



ChangeMan[®] SSM

Data Extraction User's Guide

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Product version: 8.4 (October 2013)

Publication date: October 2020 (rebranded only)

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Welcome to ChangeMan SSM

This document describes the Data Extraction component of ChangeMan[®] SSM (System Software Manager for z/OS), a product of Serena Software, Inc., a Micro Focus company.

ChangeMan SSM detects and tracks changes within groups of applications or system data sets, synchronizes local or remote operating environments, and restores environments to a clean and working state. ChangeMan SSM detects changes to data sets, PDS members, or full DASD volumes using a unique fingerprinting technology.

Before You Begin See the Readme for the latest updates and corrections for this manual. You can access the Readme on the Micro Focus SupportLine website at <https://supportline.microfocus.com/>

Objective This manual provides information to help you:

- Understand the ChangeMan SSM Data Extraction component.
- Use the Online Data Extraction facility.
- Use the Batch Data Extraction facility.

Audience This manual is intended for anyone responsible for performing ChangeMan SSM tasks on VSAM files.

Change Bars Change bars in the left margin identify text that has changed for SSM 8.4.

Manual Organization

This chapter...	Contains this information...
1	Gives an overview of the product.
2	Explains how to use the Data Extraction online panels. A detailed description is provided for each parameter displayed in the panels.
3	Explains how to use the Data Extraction batch commands.
4	Gives a detailed description of the commands, parameters, and subparameters.
Glossary	Defines terms used within ChangeMan SSM.
Index	Index of subjects.

Related Documents

The following manuals are available in Adobe Acrobat PDF format and can be downloaded from the Micro Focus SupportLine website at <https://supportline.microfocus.com/>.

Title	Description
ChangeMan SSM Change Tracking User's Guide	Instructions for using the Change Tracking Component.
ChangeMan SSM Detection and Synchronization Guide	Instructions for using the Detection and Synchronization Component.
ChangeMan SSM Data Extraction User's Guide	Instructions for using the Data Extraction Component.
ChangeMan SSM Messages Guide	A listing of ChangeMan SSM error and information messages and their meaning.
ChangeMan SSM Getting Started Guide	Provides: <ul style="list-style-type: none"> An overview of the ChangeMan SSM components. Instructions for setting up your environment to get started quickly. Instructions for performing the most commonly used functions.
ChangeMan SSM Installation Guide	Provides instructions for installing the three components of ChangeMan SSM.

Using the Manuals

The manuals use Adobe Portable Document Format (PDF). To view PDF files, use Adobe® Reader®, which is freely available from www.adobe.com.



TIP Be sure to download the *full version* of Reader. The more basic version does not include the search feature.

PDF Document Features

This section highlights some of the main Reader features. For more detailed information, see the Adobe Reader online help system.

The PDF manuals include the following features:

- **Bookmarks.** All of the manuals contain predefined bookmarks that make it easy for you to quickly jump to a specific topic. By default, the bookmarks appear to the left of each online manual.
- **Links.** Cross-reference links within a manual enable you to jump to other sections within the manual and to other manuals with a single mouse click. These links appear in blue.
- **Printing.** While viewing a manual, you can print the current page, a range of pages, or the entire manual.
- **Advanced search.** Starting with version 6, Adobe Reader includes an advanced search feature that enables you to search across multiple PDF files in a specified directory. (This is in addition to using any search index created by Adobe Catalog—see step 3 below.)

Multiple Document Search

Adobe Reader Version 6 and higher supports multiple document search. To search across multiple PDF documents concurrently, perform the following steps:

- 1 In Adobe Reader, select Edit > Search (or press CTRL+F).
- 2 In the text box, enter the keywords for which you want to search.
- 3 Select the **All PDF Documents in** option, then browse to select the folder in which you want to search. (If you have a document open that has an Adobe Catalog index attached, you can leave the **In the index named...** option selected to search across all the manuals in the index.)
- 4 Optionally, select one or more of the additional search options, such as **Whole words only** or **Case-Sensitive**.
- 5 Click the **Search** button.

For more information, see Adobe Reader's online help.

Online Help

ChangeMan SSM includes an online help system that offers the following:

Attribute	Description
Guidance Information	Press F1 in the command field to display an overview of the current panel.
Index	A list of key words from which you can access detailed information on each subject. Press F1 from the main menu of each of the components to access the menu.
Field Sensitive Help	Field sensitive help is available for every field on the ISPF panels. Place the cursor on the field and press F1 for help.

Chapter 1

Introduction

This chapter gives an overview of the ChangeMan SSM Data Extraction component.

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ChangeMan SSM Solutions

ChangeMan SSM is a comprehensive suite of change management solutions. Together, these solutions assist all organizational personnel in detecting, tracking, reporting, implementing, distributing, and recovering from changes to the MVS environment. ChangeMan SSM provides solutions for both small data centers as well as large, complex environments with multiple LPARs, CPUs, and sites.

ChangeMan SSM also assists with data center consolidations and mergers/acquisitions.

ChangeMan SSM consists of three components:

- Change Tracking
- Detection and Synchronization
- Data Extraction

These components provide you with toolsets to detect changes and synchronize environments at the data set, PDS member, and VSAM record level.

Fingerprinting Technology

All ChangeMan SSM components use the Fingerprinting technology. Like DNA mapping that uniquely identifies a human, Fingerprint technology uniquely identifies a file by creating a unique 8 byte *token* representing the contents (*the content Fingerprint*) of any PDS member or data set. When the contents of a data set or member change, so does its token. As long as the contents of the data set or member do not change, the generated token will not change. This means that a data set can be copied to another volume, distributed to a remote site, or reblocked without incurring a change to its token.

ChangeMan SSM uses Fingerprint technology to detect differences in the contents of one or more members, an entire data set, a group of data sets, a volume, or group of volumes regardless of the naming conventions. For partitioned data sets, one token is generated for each member, and one for the entire PDS.

For VSAM KSDS clusters, ChangeMan SSM generates one token per record, and one composite token for the entire data component. These tokens are stored externally in a Fingerprint data set. The VSAM Fingerprint representations are evaluated to determine the changed records. By comparing the current VSAM Fingerprint data set with a previous one, the added, updated, and deleted records are identified. To synchronize VSAM clusters, ChangeMan SSM creates a VSAM Change Basket containing only the added, deleted, and changed records. The Change Basket, created in a Base environment, is transferred to local or remote environments for Import processing to synchronize the Target cluster.

Flat files and flattened databases can also be Fingerprinted at the record level. Flat files can be Fingerprinted as either KEYED or TEXT format. A Fingerprint token is produced for each record of the flat file. The record token is a six-byte representation of the content of a record. If the flat file has a user specified key, then the token is the six-byte representation plus the key.

PDS member-level directory tokens can optionally be used as an additional determination of change (when a change occurs in the PDS directory during the comparison and

synchronization processes). Refer to the EXTENDED SYNC command in the *ChangeMan SSM Detection and Synchronization Guide*.

Data Extraction Component

The Data Extraction component uses record-level fingerprint tokens to detect changes in data files. This facility supports VSAM KSDS and any flattened file. Examples of flattened files are VSAM clusters (RRDS, ESDS, LDS) flattened with IDCAMS REPRO, DB2 tables flattened with DSN1COPY, and any other file type that can be flattened to a physical sequential file. VSAM KSDS is directly fingerprinted, with the keys and record-level tokens stored in a fingerprint data set. Flat files are fingerprinted as keyed or non-keyed files, depending on the nature of the data file.

