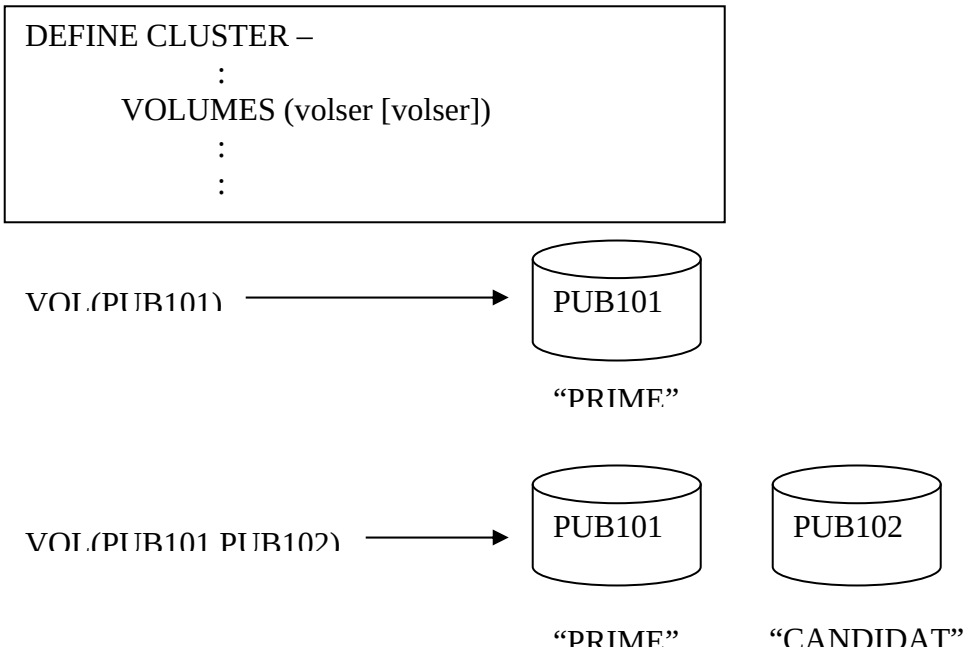


Figure 2-8.

- The VOLUMES parameter can be specified either at CLUSTER or both DATA and INDEX levels.
- In a single VOLUMES parameter, multiple volumes can be coded, but they must have the same device type. If more than one volume is listed, the first is the prime volume. The others are candidate volumes for expansion.
- One cluster can have a maximum of 123- extents for all volumes together.

FREE SPACE

FREESPACE (CIPERCENT [CAPERCENT])
Default: FREESPACE (0 0)

Figure 2-9.

USE OF FREE SPACE:

DIRECT/SKIP SEQUENTIAL

- FREE SPACE WILL ALWAYS E USED

SEQUENTIAL

- FREE SPACE WILL BE USED IF INSERTING IN FRONT OF FREESAPCE THRESHOLD
- FREE SPACE WILL BE PRESERVED IF
- LOADING FILE
- EXTENDING FILE
- INSERTING AT END OF CI

- Free space occurs as a result of the DEFINE specification or due to a CI\CA split.
- During initial load, VSAM places at least one record in each CI except
  - If FSPC (100 100) is specified, then one record is written in the first CI of each CA.
  - If capercent is specified, but less than one free CI per CA, VSAM leaves one CI free in each CA.
  - When a record is deleted or erased, the record space becomes free space.

EXAMPLE OF DEFINE CLUSTER

```
DEFINE CLUSTER                          -
      (NAME(A2000.LIB.KSDS.CLUSTER)     -
       CYLINDERS(5 1)                   -
       VOLUMES(VS010)                   -
       RECORDSIZE(80 80)                -
       KEYS(8 0)                        -
       INDEXED)                         -
DATA                                    -
      (NAME(A2000.LIB.KSDS.CLUSTER.DATA) –
       CISZ(4096)                       -
       FREESPACE(20 10))                -

INDEX                                   -
      (NAME(A2000.LIB.KSDS.CLUSTER.INDEX))
```

- The relative record number is always used as a search argument.

