Appendix
A

ACCESS METHOD SERVICES FUNCTIONAL COMMANDS

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DEFINE CLUSTER | ALTERNATEINDEX

       (
Name(name)
CYLINDERS(p s) | RECORDS (p s) | TRACKS (p s) MEGABYTES (), KILOBYTES ()
VOLUMES (volser volser...)
[INDEXED NOINDEXED | NUMBERED] | RELATE(name[/password])
[RECORDSIZE(average maximum)]
[CONTROLINTERVALSIZE(size)]
[SPANNED | NONSPANNED]   for CLUSTER only
[BUFFERSPACE(size)]
[ORDERED | UNORDERED]
[REUSE | NOREUSE]
[TO(date) | FOR(days)]
[SPEED | RECOVERY]
[FREESPACE(CI% [CA%])]
[KEYS(length disp)]
[KEYRANGES((lo hi) [(lo hi)...])]
[IMBED | NOIMBED]
[REPLICATE | NOREPLICATE]   for ALTERNATEINDEX
[UNIQUEKEY | NOUNIQUEKEY]   for ALTERNATEINDEX
[UPGRADE | NOUPGRADE]
[only READPW (password)]
[UPDATEPW)password)]
[MASTERPW(password)]
[CONTROLPW(password)]
[ATTEMPTS(n | 2)]
[AUTHORIZATION(entrypoint [string])]
[CODE(code)]
[SHAREOPTIONS(crossregion [crosssystem])]
[WRITECHECK NOWRITECHECK]
[OWNER(ownerid)]
[EXCEPTIONEXIT (entrypoint)]
[MODEL(name [/password][catname [/password]])]
)
[CATALOG(catname [/password])]

```
[DATA
(
[NAME (name)]
[CYLINDERS (p[s])|RECORDS(p[s])|TRACKS(p[s])]
[VOLUMES(volsr[volser...])]
[RECORDSIZE(average maximum)]
[CONTROLINTERVALSIZE(size)]
[SPANNED|NONSPANNED]              for CLUSTER only
[BUFFERSPACE(size)]
[ORDERED|UNORDERED]
[REUSE|NOREUSE]
[SPEED|RECOVERY]
[FREESPACE(CI%[CA%])]
[KEYS(length disp)]
[KEYRANGES((lo hi)[(lo hi)...])]
[UNIQUEKEY|NONUNIQUEKEY]          for ALTERNATEINDEX only
[READPW(password)]
[UPDATEPW(password)]
[MASTERPW(password)]
[CONTROLPW(password)]
[ATTEMPTS(n|2)]
[AUTHORIZATION(entrypoint[string])]
[CODE(code)]
[SHAREOPTIONS(crossregion[crosssystem])]
[WRITENECK|NOWRITECHECK]
OWNER(ownerid)]
EXCEPTIONEXIT(entrypoint)]
[MODEL(name[/passwoed][catname[/password]])]
)]
```

```
                [INDEX
                (

A.      [NAME (name)]
        1.      [CYLINDERS (p[s])|RECORDS(p[s})|TRACKS(p[s])]
        2.      [VOLUMES(volser[volser...])]
        3.      [CONTROLINTERVALSIZE(size)]
        4.      [ORDERED|UNORDERED]
        5.      [REUSE|NOREUSE]
        6.      [IMBED|NOIMBED]
        7.      [REPLICATE|NOREPLICATE]
        8.      [READPW(password)]
                [UPDATEPW(password)]
                [MASTERPW(password)]
                [CONTROLPW(password)]
        9.      [ATTEMPTS(n|2)]
        10.     [AUTHORIZATION(entrypoint[string])]
        11.     [CODE(code)]
        12.     [SHAREOPTIONS(crossregion[crosssystem])]
        13.     [WRITENECK|NOWRICHECK]
        14.     [OWNER(ownerid)]
        15.     [EXCEPTIONEXIT(entrypoint)]
        16.     [MODEL(name[/password][catname[/password]])]
                )]
```

REQUIRED PARAMETERS

The following parameters are required for a cluster or alternate index definition.

The data component and index component definitions, which are themselves optional, have no required parameters.

A.   NAME specifies the name of the cluster, alternate index, data component, or index component.

    1.   The data and index components may be named separately. If not named, VSAM will generate a name.

    2.   the name may be up to 44 alphanumeric characters plus @, #, $, and -

    3.   If the name is more than 8 characters it must be divided into segments of 8 characters or less with a period between segments. A segment may not start with a number or hyphen.