The Data Extraction component is capable of synchronizing KSDS files. Two local or remote clusters can be fingerprinted to determine the differences, or the same cluster can be fingerprinted at two different times to determine the files changes over time. The record-level differences are exported to a VSAM change basket, and then imported to local or remote clusters for synchronization.

The same facility can be used to identify and package the daily updates in very large VSAM KSDS files and flat files. ChangeMan SSM provides optional parameters for selecting specific record types and fields, which allow field-level changes to be detected. Changed records are extracted and exported to a change basket. This change basket can then be used to update other databases (even those residing on other platforms). A facility for editing VSAM change baskets enables additional customizing options.

A live, side-by-side comparison, can be invoked for any two text files, including PDS members (source or load) and physical sequential files or flattened databases.

Use the Data Extraction component to:

- Fingerprint VSAM KSDS and any flat files (unloaded databases such as DB2 or IMS).
- Identify differences between two local or remote VSAM KSDS files.
- Compare data files at the record level for any flat files or unloaded databases.
- Detect changes in data files over time (VSAM, PS, DA, and flattened databases).
- Extract changed data to update other flat files or databases.
- Package VSAM KSDS changes in a single physical sequential file (change basket) to synchronize other clusters at local or remote environments.
- Apply VSAM change baskets using the VSAM IMPORT command.
- Undo the VSAM KSDS updates imported from a VSAM change basket (if necessary) using the VSAM reverse basket.

Chapter 2

Online Data Extraction Facility

This chapter tells how to extract data in ChangeMan SSM using the online data extraction facility.

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Data Extraction Facility Overview

The ChangeMan SSM online data extraction facility provides online access to the data extraction functions. All of the data extraction functions can be accessed from this menu.

These functions are invoked through ISPF by the selection of the desired option (an abbreviation for a selected function) causing a secondary panel to display. The function abbreviations are listed below in parentheses. This chapter discusses each of the data extraction functions, and includes step-by-step instructions.

Some of the functions generate JCL which, when executed in batch, complete the selected function. JCL is generated because these functions are not feasible as a foreground task. The remaining functions can be executed in the foreground.

Options include:

- FLAT Save a file or database as a flat file
- FGP Fingerprint a file or cluster
- COMPCompare fingerprint data sets
- DATACompare Live data sets
- EXPEExtract and Export record level changes to a change basket
- IMPIImport and Create reverse basket (VSAM KSDS only)
- UNDOUndo the import operation (VSAM KSDS only)

Access Data Extraction Menu

The Data Extraction component is available to any user with a TSO User ID and access to the software. A user does not need to be authorized by ChangeMan SSM to access the Data Extraction functions. Granted authority is required only for access to the Change Tracking component.

When logging on, the ChangeMan SSM *Multiple Functions Menu* displays. From this menu, select Option D.

Exit ChangeMan SSM

You can exit ChangeMan SSM from the *Data Extraction Menu* by entering X, then pressing Enter, or by pressing F4 at any time.

From each of the subordinate panels, press End (or X) to return to the previous panel. To exit ChangeMan SSM completely, press Return (PF4) at any time.

Field Level Help

Contextual help is provided for every field in the ChangeMan SSM ISPF interface. To access the help panels, position the cursor in the desired field, then press Help (PF1).

Select Data Extraction Function

This is the primary menu for the online Data Extraction component. From this menu you can select any one of the Data Extraction functions.

Using the ChangeMan SSM fingerprinting technology, local or remote VSAM clusters or data files may be synchronized. The appropriate JCL for all operations regarding fingerprinting, change basket generation, and applying the change basket to target clusters are generated by selecting different options in this menu. Applying of the change basket is available only for VSAM KSDS clusters. For other types of files or databases, the change basket must be applied by the users program.

```

HPSMENUV ----- ChangeMan SSM Data Extraction Menu (Ver 8.3.3)-----
Option ==>

Select one of the functions

                -- USE THIS FOR ALL FILES --

FLAT - Flatten a file and Fingerprint      Database or Library System
FGP  - Fingerprint a file                  VSAM KSDS, Compressed or Flat Files

COMP - Detect Changes                      Changes over time or local to remote
DATA - Compare Local Files                 Compare PS/DA and PDS Members
EXP  - Extract and Export                  Export Changes to a Basket

                -- IMPORT/UNDO APPLIES TO VSAM KSDS ONLY --

IMP  - Import and Create Reverse Basket    Import the Basket to a Target Cluster
UNDO - Undo the Import operation           Reversal of the Imported Changes

X    - Exit

Press END to Exit

```

To select a function:

- 1 Type the abbreviation of the function you want to perform on the option field.
- 2 Press Enter to proceed to the next panel, or press End to return to the previous menu.

The following table describes the functions available from the *Data Extraction Operations Menu*.

Abbreviation	Description:
FLAT	<p>Flatten a File</p> <p>Save the records from a database table or library member as a physical sequential file. This allows ChangeMan SSM to fingerprint, compare, and export the changed data from these types of files. For VSAM KSDS, the flatten step is not required.</p>
FGP	<p>Fingerprint a file</p> <p>Fingerprints a data file and saves the individual record tokens in a fingerprint data set. The fingerprint DCB attributes are set internally by the program.</p>
COMP	<p>Compare fingerprints</p> <p>Compares two data files, represented by their fingerprint data sets. Local or remote files, previously fingerprinted, can be compared using this option.</p>
DATA	<p>Compare local files</p> <p>Compare PS/DA files and PDS Members. Many reporting options are available.</p>
EXP	<p>Extract and export</p> <p>Creates a change basket by comparing two fingerprint data sets for VSAM KSDS and keyed flat files.</p> <p>Text and positional data is extracted using a fingerprint data set and the live data set. The differences, determined by the individual record token, are extracted from the base file and copied into the change basket.</p> <p>A change basket is a physical sequential file containing header records in the beginning, followed by the actual offloaded records. The DCB information of this file is internally set by the software.</p>
IMP	<p>Import and create a reverse basket</p> <p>Applies a VSAM change basket to a local or remote cluster. Optionally, a reverse change basket can be created at the time of import.</p> <p>This option is available for VSAM KSDS files only.</p>
UNDO	<p>Undo the import operation</p> <p>Applies a reverse change basket to undo the effects of a previous import operation.</p> <p>This option is available for VSAM KSDS files only.</p>
X	<p>Exit</p> <p>Exits the <i>Data Extraction Operations</i> panel.</p>

FLAT - Flatten Database or Library Member

ChangeMan SSM offers a method to convert database and library files to a flat file format (PS). This allows ChangeMan SSM to create a fingerprint representation of the file in its flattened form. Through these fingerprint representations, changes are detected. This option fingerprints a database table or library member, and saves the generated record tokens in the fingerprint data set (a PS file).

For information on how to access this panel, see ["Select Data Extraction Function" on page 15](#).

```

HPSUVFLT      Flatten a Database or Library File
Command =====>

      Select the type of file to flatten:

      Database      Library System      MVS
      -----      -
      _ DB2          _ PANVALET          _ VSAM
      _ ADABAS       _ LIBRARIAN         _ IAM
      _ DATACOM      _ GEM                _ PDS MEMBER
      _ IDMS         _ OWL                 _ USER
                   _ ROSCOE
                   _ WYLBUR

Press ENTER to continue or press END to exit.
    
```

To flatten a database table or library member, select the type of file to flatten by typing S in the corresponding input field; then press Enter.