FREE SPACE CONSIDERATION

LARGE FREE SPACE

- More DASD Space
- More I/O for sequential processing for same number of records
- More levels of index for KSDS, so possible increase in run time for direct processing

NO FREE SPACE/TOO little FREE SPACE

- More CI CA SPLIT
- After splits, possibly more time sequential processing, because file is not in physical sequence

DEFINING KSDS

```
//JOBNAME   JOB
//STEP EXEC PGM=IDCAMS
//SYSIN DD *
  DEFINE CLUSTER ((NAME(MTPL002.VSAM.KSDS) -
           TRACKS(1 1) -
           VOLUMES(STOR2 ) -
           KEYS(5 0) -
           FREESPACE(10 10) -
           INDEXED  ) -

           DATA   (NAME(MTPL002.VSAM.KSDS.DATA)
           INDEX  (NAME(MTPL002.VSAM.KSDS.INDEX)
```

KSDS LISTCAT

```
IDCAMS SYSTEM SERVICES                                    TIME: 03-:26:17

  LISTCAT ENTRIES(MTPL002.VSAM.KSDS) ALL
CLUSTER ------- MTPL002.VSAM.KSDS
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       BWO STATUS--------(NULL)     BWO TIMESTAMP-----(NULL)
       BWO---------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       DATA-----MTPL002.VSAM.KSDS.DATA
       INDEX----MTPL002.VSAM.KSDS.INDEX
   DATA ------- MTPL002.VSAM.KSDS.DATA
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       ACCOUNT-INFO-----------------------------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
ASSOCIATIONS
  CLUSTER--MTPL002.VSAM.KSDS
ATTRIBUTES
  KEYLEN----------------64  AVGLRECL--------------80   BUFSPACE-------
  RKP-------------------0  MAXLRECL--------------80   EXCPEXIT-------
  SHROPTNS(1,3-)   RECOVERY    UNIQUE      NOERASE     INDEXED       N
  UNORDERED        NOREUSE     NONSPANNED
STATISTICS
  REC-TOTAL--------------0 SPLITS-CI--------------0   EXCPS----------
  REC-DELETED------------0 SPLITS-CA--------------0   EXTENTS--------
  REC-INSERTED-----------0 FREESPACE-%CI---------10   SYSTEM-TIMESTAM
  REC-UPDATED------------0 REESPACE-%CA---------10    X'00000000
  REC-RETRIEVED----------0 FREESPC------------55296
```

KSDS LISTCAT (Cont….)

```
ALLOCATION

  SPACE-TYPE---------TRACK     HI-A-RBA-----------55296
  SPACE-PRI----------------1     HI-U-RBA---------------0
  SPACE-SEC----------------1

VOLUME
  VOLSER------------STOR02 PHYREC-SIZE--------1843-2   HI-A-RBA-------
  DEVTYPE------X'3-010200F'PHYRECS/TRK------------3-   HI-U-RBA-------
  VOLFLAG------------PRIME     TRACKS/CA--------------1
  EXTENTS:
COMMAND INPUT ===>                                    SCROLL ===> PAGE
  LOW-CCHH-----X'00080004'  LOW-RBA----------------0   TRACKS---------
  HIGH-CCHH----X'00080004'  HIGH-RBA-----------55295
   INDEX ------ MTPL002.VSAM.KSDS.INDEX
   IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
IDCAMS SYSTEM SERVICES                                TIME: 03-:26:17
     RELEASE----------------2     EXPIRATION------0000.000
     PROTECTION-PSWD-----(NULL)   RACF----------------(NO)
     ASSOCIATIONS
       CLUSTER--MTPL002.VSAM.KSDS
ATTRIBUTES
KEYLEN----------------64 AVGLRECL---------------0     BUFSPACE-------
RKP--------------------0 MAXLRECL-------------505       EXCPEXIT-------
SHROPTNS(1,3-)      RECOVERY          UNIQUE      NOERASE      NOWRITECHK
NOREUSE
STATISTICS
REC-TOTAL--------------0  SPLITS-CI--------------0     EXCPS----------
REC-DELETED-----------    SPLITS-CA--------------0     EXTENTS--------
REC-INSERTED-----------0  FREESPACE-%CI----------0     SYSTEM-TIMESTAM
REC-UPDATED------------0    FREESPACE-%CA----------0         X'00000000
REC-RETRIEVED----------0     FREESPC------------25088
```