    4.   CYLINDERS, RECORDS or TRACKS specifies amount of space to be allocated, in number of records, number of megabytes, number of kilobytes, tracks, or cylinders, where p is the primary allocation and s is the secondary allocation.

    5.   VOLUMES specifies the volume(s) on which space is to be allocated.

        a)   if more than volume is listed, the volumes must be of the same device type.

        b)   If data and index are to be on different device types, the VOLUME parameter must be used in the DATA definition and in the INDEX definition.

        c)   A volume serial number may be repeated in the list if KEYRANGES is specified, to have more than one keyrange on a given volume.

    6.   a)   INDEXED, NOINDEXED, NUMBERED, or LINEAR specifies, for a CLUSTER, which type of cluster is being defined:

            INDEXED=KSDS, NOINDEXED=ESDS, and NUMBERED=RRDS.

        b)   INDEXED|NONINDEXED|NUMBERED|LINEAR parameter: Specifies the type of data organization used (key-sequenced, entry-sequenced, relative record, or linear).

            LINEAR specifies that the cluster being defined is for linear data. Because linear data set clusters are treated as ESDS clusters that must be processed using control interval access, most of the commands and parameters used to manipulate ESDS clusters can be used.

            There are two exceptions:

            -    Parameters that refer to logical records are not allowed (except RECORDS).

            -    Partial printing can be specified only by using the RBA syntax.

            Space is allocated for a linear data set with the number of control intervals equal to the number of records.

RECORDSIZE parameter:

Specifies the average and maximum lengths of data records. The RECORDSIZE parameter is not used for a linear data set.

Notes: A variable-length RRDS is defined using NUMBERED and RECORDSIZE, where the average and maximum record length must be different.

c)   RELATE specifies, for ALTERNATEINDEX, the base cluster over which the alternate index is to be defined.

Password must be the master password of the base cluster, or the master password of the catalog in which the base cluster is defined, and in which the alternate index is to be defined.

7.   RECORDSIZE specifies the average and maximum lengths, in bytes, or the records in the data component.

    a)   For CLUSTER, the default is (4086 32600) for spanned records, otherwise (4089 4089).

         For ALTERNATE INDEX, the default is (4086 32600).

    b)   Fixed-length records are indicated by specifying the same value for average and maximum; this is required for RRDS.

8.   CONTROLINTERVALSIZE specifies the size of the control interval for a cluster, alternate index or component.

    a)   For CLUSTER and ALTERNATEINDEX, the control interval size for the data or index component may be between 512 and 32,768, and must be an integral multiple of 512 or 2048: n x 512 or n x 2048, where n is from 1 to 16.

    b)   When CONTROLINTERVALSIZE is not specified, VSAM selects it for you.

9.   SPANNED or NONSPANNED specifies whether spanned records are to be supported for the cluster; not applicable to alternate indexes, which always support spanned records.

10.   BUFFERSPACE specifies the amount of buffer space to be provided.

    a)   This specification must be at least enough for two datacomponent control intervals, and, if applicable, one index component control interval.

    b)   The above is the default.

11.   ORDERED or UNORDERED specifies whether volumes are to be used in the order in which they are listed in the VOLUMES parameter.

    a)   If KEYRANGES is specified, the first keyrange is placed on the first volume, the second keyrange on the second volume, etc.

12. REUSE or NONREUSE specifies whether the cluster or alternate index can be opened as an empty dataset.

 a) A reusable cluster can be used as a workfile.

 b) A reusable alternate index can be re-built with the BLDINDEX command without being deleted and re-defined.

 c) REUSE precludes KEYRANGES and UNIQUE.

13. TO or FOR specifies a retention period for the cluster or alternate index.

 a) Date is a Julian date in the form yyddd; days is a number of days from 0 through 9999.

 b) If a retention period is not specified, the cluster or alternate index may be deleted at any time.

14. SPEED or RECOVERY specifies whether the data component is to be pre-formatted before any records are placed in it.

 a) SPEED specifies that the data component is not to be pre-formatted. If the initial load fails, it must be re-started from the beginning.

 b) RECOVERY specifies pre-formatting. In addition, every time a record is written it is followed by an end-of-file record; if the initial load fails, it can be resumed from the point of failure.

15. FREESPACE specifies the amount of free space to be left in each control interval and control area in the data component of a KSDS or alternate index.

 a) CI% is converted to a number of bytes in each control interval.

 b) CA% is converted to a number of control intervals in each control area.