In this example we will choose VSAM, and use an ESDS, because this is a file type everyone should have available to them. ChangeMan SSM can fingerprint a VSAM KSDS file directly, therefore flattening is not required.

Not all of the generated JCL will match your environment. The following table identifies the panels and skeleton files that may need to be modified to fit the environment. In most JCL, Comparex[®] is used to flatten the database or the library member. Users may modify the generated skeleton to use a vendor's supplied utility to flatten the file.

Name	Panel/Skeleton	Description
DB2	HPSXDB2 \$\$XDB2	Flatten a DB2 database table to a physical sequential file. Optionally fingerprint the flat file.
ADABAS	HPSXADA \$\$XADA	Flatten an ADABASE database table to a physical sequential file. Optionally fingerprint the flat file.
DATACOM	HPSXDCM \$\$XDCM	Flatten a DATACOM database table to a physical sequential file. Optionally fingerprint the flat file.
IDMS	HPSXIDM \$\$XIDM	Flatten an IDMS database table to a physical sequential file. Optionally fingerprint the flat file.

Name	Panel/ Skeleton	Description
PANVALET	HPSXPAN \$\$XPAN	Flatten a CA-Panvalet library member to a physical sequential file. Optionally fingerprint the flat file.
LIBRARIAN	HPSXLIB \$\$XPAN	Flatten a CA-Librarian library member to a physical sequential file. Optionally fingerprint the flat file.
GEM	HPSXGEM \$\$XGEM	Flatten a GEM library member to a physical sequential file. Optionally fingerprint the flat file.
OWL	HPSXOWL \$\$XOWL	Flatten an OWL library member to a physical sequential file. Optionally fingerprint the flat file.
ROSCOE	HPSXROS \$\$XROS	Flatten a ROSCOE library member to a physical sequential file. Optionally fingerprint the file as a flat file.
WYLBUR	HPSXWYL \$\$XWYL	Flatten a WYLBUR library member to a physical sequential file. Optionally fingerprint the flat file.
VSAM	HPSXSAM \$\$XSAM	Flatten a VSAM cluster to a physical sequential file. Optionally fingerprint the flat file. Note that a VSAM KSDS can be fingerprinted directly, without requiring the flattening step.
PDS MEMBER	HPSXPDS \$\$XPDS	Flatten a PDS member to a physical sequential file. Optionally fingerprint the flat file.
USER	HPSXUSR1 \$\$XUSR2	Flatten a USER DEFINED file to a physical sequential file. Optionally fingerprint the flat file.

The following panel displays after selecting VSAM from the "Flatten a Database or Library File" panel.

```

HPSXSAM      Save a VSAM Cluster as a Flat File
Command =====>

VSAM Cluster  =====> 'somnode.VSAM.ESDS'
Flat File DSN =====> 'somnode.VSAM.ESDS.FLAT'

New allocation =====> SYSDA          (SYSALLDA,SYSDA,..)
Space units   =====> TRK            (TRK,CYL,BLK)
Primary       =====> 1              (1-99999)
Secondary     =====> 1              (0-99999)

Member Name   =====> FLATVSAM (Saved member name
                               in the user JCL library)

Optionally Fingerprint The Flat File: Y (Y/N)

Press ENTER to create the JCL or press END to exit.

```

To flatten a VSAM cluster:

- 1 Specify the DSN of the VSAM cluster. Be sure to specify a VSAM cluster name (*not* a component name) that already exists.
- 2 Specify the DSN of the flat file data set.
- 3 If the flat file is a new data set, specify the unit, space units, and primary and secondary allocation.
- 4 Specify the member name for the generated JCL.
- 5 To fingerprint the flat file as a second step of the job, specify Y in the final field. This causes an additional panel to be displayed for the fingerprinting information. If N is specified, the JCL is generated without the second step.
- 6 Press Enter to continue.

The following table describes that parameters on the *Save a VSAM Cluster as a Flat File* panel:

Parameter	Description
VSAM Cluster	Cluster name of a VSAM file. Be sure to specify a VSAM cluster name (<i>not</i> a component name) that already exists.
Flat File DSN	Name of a physical sequential file that will contain the records from the KSDS cluster.
New Allocation	Esoteric name for the allocation of the new data set.
Space Units	Specify TRK, CYL, or BLK for the allocation type of the new data set.
Primary	Primary allocation; can be from 1 - 500.
Secondary	Secondary allocation; can be from 0 - 500.
Member Name	Default member name; can be changed.

To fingerprint the flat file:

```

HPSXFGPK ----- Fingerprint The Flat File -----
Command =====>

    Flat File Data Set: USER14.COMP.INV.TXT

Specify the Fingerprint Data Set to save the results:
Data Set Name =====>

New allocation =====>          (SYSALLDA,SYSDA,..)
Space units      =====>          (TRK,CYL,BLK)
Primary          =====>          (1-99999)
Secondary        =====>          (0-99999)

Optional Parameters - Specify only with KEYED files

RKP              =====> 0 (Relative Key Position)
Key Length       =====> 0 (Length of the Key; 0 for NO KEY

Press ENTER to create the JCL or press END to exit.
    
```

- 1 Specify the flat file fingerprint DSN.
- 2 Specify the relative key position (RKP). This value is the displacement of the key relative to byte 0. If no key exists, specify 0.
- 3 Specify the key length. This is the length of the key in the flat file if it exists. If no key exists, specify 0.
- 4 If the fingerprint data set has not already been allocated, specify the data set allocation information.
- 5 Press Enter to generate the JCL.

The following table describes parameters on the *Fingerprint the Flat File* panel:

Parameter	Description
Data Set Name	Name of a physical sequential file that will contain the fingerprint tokens.
RKP	Relative key position, where the first byte is at displacement 0.
Key Length	Length of the key embedded in the flat file.
New Allocation	Esoteric name for the allocation of the new data set.
Space Units	Specify TRK, CYL, or BLK for the allocation type of the new data set.
Primary	The primary allocation can be from 1 - 500.
Secondary	The secondary allocation can be from 0 - 500.
Member Name	The default member name can be changed.

FGP - Fingerprint Data File

ChangeMan SSM establishes a representation of a VSAM KSDS cluster or flat file in a small fingerprint data set. Through these representations, changes are detected. This option fingerprints a VSAM cluster or flat file, and saves the generated record tokens in the fingerprint data set (a PS file).

```

HPSUIFGP          Fingerprint a VSAM KSDS Cluster or Flat File
Command =====>

  Select the type of file to Fingerprint:

    _ VSAM KSDS          - VSAM KSDS Cluster

    S Flat File (KEYED)   - PS/DA file with a KEY field
    _ Flat File (TEXT)   - PS/DA file with no KEY field

  Note: The POSITIONAL and TEXT Fingerprints are identical.
        Use Flat File (TEXT) to Fingerprint POSITIONAL
        files.

  Press ENTER to continue or press END to exit.

```

For information on how to access this panel, see ["Select Data Extraction Function" on page 15](#).

The following table describes parameters on the *Fingerprint a VSAM KSDS Cluster or Flat File* screen:

Parameter	Description
VSAM KSDS	This allows the fingerprinting of a VSAM KSDS cluster. When you select this option, the "Fingerprint a VSAM KSDS Cluster" panel displays, where you must specify a VSAM cluster name (<i>not</i> a component name) that already exists.
Flat File (KEYED)	This allows the fingerprinting of a flat file (PS/DA) that has an internal key.
Flat File (TEXT)	This allows the fingerprinting of a flat file (PS/DA) that does not have an internal key.