KSDS LISTCAT (Cont….)

```
ALLOCATION
       SPACE-TYPE---------TRACK     HI-A-RBA-----------25088
       SPACE-PRI----------------1     HI-U-RBA---------------0
       SPACE-SEC----------------1
VOLUME
VOLSER------------STOR02     PHYREC-SIZE----------512   HI-A-RBA-------
DEVTYPE------X'3-010200F'    PHYRECS/TRK-----------4   HI-U-RBA-------
       VOLFLAG------------PRIME     TRACKS/CA--------------1
EXTENTS:
LOW-CCHH-----X'00080005'   LOW-RBA----------------0   TRACKS---------
HIGH-CCHH----X'00080005'   HIGH-RBA-----------25087
IDCAMS SYSTEM SERVICES                                  TIME: 03-:26:17
         THE NUMBER OF ENTRIES PROCESSED WAS:
                   AIX -------------------0
                   ALIAS -----------------0
                   CLUSTER ---------------1
                   DATA ------------------1
                   GDG -------------------0
                   INDEX -----------------1
                   NONVSAM ---------------0
                   PAGESPACE -------------0
                   PATH ------------------0
                   SPACE -----------------0
                   USERCATALOG -----------0
                   TAPELIBRARY -----------0
                   TAPEVOLUME ------------0
                   TOTAL -----------------3
THE NUMBER OF PROTECTED ENTRIES SUPPRESSED WAS 0
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IDC0002I IDCAMS PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 0
```

DEFINING ESDS

```
//JOBNAME   JOB
//STEP EXEC PGM=IDCAMS
//SYSIN DD *
  DEFINE CLUSTER (NAME(MTPL002.VSAM.ESDS) -
                  TRACKS(1 1) -
                  VOLUMES(STOR2 ) -
                  NONINDEXED ) -

     DATA (NAME(MTPL002.VSAM.ESDS.DATA) )
```

ESDS LISTCAT

```
  LISTCAT ENTRIES(MTPL002.VSAM.ESDS) ALL
CLUSTER ------- MTPL002.VSAM.ESDS
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       BWO STATUS--------(NULL)     BWO TIMESTAMP-----(NULL)
       BWO---------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       DATA-----MTPL002.VSAM.ESDS.DATA
  DATA ------- MTPL002.VSAM.ESDS.DATA
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       ACCOUNT-INFO-----------------------------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       CLUSTER--MTPL002.VSAM.ESDS
   ATTRIBUTES
     KEYLEN-----------------0 AVGLRECL--------------80 BUFSPACE-------
     RKP--------------------0 MAXLRECL--------------80 EXCPEXIT-------
     SHROPTNS(1,3-)   RECOVERY     UNIQUE  NOERASE     NONINDEXED    N
     UNORDERED        NOREUSE     NONSPANNED
  STATISTICS
    REC-TOTAL--------------0 SPLITS-CI--------------0  EXCPS----------
    REC-DELETED------------0 SPLITS-CA--------------0  EXTENTS--------
    REC-INSERTED-----------0 FREESPACE-%CI----------0  SYSTEM-TIMESTAM
    REC-UPDATED------------0 FREESPACE-%CA----------0  X'00000000
    REC-RETRIEVED----------0 FREESPC------------55296
```