16. KEYS specifies the length and location in the data record of the prime key for a KSDS, or the length and location in the base cluster data record of the alternate key, for an alternate index.

 a) length must be from 1 to 255.

 b) disp is the displacement of the key from the beginning of the record, relative to zero.

17. KEYRANGES specifies that different parts of the data component of a KSDS or alternate index are to be placed on different volumes.

 a) lo and hi are the keys which define the beginning and end of a part of the data component.

 b) lo and hi keys may be from 1 to 64 characters, and may be generic.

 c) There should be as many volumes listed in the VOLUME parameter as there are keyranges; a volume may be listed more than once.

18. IMBED or NOIMBED specifies, for a KSDS or alternate index, whether or not the sequence-set record for each data component control area is to be placed on the track preceding the track preceding the control area; if so specified (IMBED), the sequence-set record is replicated as many times as it will fit on the track.

19.   REPLICATE or NOREPLICATE specifies for a KSDS or alternate index, whether each index record is to be written on a track of its own, as many times as it will fit.

20.   UNIQUEKEY or NONUNIQUEKEY specifies, for an alternate index, whether alternate keys are unique. The maximum number of occurrences of an alternate key is 32,768.

21.   UPGRADE or NOUPGRADE specifies, for an alternate index, whether or not it is to be updated when its base cluster is modified.

22.   Passwords specifies passwords which must be provided by the user program or AMS command, to allow access to the data records of a cluster or alternate index.

   a)   READPW allows input operations.

   b)   UPDATEPW allows input and output operations.

   c)   CONTROLPW allows control interval processing.

   d)   MASTERPW allows all of the above.

   e)   Password is a character string of from 1 to 8 characters consisting of alphanumeric and special characters (comma, semicolon, blank, slash, period, single quote, plus sign, equal ampersand). If the password contains special characters, it must be enclosed in single quotes.

   f)   Separate passwords may be specified for the data component and index component, to allow access to these components as datasets.

23.   ATTEMPTS specifies the number of times the console operator is prompted for a password, when the user program or AMS command does not provide one.

   a)   n may be from 0 to 7; the default is 2

   b)   If 0 is specified, the operator is not prompted.

24.   AUTHORIZATION specifies the entry point of a user-written routine to be given control when a correct password is supplied that is not the master password.

   a)   String specifies a character string of 1 to 255 characters to be passed to the user routine.

25.   CODE specifies a code name for a cluster, alternate index, or component, to be used in a prompting message to the console operator, to avoid revealing the name of the object.

   a)   Code is a character string of from 1 to 8 characters, with the same characters allowed as for passwords.

26.   SHAREOPTIONS specifies how a cluster, alternate index, or component may be shared between different jobs in the same system, and between different systems.

   a)   Shareoption 1 allows sharing by any number of users for input, <u>or</u> access by only one user for input and output. Not applicable to crosssystem sharing.

   b)   Shareoption 2 allows sharing by any number of users for input <u>and</u> access by one user for output. Not applicable to crosssystem sharing.

   c)   Shareoption 3 allows full sharing by any number of users.

   d)   Shareoption 4 allows full sharing by any number of users, and also specifies that buffers used for direct processing are to be refreshed for each request.

   e)   The default is (1 3).

27.   WRITECHECK or NOWRITECHECK specifies whether VSAM is to request the hardware to re-read each record when it is written without data transfer, to ensure that it was written correctly.

28.   OWNER specifies the identification of the owner of a cluster or alternate index.

   a)   Ownerid is a character string of from 1 to 8 characters, with the same characters allowed as for passwords.

29.   EXCEPTIONEXIT specifies the entry point of a user-written routine to be invoked if an I/O error occurs during processing of the cluster or alternate index.

30.   MODEL specifies that the named cluster or alternate index is to be used as a model for the cluster or alternate index being defined.

   a)   Any attributes of the model may be overridden by explicitly specifying them in the cluster or alternate index definition.

   b)   Different MODELS may be specified for cluster or alternate index and the data and index components.

   c)   The read or higher-level password of the model or its catalog must be specified.

   d)   If the MODELs passwords are to be used for the new alternate index is to be defined.

31.   CATALOG specifies the catalog in which the cluster or alternate index is to be defined.

   a)   The read or higher-level password must be specified.

   b)   If a correct password is not specified, the console operator is prompted for a password.