Select the type of file to fingerprint by typing an S in the selection field for the file type. In this example, "Flat File (KEYED)" was selected.

```

HPSUKFGP          Fingerprint a KEYED Flat File
Command =====>

Flat File to Fingerprint:
Data Set Name  ===> 'somnode.FLAT'
  Key Position  ===> 0
  Key Length   ===> 10

RECORDTYPE:
  COL====>  VALUE====>  FIELDS====>
  COL====>  VALUE====>  FIELDS====>

Specify the Fingerprint data set to save the results:
Data Set Name  ===> 'somnode.FLAT.FGP.MAR04'

New allocation ===> SYSDA          (SYSALLDA,SYSDA,...)
  Space units  ===> TRK           (TRK,CYL,BLK)
  Primary      ===> 5             (1-99999)
  Secondary    ===> 5             (0-99999)

Member Name    ===> KEYEDFGP (Saved member name in the
                          user JCL library)

Press ENTER to create the JCL or press END to exit.
    
```

The following table describes parameters on the panel:

Parameter	Description
Flat File data set Name	Name of the flat file to be fingerprinted.
Key Position	Key position relative to the beginning of the record. The first byte is considered displacement 0.
Key Length	Length of the key in the flat file data set. The maximum length is 250.
COL	Column (byte number) in a record checked for the value specified in the VALUE parameter.
VALUE	Value that qualifies a record for being selected for the fingerprinting.
FIELDS	Paired values that determine one or multiple fields that form a record for the fingerprinting operation. For example: COL => 10 VALUE => A FIELDS=>20,29,60,79 means to look at column 10 and check for the value "A". If this record is selected, then form a record using the 10 bytes from 20 through 29, and the 20 bytes from 60 through 79. The partially-created record in memory will then be fingerprinted.
FGP data set Name	Name of the new or pre-existing fingerprint data set. This is a physical sequential file that stores the key followed by the record-level token. (6 bytes)
New Allocation	Esoteric name for the allocation of the new data set.

Parameter	Description
Space Units	Specify TRK, CYL, or BLK for the allocation type of the new data set.
Primary	Primary allocation size of the data set; range 1 - 500.
Secondary	Secondary allocation size of the data set; range 0 - 500.
Member Name	The default member name can be changed.

To specify the fingerprint information:

- 1 Enter the name of the flat file to fingerprint and the position and length of the embedded key.
- 2 Enter the DSN of the fingerprint data set. For a new allocation, specify the volume, space units, primary and secondary allocation.
- 3 Optionally, change the member name to one that is more suitable for your application.
- 4 Press Enter to create the JCL.

COMP - Compare Files

This option creates JCL to compare two VSAM clusters or flat files represented by their fingerprint data sets. The VSAM clusters can be local or remote. Changes in a VSAM cluster or flat file can also be detected by comparing a current fingerprint data set with a previous one. This technique identifies the presence or lack of change in a file over a period of time.

```

HPSUICMP          Compare Fingerprint Representations
Command =====>

  Select the type of Fingerprints to compare:

    _ VSAM KSDS          - VSAM KSDS Cluster
    _ Flat File (KEYED)  - PS/DA file with a
                        KEY field (database)
    _ Flat File (TEXT)   - PS/DA file compared by
                        matching text records
    _ Flat File (POSITIONAL) - PS/DA file compared line
                        by line

Press ENTER to continue or press END to exit.

```

The following table describes parameters on the panel:

Parameter	Description
VSAM KSDS	Compares the fingerprint representations of two VSAM KSDS files.
Flat File (KEYED)	Compares the fingerprint representation of a keyed flat file and the current file.

Parameter	Description
Flat File (TEXT)	Compares the fingerprint representation of a flat file and the current file, using text compare logic. There is no key to match the records.
Flat File (Positional)	Compares the fingerprint representation of a flat file and the current file, record-by-record. For example, record 5 is compared to record 5.

For information on how to access this panel, see ["Select Data Extraction Function" on page 15](#).

To select the type of fingerprint to compare:

- 1 Type an S in the input field associated with the desired fingerprint type.
- 2 Press Enter to continue, or press End to exit.

To compare two VSAM fingerprints:

```
HPSUVCMP          Compare Local or Remote VSAM Fingerprints
Command =====>

Specify the VSAM Fingerprints:

  BASE FGP DSN (CURRENT) =====> 'somnode.VSAM.KSDS.FGP.NEW'
  TARGET FGP DSN   (OLD)  =====> 'somnode.VSAM.KSDS.FGP.OLD'

Specify Reporting Options and the Jobname:
  (Optional) =====> ADD,UPD,DEL (ADD,UPD,DEL,ALL,NONE,EQUAL)
  Member Name =====> VSAMCOMP   (Member saved in the user
                                   JCL library)

Press ENTER to create the JCL or press END to exit.
```

- 1 Enter values for the Base fingerprint DSN, Target fingerprint DSN, and Member Name fields. These parameters are required.
- 2 Optionally, enter the desired reporting options.
- 3 Press Enter to generate the JCL, or press End to return to the *Compare Fingerprints* panel.

The generated JCL can be edited, saved (SAVE), submitted (SUB) for execution, or cancelled (CAN).

The following table describes the parameters displayed in the *Compare VSAM fingerprints* panel.

Parameter	Description
Base FGP DSN	VSAM fingerprint representation of the current VSAM file. If the quotes are not specified, your TSO user ID will be automatically prefixed to the data set name.
Target FGP DSN	Old representation of a VSAM file. If the quotes are not specified, your TSO User ID will be automatically prefixed to the data set name.

Parameter	Description
Reporting Options	Details of the differences can be tailored to suit your requirements: NONE - Only summary information is reported ALL – All change details are reported ADD – The added records will be reported DEL – The deleted records will be reported UPD – The updated records will be reported EQUAL – The records with identical contents will be reported
Member Name	The created JCL will be saved under this name.

DATA - Compare Files Directly

This option creates JCL to compare two flat files or two PDS members. This option also allows a flat file to be compared with a PDS member. Load modules are supported, which automatically invokes a hex format report.

```

HPSUVDAT                Compare Local Files
Command =====>

Base Data Set Name:          Target Data Set Name:
  Project ===> USER14       Project ===> USER12
  Library ===> DEV           Library ===> DEV
  Type    ===> PANELS        Type    ===> PANELS
  Member  ===> HPSXPAN        Member  ===> HPSXPAN

Other Partitioned or Sequential Data Set:
  Base DSN  =====>
  Target DSN =====>

Specify Reporting Options and the Jobname:
  (Optional) ===> Y          (SIDE BY SIDE REPORTING? Y/N)
                ===> N          (DISPLAY COMPLETE RECORDS? Y/N)
                ===> ADD,UPD    (NONE,ALL,ADD,DEL,UPD,EQUAL)
  Member Name ===> LIVECOMP  (Member saved in the user JCL
                               library)

Press ENTER to create the JCL or press END to exit.

```

For information on how to access this panel, see ["Select Data Extraction Function" on page 15](#).

To specify the files or members to compare:

- 1 Any combination of base/target PDS members and base/target sequential data sets (flat file) are allowed. The 'Other Partitioned or Sequential data set' fields override the 'Base Data Set Name' and 'Target Data Set Name', respectively.
- 2 Specify the desired reporting options.
- 3 Modify the Member Name to something more suitable, if desired. This member name is required, but will only be used if you save the generated JCL.