ESDS LISTCAT (Cont…)

```
ALLOCATION
       SPACE-TYPE---------TRACK     HI-A-RBA-----------55296
       SPACE-PRI----------------1     HI-U-RBA---------------0
       SPACE-SEC----------------1
VOLUME
   VOLSER------------STOR02  PHYREC-SIZE--------1843-2 HI-A-RBA-------
   DEVTYPE------X'3-010200F' PHYRECS/TRK------------3- HI-U-RBA-------
   VOLFLAG------------PRIME  TRACKS/CA--------------1
EXTENTS:
   LOW-CCHH-----X'00080006'  LOW-RBA----------------0  TRACKS---------
   HIGH-CCHH----X'00080006'  HIGH-RBA-----------55295

IDCAMS SYSTEM SERVICES                                  TIME: 03-:3-6:3-2
         THE NUMBER OF ENTRIES PROCESSED WAS:
                   AIX -------------------0
                   ALIAS -----------------0
                   CLUSTER ---------------1
                   DATA ------------------1
                   GDG -------------------0
                   INDEX -----------------0
                   NONVSAM ---------------0
                   PAGESPACE -------------0
                   PATH ------------------0
                   SPACE -----------------0
                   USERCATALOG -----------0
                   TAPELIBRARY -----------0
                   TAPEVOLUME ------------0
                   TOTAL -----------------2
THE NUMBER OF PROTECTED ENTRIES SUPPRESSED WAS 0
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IDC0002I IDCAMS PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 0
```

DEFINING RRDS

```
//JOBNAME   JOB
//STEP EXEC PGM=IDCAMS
//SYSIN DD *
  DEFINE CLUSTER (NAME(MTPL002.VSAM.RRDS) -
         TRACKS(1 1) -
         VOLUMES(STOR2 ) -
         NUMBERED ) -
         DATA (NAME(MTPL002.VSAM.RRDS.DATA) )
```

RRDS LISTCAT

```
IDCAMS SYSTEM SERVICES                                   TIME: 03-:43-:08

  LISTCAT ENTRIES(MTPL002.VSAM.RRDS) ALL
CLUSTER ------- MTPL002.VSAM.RRDS
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       BWO STATUS--------(NULL)     BWO TIMESTAMP-----(NULL)
       BWO---------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       DATA-----MTPL002.VSAM.RRDS.DATA
DATA ------- MTPL002.VSAM.RRDS.DATA
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       ACCOUNT-INFO-----------------------------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       CLUSTER--MTPL002.VSAM.RRDS
 ATTRIBUTES
   KEYLEN-----------------0 AVGLRECL--------------80  BUFSPACE-------
   RKP--------------------0 MAXLRECL--------------80  EXCPEXIT-------
   RECORDS/CI-----------222                    MAXRECS---------51729552
SHROPTNS(1,3-)   RECOVERY     UNIQUE       NOERASE     NUMBERED      N
UNORDERED        NOREUSE      NONSPANNED
 STATISTICS
   REC-TOTAL--------------0 SPLITS-CI--------------0  EXCPS----------
   REC-DELETED------------0 SPLITS-CA--------------0  EXTENTS--------
   REC-INSERTED-----------0 FREESPACE-%CI----------0  SYSTEM-TIMESTAM
   REC-UPDATED------------0 FREESPACE-%CA----------0  X'00000000
   REC-RETRIEVED----------0 FREESPC------------55296
```