The following table describes the parameters displayed in the *Compare Local Files* panel.

Parameter	Description
Base data set: Project/Library/ Type/Member	Data set name in the ISPF LIBRARY specification area.
Target data set: Project/Library/ Type/Member	Data set name in the ISPF LIBRARY specification area.
Other Partitioned Or Physical Sequential Base data set	Data set name in this area. This parameter overrides the "Base Data Set Name". Enclosing the data set name in quotes indicates an explicit data set. Otherwise, the TSO User ID is prefixed.
Other Partitioned Or Physical Sequential Target data set	Data set name in this area. This parameter overrides the "Target Data Set Name". Enclosing the data set name in quotes indicates an explicit data set. Otherwise, the TSO user ID is prefixed.
Side by Side reporting?	Print records side by side. The target records are displayed on the right, and the base records on the left. Y specifies side by side reporting. No specification, or N indicates horizontal reporting.
Display Complete Records?	Display the entire record. By default, only the part of a record that will fit on a single line is displayed. Y specifies that as many lines as necessary will be printed to display the entire record. During CSECT processing, the entire CSECT will be printed.
Reporting Options	Details of the differences can be tailored to suit your requirements: NONE No change details are reported ALL – All change details are reported ADD – The added records will be reported DEL – The deleted records will be reported UPD – The updated records will be reported EQUAL – The records with identical contents will be reported
Member Name	The created JCL will be saved under this name.

EXP - Extract and Export Changed Data

This option generates the JCL to identify the changes in a VSAM cluster or flat file, and copy them to a change basket. It can also be used to synchronize two local or remote clusters.

```

HPSUIEXP          Export Changed Data from a File
Command =====>

  Select the type of File to Extract Changes and Export:

  S VSAM KSDS          - VSAM KSDS Cluster
  _ Flat File (KEYED)  - PS/DA file with a KEY field
  _ Flat File (TEXT)   - PS/DA file compared by
                        matching text segments
  _ Flat File (POSITIONAL) - PS/DA file compared line
                        by line

Press ENTER to continue or press END to exit.

```

For information on how to access this panel, see ["Select Data Extraction Function" on page 15](#).

The following table describes parameters in the panel:

Parameter	Description
VSAM KSDS	Exports changed data using the fingerprint representations of two VSAM KSDS files.
Flat File (KEYED)	Exports changed data using the fingerprint representation of a keyed flat file and the file that was fingerprinted.
Flat File (TEXT)	Exports changed data using the fingerprint representation of a flat file and the file that was fingerprinted, using text compare logic.
Flat File (Positional)	Exports changed data using the fingerprint representation of a flat file and the file that was fingerprinted, record-by-record.

To select the type of file or fingerprint to extract changed data from:

- 1 Type S in the input field associated with the desired fingerprint type.
- 2 Press Enter to continue, or press End to exit.

To extract and export changes from a KSDS file:

```

HPSUVEXP      Extract and Export the Changes from a KSDS file
Command =====>

Specify the VSAM Fingerprints:

BASE FGP DSN  (NEW) =====> 'somnode.VSAM.KSDS.FGP.NEW'
TARGET FGP DSN (OLD) =====> 'somnode.VSAM.KSDS.FGP.OLD'

Specify the VSAM BASKET data set to save the differences:
Change Basket DSN      =====> 'somnode.VSAM.KSDS.BASKET'

GDG or NEW dsn allocation  =====>      (SYSALLDA,SYSDA,..)
Space units                =====>      (TRK,CYL,BLK)
Primary                    =====>      (1-99999)
Secondary                  =====>      (0-99999)

Specify Reporting Options and the Jobname:
Reporting   =====> YES      (NO, YES: Show Exported Records)
Member Name =====> VSAMEXP  (Member saved in the user JCL
                               library)

Press ENTER to create the JCL or press END to exit.
    
```

- 1 Enter values for the Base fingerprint DSN, Target fingerprint DSN, the change basket, and the Member Name fields. These parameters are required.
- 2 Optionally, enter the desired reporting options.
- 3 Press Enter to generate the JCL, or press End to return to the previous panel.

The generated JCL can be edited, saved (SAVE), submitted (SUB) for execution, or cancelled (CAN).

The following table describes the parameters displayed in the *Extract and Export Changed Data from a KSDS file* panel.

Parameter	Description
Base fingerprint DSN	The VSAM fingerprint representation of a base VSAM KSDS. If the quotes are not specified, your TSO User ID will be prefixed to the data set name.
Target fingerprint DSN	The representation of a target VSAM KSDS. If the quotes are not specified, your TSO User ID will be prefixed to the data set name.
Change Basket DSN	Allocation – Specify the esoteric name for the allocation unit. Space Units – Specify the units for allocation Primary – Specify the primary allocation Secondary – Specify the secondary allocation
Reporting Options	Details of the differences can be tailored to suit your requirements: NO – No change details are reported YES – All changed record keys are reported
Member Name	The created JCL will be saved under this name.

To extract and export changes from a flat file:

```

HPSUVEXP      Extract and Export the Changes to a Basket
Command =====>

Specify the TEXT File and Fingerprint:

  Flat file DSN      ==>> COMP.INV.TXT
  Fingerprint DSN   ==>> COMP.INV.TXT.FGP.JUN1199

Specify the BASKET data set to save the differences:
  Change Basket DSN ==>> VSAM.KSDS1.BASKET

NEW dsn allocation ==>>          (SYSALLDA,SYSDA,..)
  Space units      ==>>          (TRK,CYL,BLK)
  Primary          ==>>          (1-99999)
  Secondary        ==>>          (0-99999)

Specify Reporting Options and the Jobname:
  Reporting        ==>> YES      (NO, YES: Show Exported
                                Records)
  Member Name     ==>> TXTEXP    (Member saved in the user
                                JCL library)

Press ENTER to create the JCL or press END to exit.

```

- 1 Enter values for the Flat File DSN, fingerprint DSN, the Change Basket DSN, and the Member Name fields. These parameters are required.
- 2 Optionally, enter the reporting option.
- 3 Press Enter to generate the JCL, or press End to return to the previous panel.

The generated JCL can be edited, saved (SAVE), submitted (SUB) for execution, or cancelled (CAN).

The following table describes the parameters displayed in the *Extract and Export Changed Data* panel.

Parameter	Description
Flat File DSN	The current flat file with the changed records that are to be extracted. If the quotes are not specified, your TSO User ID will be prefixed to the data set name.
Fingerprint DSN	The representation of a previous version of the flat file. If the quotes are not specified, your TSO User ID will be prefixed to the data set name.
Change Basket DSN	DSN – Specify the DSN for the change basket Allocation – Specify the esoteric name for the allocation unit. Space Units – Specify the units for allocation Primary – Specify the primary allocation Secondary – Specify the secondary allocation

Parameter	Description
Reporting Options	Details of the differences can be tailored to suit your requirements: NO No change details are reported YES All changed records are reported
Member Name	The created JCL will be saved under this name.

Import Flat File Change Baskets

ChangeMan SSM does not support importing change baskets created using the extract and export operations for text, positional, or keyed files. The format of these change baskets, as well as the VSAM KSDS change basket, is available for those who want to write their own import programs (for example, using a VSAM KSDS change basket created on the mainframe to update a database running under UNIX). The import program on the UNIX platform was written using the provided format of the change basket.

IMP - Import VSAM Change Basket to VSAM KSDS

The following panel generates JCL to apply a VSAM change basket to a target cluster. A reverse change basket can optionally be created before updating the target cluster. The reverse change basket provides you with the ability to undo the changes that have been imported. This eliminates the need for a full backup prior to an import job.

```

HPSUVIMP          Import the Change Basket to a Target Cluster
Command =====>
Basket Data Set Name:      =====> 'somnode.VSAM.KSDS.BASKET'
Optional Specifications:
  Simulate Run              =====> N (Y/N)
  Force Any Regressions    =====> N (Y/N)
  Create the Reverse Basket =====> N (Y/N)
  Target Cluster Override  =====> 'somnode.VSAM.KSDS.NEWNAME'
Reverse Basket DSN:        =====> 'somnode.VSAM.KSDS.BASKET.REVERSE'
GDG or NEW dsn allocation  =====> (SYSALLDA,SYSDA,...)
  Space units              =====> (TRK,CYL,BLK)
  Primary                  =====> (1-99999)
  Secondary                =====> (0-99999)
Member Name                =====> VSAMIMP (Saved member name in user JCL library)
Press ENTER to generate the JCL or press END to exit.

```

For information on how to access this panel, see ["Select Data Extraction Function" on page 15](#).

To import a VSAM change basket and create a VSAM reverse change basket:

- 1 Enter values for the Basket Data Set Name, Set Optional Specifications, and Member Name fields. These parameters are required.
- 2 Optionally, enter values for the remaining parameters.

- 3 Press Enter to generate the JCL, or press End to return to the *VSAM Fingerprinting Operations* panel.

The JCL can be edited, saved (SAVE), submitted (SUB) for execution, or cancelled (CAN).

The following table describes the parameters displayed in the *Import the Change Basket to a Target Cluster* panel.

Parameter	Description
Basket Data Set Name	Name of the input file that contains the offloaded changes. This data is used to update the target cluster. The update of the target cluster is handled by standard VSAM I/O routines. This implies that after an import has been completed, the indexes reflect the current updated VSAM file.
Simulate RUN	If Y is specified, no update is performed, but the entire process is simulated. If N is specified, APPLY processing is performed.
Force any Regression	At the time of an update, the target record is fingerprinted to determine if the token is identical to the expected token in the change basket. If there is a difference, a regression is possibly occurring. If a record is to be deleted but is non-existent, another type of regression is occurring. Detection of any regression will prevent the update, unless the Force any Regressions option is Y.
Create the Reverse Basket	Y – a reverse change basket must be created during the import operation. A reverse change basket has an identical structure to the actual change basket. Consequently, this file can be provided as a direct input to the import operation to undo the updates.
Target Cluster Override	The target cluster name is recorded In the change basket. This name is retrieved from the target fingerprint data set supplied to the export function. It may be necessary to apply a change basket to multiple target clusters, where the naming convention may not be the same. This option enables you to override the hard coded target cluster name with the desired cluster name.

UNDO - Reverse Change Basket Import

This panel generates the JCL to undo the effects of an import operation.

```

HPSUVUNDO          Undo the VSAM Import Operation
Command =====>

Undo the VSAM Import Operation by applying the Reverse
Change Basket.

Specify the VSAM Reverse Change Basket:
  Basket DSN =====> 'somnode.VSAM.KSDS.BASKET.REVERSE'

Optional Specifications:
  Simulate Run          =====> Y (Y/N)
  Force Any Regressions =====> N (Y/N)

Member Name          =====> VSAMUNDO (Saved member name in
                                     user JCL library)

Press ENTER to create the JCL or press END to exit.

```

The following table describes parameters on the panel:

Parameter	Description
Reverse Basket Data Set	VSAM reverse change basket data set name, created at the time of import if the reverse option was specified. The reverse change basket created at that time can now be used as an input to undo the updates. The reverse basket contains all the reversal information.
Simulate Run	This simulates the run, without applying any changes.
Force Any Regressions	This overrides regression checking, causing changes to be applied regardless of regression.
Member Name	The JCL will be saved under this name.
Reverse Basket Data Set	This specifies the VSAM reverse change basket data set name, created at the time of Import if the reverse option was specified. The reverse change basket created at that time can now be used as an input to undo the updates. The reverse basket contains all the reversal information.

To undo the VSAM change basket import:

- 1 Enter values for the Reverse Basket Data Set, and Member Name fields. These parameters are required.
- 2 Press Enter to generate the JCL, or press End to return to the previous panel.

The JCL can be edited, saved (SAVE), submitted (SUB) for execution, or cancelled (CAN).

Chapter 3

Batch Data Extraction

The ChangeMan SSM Batch Data Extraction Facility includes commands which, when used in JCL batch execution, complete the Data Extraction functions. Using the record-level fingerprinting process, changed data in a file or flattened database is identified, extracted and exported to a file referred to as a change basket.

This chapter describes each of the Data Extraction commands, and includes examples of proper usage.

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Changed Data Extraction for VSAM KSDS	34
Changed Data Extraction for Flat Files	37

Batch Execution Examples

Please refer to examples in the Quick Start Guide and the SAMPLES distribution library. The following naming convention is used for the Data Extraction sample jobs:

- VSAM KSDS OperationsVS*
- KEYED Flat FilesKEY*
- POSITIONAL Flat Files POS*
- TEXT Flat FilesTXT*
- DATACOMPARE DATA*

Following are the primary commands used in the Data Extraction process. The commands are logically grouped by function.

Function Type	Available Commands
VSAM KSDS operations	VSAMFGP VSAMCOMPARE VSAMEXPORT VSAMIMPORT
Keyed flat file operations	KEYEDFGP KEYEDCOMPARE KEYEDEXPORT
Positional flat file operations	POSFGP POSCOMPARE POSEXPORT
Text flat file operations	TEXTFGP TEXTCOMPARE TEXTEXPOR
Live files	DATACOMPARE

Two data files may be compared directly if they are both available to the process. However, if one or both are remote, the fingerprint representation is all that is required to be made available to the compare process. Fingerprint data sets can also be used to detect changes to a reference file, over a period of time. To extract the changes, the current file is used, along with the fingerprint representation of this file in the past. The fingerprint data set is a physical sequential file for which the attributes are internally set by the software.

Changed Data Extraction for VSAM KSDS

Using the fingerprinting technology, ChangeMan SSM provides a facility to synchronize a reference VSAM cluster with one or more local/remote clusters.

By comparing a current fingerprint with a previously-generated fingerprint, ChangeMan SSM quickly identifies which records were added, deleted, or updated in the VSAM cluster. ChangeMan SSM can then generate a VSAM change basket containing only the record-level differences, that can be shipped to other locations to synchronize those VSAM files.

Full regression testing is imbedded in the design for data integrity.

This facility can be used in centralized maintenance (SMP/E CSI synchronization), disaster recovery, and the propagation of VSAM changes across multiple LPARs or sites at the record level.

Being able to identify the daily update in a VSAM file is an important feature. The VSAM change basket can be used to update other data bases such as an ORACLE database on a non-MVS machine that should be kept in synchrony with a VSAM file.

Following are the primary commands used in the VSAM Changed Data Extraction processes.

Command	Description
VSAMFGP	Fingerprints a VSAM KSDS cluster. Generation of the fingerprint data set is a prerequisite to any comparison, extraction, or synchronization task.
VSAMCOMPARE	Compares two VSAM fingerprint data sets. This command compares a VSAM cluster to one or more local or remote clusters, or identifies changes in a VSAM KSDS over a period of time.
VSAMEXPORT	Exports the differences between two VSAM clusters (represented by their VSAM fingerprints) into a VSAM change basket. The change basket can then be imported to one or more local or remote clusters.
VSAMIMPORT	Imports the changes introduced in a VSAM cluster to another local or remote cluster to bring them into synchrony. It also provides for an optional reverse VSAM change basket to be generated to undo the changes introduced by the import of the change basket.