RRDS LISTCAT (Cont….)

```
ALLOCATION
       SPACE-TYPE---------TRACK     HI-A-RBA-----------55296
       SPACE-PRI----------------1     HI-U-RBA---------------0
       SPACE-SEC----------------1
VOLUME
   VOLSER------------STOR02  PHYREC-SIZE--------1843-2 HI-A-RBA-------
   DEVTYPE------X'3-010200F' PHYRECS/TRK------------3- HI-U-RBA-------
   VOLFLAG------------PRIM   TRACKS/CA--------------1
EXTENTS:
   LOW-CCHH-----X'002C000B'  LOW-RBA----------------0  TRACKS---------
   HIGH-CCHH----X'002C000B'  HIGH-RBA-----------55295
IDCAMS SYSTEM SERVICES                                  TIME: 03-:43-:08
         THE NUMBER OF ENTRIES PROCESSED WAS:
                   AIX --------------------0
                   ALIAS ------------------0
                   CLUSTER ----------------1
                   DATA -------------------1
                   GDG --------------------0
                   INDEX ------------------0
                   NONVSAM ----------------0
                   PAGESPACE --------------0
                   PATH -------------------0
                   SPACE ------------------0
                   USERCATALOG ------------0
                   TAPELIBRARY ------------0
                   TAPEVOLUME -------------0
                   TOTAL ------------------2
THE NUMBER OF PROTECTED ENTRIES SUPPRESSED WAS 0
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IDC0002I IDCAMS PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 0
```

DEFINING LDS

```
//JOBNAME JOB
//STEP EXEC PGM=IDCAMS
//SYSIN DD *
  DEFINE CLUSTER (NAME(MTPL002.VSAM.LDS) -
         TRACKS(1 1) -
         VOLUMES(STOR2 ) -
         LINEAR  ) -
         DATA (NAME(MTPL002.VSAM.LDS.DATA) )
```

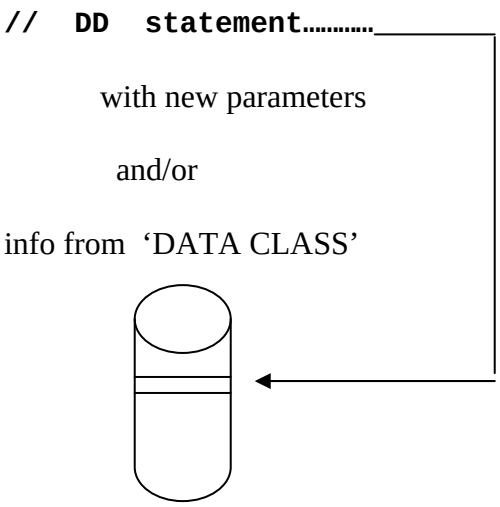
LDS LISTCAT

```
IDCAMS SYSTEM SERVICES                                   TIME: 03-:47:17

  LISTCAT ENTRIES(MTPL002.VSAM.LDS) ALL
CLUSTER ------- MTPL002.VSAM.LDS
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       BWO STATUS--------(NULL)     BWO TIMESTAMP-----(NULL)
       BWO---------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       DATA-----MTPL002.VSAM.LDS.DATA
   DATA ------- MTPL002.VSAM.LDS.DATA
     IN-CAT --- CATALOG.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2002.045
       RELEASE----------------2     EXPIRATION------0000.000
       ACCOUNT-INFO-----------------------------------(NULL)
     PROTECTION-PSWD-----(NULL)     RACF----------------(NO)
     ASSOCIATIONS
       CLUSTER--MTPL002.VSAM.LDS
ATTRIBUTES
  KEYLEN-----------------0  AVGLRECL---------------0  BUFSPACE-------
  RKP--------------------0  MAXLRECL---------------0  EXCPEXIT-------
  SHROPTNS(1,3-) RECOVERY   UNIQUE      NOERASE     LINEAR         N
  UNORDERED      NOREUSE    NONSPANNED
STATISTICS
  REC-TOTAL--------------0  SPLITS-CI--------------0  EXCPS----------
  REC-DELETED------------0  SPLITS-CA--------------0  EXTENTS--------
  REC-INSERTED-----------0  FREESPACE-%CI----------0  SYSTEM-TIMESTAM
  REC-UPDATED------------0  FREESPACE-%CA----------0  X'00000000
  REC-RETRIEVED----------0  FREESPC----------------0
```

LDS LISTCAT (Cont….)