Fingerprint VSAM KSDS

ChangeMan SSM establishes a representation of a VSAM KSDS cluster in a small fingerprint file. It is through these VSAM representations that changes are detected, extracted, and exported to a VSAM change basket.

Comparing these small fingerprint files eliminates the requirement of bringing the two files together to make the comparison. This process eliminates the necessity of transferring the VSAM clusters to make them available for the comparison. ChangeMan SSM identifies which records were added, deleted, updated and the total number of records that remain unchanged. The fingerprint data sets used can be from a file on a local and a remote system, or from the same file taken over a period of time.

When a VSAM KSDS file is fingerprinted, a unique 6-byte token is generated that identifies each individual record. This is referred to as a record-level token. Additionally, one composite token, a 10-byte hexadecimal value, is generated to represent the entire cluster, which is referred to as cluster-level token. To assure that two entire clusters are identical, compare the two cluster-level tokens without any data transfer or any other extensive compare operations.

VSAM Fingerprint Data Sets

Once a VSAM file is fingerprinted, the result of the process is stored in a physical sequential file. The VSAM fingerprint file must be created with the following DCB attributes:

```
LRECL=0, BLKSIZE=4096, DSORG=PS, RECFM=U
```

This file has a header record with the following data:

- Cluster-level token.
- Cluster, data, and index component names.
- Creation date and other internal data.

The header is followed by one node per record. Each node is composed of a token and a key, which are physically stored in the key order. The size of the key and the number of records in a VSAM data component affect the size of the fingerprint data set. The following formula can be used to determine the storage requirements for this fingerprint representation file.

$$\text{Size} = (6 + \text{keysize}) * \text{number-of-records}$$

Consider, for example, a one million record VSAM cluster, where the social security number is the key (9 bytes), and that has a record length of 512 bytes. A 15 megabyte fingerprint file is sufficient to represent the entire file and its contents. This compares with the 512 megabytes of the VSAM file, plus any associated VSAM overhead. This amount translates into approximately 21 cylinders on a 3390 device. This would compare to a VSAM file of 720 cylinders on a 3390 device.

Internal Sort/Merge Algorithm

In the VSAM fingerprinting operation, because the records are fingerprinted in the order they reside on a track (full track read), they may not be in their key order. ChangeMan SSM internally sorts the keys before creating the fingerprint data set. This work file must be referenced by the VSAMWORK DD in the JCL.

The amount of space required is equal to the size of the fingerprint data set. If more than one VSAM cluster is to be fingerprinted, the size of this work file should be minimally equal to the size required for the largest fingerprint data set being created. This space is reused when multiple data sets are being fingerprinted.

VSAM Change Basket

This is a physical sequential file that contain the offloaded records from a cluster during export processing. In the beginning of this file, there is a super directory that contains all the information required to apply the change basket to target clusters.

Refer to the member VSEXPORT in the samples library. This member contains the JCL that creates a change basket. This data set has the following DCB attributes:

```
LRECL=4096, BLKSIZE=4096, DSORG=PS, RECFM=F
```

VSAM Reverse Change Basket

The ability to reverse changes generated during import processing assures you that you can always back out the changes introduced by importing a change basket. The reverse change basket has the same structure as a change basket and, therefore, can be directly imported to undo the effects of the changes.

Refer to "[VSAMIMPORT](#)" on page 54 for the generation of the reverse change basket. The DCB attributes of this file is identical to those of a VSAM change basket data set.

Changed Data Extraction for Flat Files

Using the fingerprinting technology, ChangeMan SSM provides a facility to compare a reference file with another file or version of the same file. By comparing a current fingerprint with a previously-generated fingerprint, ChangeMan SSM quickly identifies which records were added, deleted, or updated in the data file.

ChangeMan SSM can then generate a change basket that can be transferred to other locations. A variety of output formats allow you to tailor the report to fit your data and requirements. For example, to report only modified records, specify ADD, UPDATE, DELETE.

The following table shows the flat file data extraction commands:

Command	Description
DATACOMPARE	Performs byte-level comparison of two live files. Many reporting parameters, including side-by-side (SBS) and filtering of the change activity.
KEYEDFGP	Creates a fingerprint data set of a file with a field that can be used as a key, or a file that is positional (line number as a pseudo-key).
KEYEDCOMPARE	Reports differences between two files using two fingerprint data sets.
KEYEDEXPORT	Creates a change basket for keyed file using two fingerprint data sets.
POSFGP	Create a fingerprint data set for a positional file.
POSCOMPARE	Compare a fingerprint representation and a live positional file (file name taken from FGP).
POSEXPORT	Export changed records from a positional file to a change basket.
TEXTFGP	Create a fingerprint data set for a text file.
TEXTCOMPARE	Compare a fingerprint representation and a live text file. (Text file name taken from FGP.)
TEXTEXPOR	Export changed records from a text file to a change basket.

DATACOMPARE - Compare Source or Load

DATACOMPARE provides the ability to compare two existing flat files or PDS members. If load modules are compared, the records are automatically displayed in hex format. The side-by-side report option provides an easy way to see the differences in source and load modules, by displaying matching records on the same line.

SORTWORK - Internal Sort/Merge Algorithm

In the flat file keyed fingerprinting operation, because the records are fingerprinted in the order they reside on a track (full track read), they may not be in their key order. ChangeMan SSM internally sorts the keys before creating the fingerprint data set. This work file must be referenced by the SORTWORK DD in the JCL.

The space required is equal to the size of the fingerprint data set. If more than one flat file is to be fingerprinted, the size of this work file should be minimally equal to the size required for the largest fingerprint data set being created. This space is reused when multiple data sets are being fingerprinted.

KEYEDFGP - Fingerprint Data Set - Keyed Flat File

Once a file is fingerprinted, the result of the process is stored in a physical sequential file. The fingerprint file must be created with the following DCB attributes:

```
LRECL=0, BLKSIZE=4096, DSORG=PS, RECFM=U
```

This file has a header record with the following data:

- File name.
- Creation date and other internal data.

The header is followed by one node per record. Each node is composed of a token and a key, which are physically stored in the key order.

The size of the key and the number of records in a data file affect the size of the fingerprint data set. The following formula can be used to determine the storage requirements for this fingerprint representation file.

```
Size = (6+keysize) * number-of-records
```

KEYEEXPORT - Change Basket - Keyed Flat File

This is a physical sequential file that contains the offloaded records from a flat file during export processing. Refer to the member KEY04EXP in the sample library. This member contains the JCL that creates a change basket. This data set has the following DCB attributes:

```
LRECL=4096, BLKSIZE=4096, DSORG=PS, RECFM=F
```

POS/TEXTFGP - Fingerprint Data Set - POS/TEXT Flat File

Once a text file is fingerprinted, the result of the process is stored in a physical sequential file. The text fingerprint file must be created with the following DCB attributes:

```
LRECL=0, BLKSIZE=4096, DSORG=PS, RECFM=U
```

This file has a header record with the following data:

- File name.
- Creation date and other internal data.