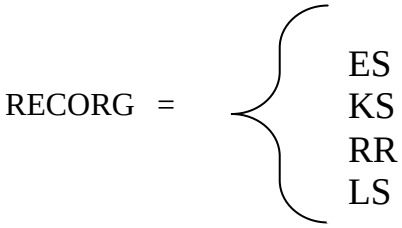
```
ALLOCATION
    SPACE-TYPE---------TRACK  HI-A-RBA-----------49152
    SPACE-PRI----------------1  HI-U-RBA---------------0
    SPACE-SEC----------------1
VOLUME
   VOLSER------------STOR02  PHYREC-SIZE---------4096  HI-A-RBA-------
   DEVTYPE------X'3-010200F' PHYRECS/TRK-----------12  HI-U-RBA-------
       VOLFLAG------------PRIME     TRACKS/CA--------------1
       EXTENTS:
       LOW-CCHH-----X'002C000C'                LOW-RBA----------------0
TRACKS---------
COMMAND INPUT ===>                                        SCROLL ===> PAGE
       HIGH-CCHH----X'002C000C'     HIGH-RBA-----------49151
IDCAMS SYSTEM SERVICES                                     TIME: 03-:47:17
         THE NUMBER OF ENTRIES PROCESSED WAS:
                   AIX ------------------0
                   ALIAS ----------------0
                   CLUSTER --------------1
                   DATA -----------------1
                   GDG ------------------0
                   INDEX ----------------0
                   NONVSAM --------------0
                   PAGESPACE ------------0
                   PATH -----------------0
                   SPACE ----------------0
                   USERCATALOG ----------0
                   TAPELIBRARY ----------0
                   TAPEVOLUME -----------0
                   TOTAL ----------------2
THE NUMBER OF PROTECTED ENTRIES SUPPRESSED WAS 0
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IDC0002I IDCAMS PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 0
```

CREATE VSAM DATA SET THROUGH JCL



- A Data Class is a description of data set characteristics under control of SMS.
- JCL parameter overrides the specifications from a Data Class.

JCL parameters, new to VSAM



KEYOFF = offset-to-key
(for KSDS Only)

KEYLEN=Bytes
(for KSDS and some non-VSAM data sets)

RECORG parameter

KS specifies a VSAM key-sequenced data set
ES specifies a VSAM entry-sequenced data set
RR specifies a VSAM relative record data set.
LS specify a VSAM linear space data set.

EXAMPLES OF JCL STATEMENTS

```
KSDS  //DD1  DD DSNAME = MY.KSDATA,
      //         DISP=(NEW,CATLG),
      //         SPACE=(400,(50,5)),
      //         AVGREC=K,
      //         RECORG =KS
      //         KEYLEN= 15,
      //         KEYOFF=0,
      //         LRECL=250
```

```
ESDS  //DD2  DD DSNAME=MY.ESDATA
      //         DISP=(NEW,CATLG),
      //         SPACE=(100,(10,8)),
      //         RECORG =ES
      //         LRECL=50
```

```
LINEAR //DD3  DD DSNAME=&LIN,
       //        DISP=(NEW,PASS),
       //        SPACE=(1,(10)),
       //        AVGREC=M,
       //        RECORG=LS
```

Figure 2-10.

- Not all VSAM options can be specified in the JCL, more options and defaults may come from a Data class.
- Example 1 shows a JCL statement containing all required information for a KSDS data set.
- Example 2 shows a JCL statement containing all required information for a ESDS data set.
- Example 3 shows a JCL statement of a temporary linear data set. This example requires the assignment of a so-called storage Class.

REPRO

REPRO is an all-purpose load and backup utility command

- It loads an empty VSAM cluster with records. The data and index components(for a KSDS) are build automatically.
- It creates a backup of a VSAM dataset on a physical sequential dataset, and then restore and rebuilds the VSAM dataset using this dataset as input
- It merges data from two VSAM datasets.

REPRO terminates if

- One physical I/O error while writing to the output dataset.
- A total of four errors encountered in any combination:
  - A logical error while writing to the output data set.
  - A logical error while reading the input data set.
  - A physical error while reading the input data set.

COPYING ENTIRE DATA SETS

```
REPRO INDATASET(EXAMPLE.SAM.INPUT) –
      OUTDATASET(EXAMPLE.KSDS.OUTPUT)
```

In this example, an entire input data set is copied to the output data set. Two parameters of REPRO are used.

- INDATASET (or IDS) Name of the entry to be copied or of the user catalog to be merged.
- OUTDATASET (or ODS) Name of the target data set.
- Both INDATASET and OUTDATASET can be used to reference VSAM or non-VSAM data sets.

REPRO EXAMPLE

```
//STEP1         EXEC PGM  = IDCAMS
//SYSPRINT      DD   SYSOUT=A
//MASTER        DD   DSN =EXAMPLE.KSDS. MASTER,DISP=OLD
//BACKUP        DD   DSN=EXAMPLE.SAM.BACKUP,UNIT=SYSDA,
                     SPACE=(TRK,(2,1),RLSE),

//              DISP=(NEW,CATLAG),VOL=SER=LP2WK1,
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=6120)
//SYSIN         DD   *

   REPRO INFILE(MASTER)   OUTFILE(BKUP)
```

- Using REPRO with INFILE/OUTFILE can be used as an alternative to INDATASET/OUTDATASET.

- INFILE and OUTFILE can be abbreviated to IFILE and OFILE

REPRO RECORD SELECTION

	Where to start	Where to stop
KSDS	FROMKEY(rec-key)	TOKEY(rec-key)
KSDS,ESDS	FROMADDRESS(rba)	TOADDRESS(rba)
RRDS	FROMNUMBER(rrn)	TONUMBER(rrn)
KSDS,ESDS RRDS,ISAM	SKIP(number)	COUNT(number)

DATA set can be copied partially using starting and ending delimiter parameters on the REPRO command

- **number** = Number of records
- **key-value** = Record key for a KSDS
- **rba** = relative byte address for a record in a KSDS or ESDS
- **rrn** = Relative record number(slot) for RRDS records

REPRO EXAMPLE

```
//LOADLIB  JOB   ……..
//STEP1    EXEC  PGM=IDCAMS
//SYSPRINT DD    SYSOUT=A
//SYSIN    DD    *
     REPRO IDS(EXAMPLE.LASTNAME.INDEX) –
                ODS(EXAMPLE.EXTRACT.ESDS)   -
                FROMKEY(DEAN)    -
                TOKEY(LLOYD)
```

MERGING DATA SETS WITH REPRO

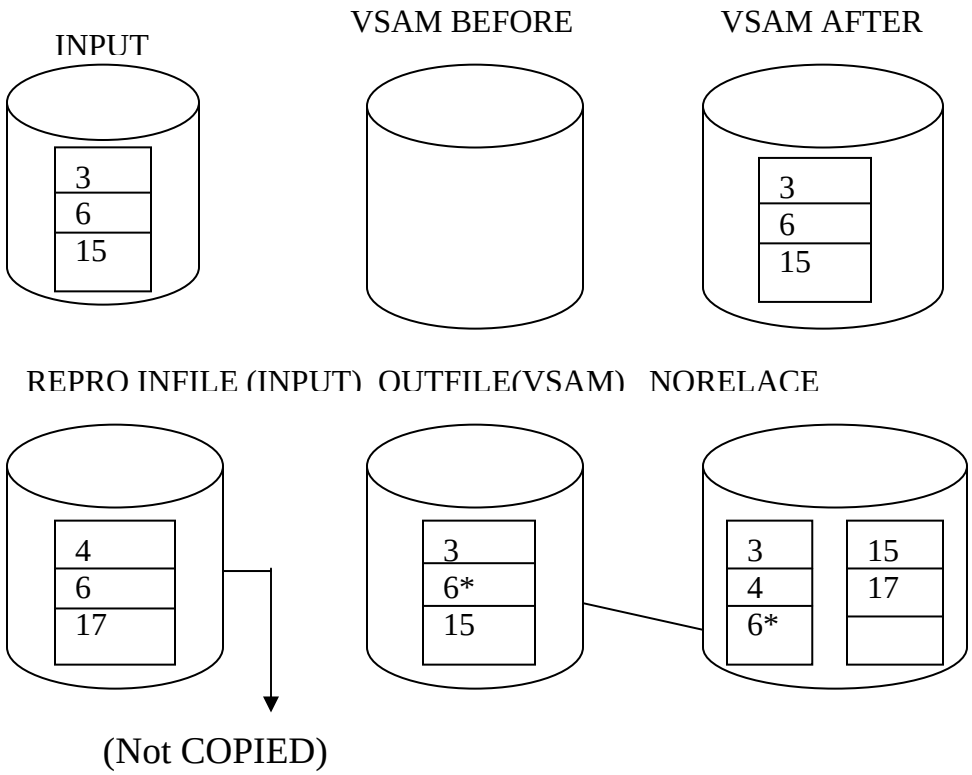


Figure 2-11.

- When the output data set is an existing KSDS OR RRDS, new records can be added
- When using the REPLACE parameter, existing records can be replaced.
- The default REPRO parameter is NOREPLACE; i.e. records already in the KSDS (or RRDS) are not replaced by records in the input data set, which have the same key (or RRN)
- REPLACE / NOREPLACE MAY BE ABBREVIATED BY REP/ NREP.

MERGING DATA SETS WITH REPRO

```
//DD1       DD    DSN=A2000.KSDS.CLUSTER,DISP=OLD
//DD2       DD    DSN=A2000.MYNEW.CLUSTER,DISP=OLD
//SYSIN     DD    *
            REPRO
                  INFILE(DD1)      -
                  OUTFILE(DD2)     -
                  REPLACE
```

When the output data set is an existing KSDS or RRDS new records can be added when using the REPLACE parameter, existing records can be replaced

- The default REPRO parameter is NOREPLACE i.e. records already in the KSDS are not replaced by records in the input data set which have same key
- The KSDS data set may require reorganization after the merging records
- REPLACE/NOREPLACE may be abbreviated by REP/NREP

REUSE PARAMETER WITH REPRO

```
//BACKUP   EXEC  PGM=IDCAMS
//SYSPRINT DD    SYSOUT=*
//MSTR     DD    DSN=EXAMPLE.MSTR.FILE,DISP=OLD
//BKUP     DD    DSN=EXAMPLE.BAKUP.FILE,DISP=OLD
//SYSIN    DD    *
           REPRO -
           INFILE(MSTR) OUTFILE(BKUP) REUSE
```

The REUSE parameter can be specified on both the DEFINE CLUSTER and the REPRO command

Unit 2 Exercises

Unit 2 Lab Exercises

Create a PDS called USERID.VSAM.CNTL for your VSAM Lab exercises.

1. **Define a KSDS named USERID.VSAM.KSDS with the following specifications:**

- **Explicit data & index components names.**
- **Allocate 10 records primary, 5 records secondary.**
- **Fixed record lengths of 80 bytes each.**
- **Default data & index CI sizes.**
- **Key starting in 1st position with a length of 5 bytes.**
- **List all catalog information related to the data set.**

2. **Define a ESDS named USERID.VSAM.ESDS with the following specifications:**

- **Default data component name.**
- **Allocation for 10 records primary & 5 records secondary.**
- **Variable length records of 80 bytes average; maximum length of 100 bytes.**
- **4K data CI size.**
- **List all catalog information related to the data set.**

3. **Define a RRDS named USERID.VSAM.RRDS with the following specifications:**

- **Default data component name.**
- **Allocation for 10 records primary and 5 records secondary.**
- **Record length 80 bytes each.**
- **4K data CI size.**
- **List all catalog information related to the data set.**

4. **Define a LDS named USERID.VSAM.LDS with the following specifications:**

- **Default data component name.**
- **Allocation for 10 records primary & 5 records secondary**
- **CI size 4096 bytes.**
- **List all catalog information related to the data set.**

Notes