The header is followed by one node per record. Each node is composed of a token and a relative record number. The number of records in a text file affect the size of the fingerprint data set. The following formula can be used to determine the storage requirements for this fingerprint representation file.

```
Size = (6+4 bytes) * number-of-records
```

POS/TEXTEXPOR - Change Basket - POS or TEXT Flat File

This is a physical sequential file that contains the offloaded records from a flat file during Export processing. Refer to the member TXT03EXP or POS03EXP in the samples library. These members contain the JCL that creates a change basket. This dataset has the following DCB attributes:

```
LRECL=4096, BLKSIZE=4096, DSORG=PS, RECFM=F
```


Chapter 4

Commands

Like any set of commands, those used by the Data Extraction component have specific uses. The following sections describe the proper formatting and parameters of the Data Extraction commands.

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Command Structure

The general format for the batch commands in ChangeMan SSM is as follows:

```
Command=(Parameter=(Subparameter=(value,...)),Parameter...)
```

All the commands and their parameters in the batch functions are summarized here. The subparameters can be found in the section under the individual commands to which they are related. Each is explained in detail following this general description. There are no spaces in the commands. Subparameter values must be fully specified on a single line. Multiple subparameter values can be specified on separate, consecutive lines. The parameters are enclosed in parentheses. If there is only one parameter in the command, the parentheses may be omitted.



NOTE Spacing shown in the following commands is for clarity only; there are no spaces in the actual commands.

All commands, parameters, and subparameters can be abbreviated to the level of non-ambiguity. For example, the KEYEDEXPORT command may be abbreviated as KEYEDEXP, KEYEDEX, or KEYEDE.

VSAM KSDS Data Extraction Commands

```
REGRESSIONCHECK = Y | N
```

```
VSAMFGP = ( cluster,
            dd | dsn,
            recordtype,
            subtype )
```

```
VSAMCOMPARE =( basedd | basedsn,
                targdd | targdsn,
                report )
```

```
VSAMEXPORT = ( basedd | basedsn,
                targdd | targdsn,
                basketdd | basketdsn,
                report )
```

```
VSAMIMPORT = ( apply | simulate,
                basketdd | basketdsn,
                reversdd | reversdsn,
                reverse,
                tocluster )
```

Flat Files (KEYED) Data Extraction Commands

```
KEYEDFGP = ( dsn,  
             volser,  
             fgpdsn | fgppd,  
             recordtype,  
             subtype )  
  
KEYEDCOMPARE=( basedd | basedsn,  
               targdd | targdsn,  
               report )  
  
KEYEDEXPORT =( basedd | basedsn,  
               targdd | targdsn,  
               basketdd | basketdsn  
               report )
```

Flat Files (TEXT) Data Extraction Commands

```
TEXTFGP = ( dsn,  
            volser,  
            fgpdsn | fgppd,  
            recordtype,  
            subtype )  
  
TEXTCOMPARE =( basedsn | basedd,  
               basefgp,  
               report )  
  
TEXTEXPORT = ( basedsn | basedd,  
               basefgp,  
               basketdd | basketdsn,  
               report )
```

Flat Files (POSITIONAL) Data Extraction Commands

```
POSGP = ( dsn,  
          volser,  
          fgpdsn | fgppd,  
          recordtype,  
          subtype )  
  
POSCOMPARE = ( basedsn | basedd,  
              basefgp,  
              report )  
  
POSEXPORT = ( basedsn | basedd,  
              basefgp,  
              basketdd | basketdsn,  
              report )
```

Live Data Compare (TEXT, SOURCE, or LOAD)

```

DATACOMPARE= ( basedd | basedsn,
               basemem,
               targdd | targdsn
               targmem,
               report )

```

MLC= 2, N where N>0

Command Stacking

Command stacking is provided for enhanced performance, improved flexibility and simplicity. Stacked commands are executed in the order of entry. An example of command stacking follows:

```

VSAMFGP=(CLUSTER=VSAM1,FGP=VSAM1.FGP)
VSAMFGP=(CLUSTER=VSAM2,FGP=VSAM2.FGP)
VSAMFGP=(CLUSTER=VSAM3,FGP=VSAM3.FGP)
*
KEYEDFGP=(DSN=CLAIM.DB,
           FGPDD=DD1,
           KEYED=(5,8))
*
KEYEDFGP=(DSN=CLAIM.DB.OLD,
           FGPDD=DD2,
           KEYED=(5,8))
*
KEYEDCOMPARE=(BASEDD=DD1,TARGDD=DD2,REPORT=YES)

```

Reserved DDs

DD	Description
HPSWORK	A temporary data set required for any job that uses the EXPORT or IMPORT commands. Five cylinders of work space is sufficient for most tasks.
HPSWORK2	A temporary data set required for any job that creates a change basket. Five cylinders of work space is sufficient for most tasks.
SORTWORK	A temporary work data set for the internal sort used during the KEYEDFGP operation.
VSAMWORK	A temporary work data set for the internal sort used during the VSAMFGP operation.

Comments

The commands in the HPSIN DD, can be commented by placing "*" in the first column. This facility improves the readability when there is a complex set of commands.

VSAM KSDS Data Extraction Commands

Each of these commands is described in detail on the following pages. A description of each of the parameters and subparameters, and examples are provided.

Using fingerprinting technology, ChangeMan SSM provides a comprehensive solution in the area of changed data extraction and synchronization for VSAM KSDS (local or remote).

By comparing a current VSAM fingerprint with a previous VSAM fingerprint, ChangeMan SSM quickly identifies what records were added, deleted, or updated in the VSAM file. ChangeMan SSM can then generate a change basket to be transferred to other locations to synchronize those VSAM clusters.

Full regression testing is imbedded in the design to ensure data integrity. This facility can be used in detecting VSAM KSDS updates, centralized maintenance (SMP/E CSI synchronization), disaster recovery, and the propagation of VSAM changes across multiple LPARs or sites.

Each VSAM fingerprint data set represents the contents of one VSAM KSDS cluster, whereas each VSAM change basket contains the changes for one VSAM KSDS cluster.

The commands in the following list are only used for VSAM KSDS. For flat files, refer to ["Data Extraction Commands - Flat Files" on page 56](#).

- REGRESSIONCHECK
- VSAMFGP
- VSAMCOMPARE
- VSAMEXPORT
- VSAMIMPORT

REGRESSIONCHECK

The REGRESSIONCHECK command re-fingerprints the records during the EXPORT and IMPORT operations to ensure the tokens match with what is expected in the fingerprint data set. If the token does not match, it is an indication of regression, and the process is stopped. This feature can be disabled by specifying REGRESSIONCHECK=N.

The general format of the command is:

REGRESSIONCHECK = Y | N

The REGRESSIONCHECK parameters are:

Parameter	Description
Y or N	At the time of exporting the VSAM updates, those records that are about to be exported, are re-fingerprinted to ensure that there have been no updates since the fingerprints were taken. This is the default behavior of ChangeMan SSM. This safeguard feature can be turned off by specifying REGRESSIONCHECK=N.

VSAMFGP

The VSAMFGP command generates a fingerprint data set for a VSAM KSDS cluster.

The general format of the command is:

```
VSAMFGP = ( CLUSTER = _ ,
             AM = FULLTRACK | STANDARD ,
             DD = _ | DSN = _ ,
             RECORDDTYPE = (COL=_, VALUE=_, FIELDS=(_,_,...)) ,
             SUBTYPE = (COL=_, VALUE=_, FIELDS=(_,_,...)))
```

The following table describes the VSAMFGP command parameters.

Parameter	Description
CLUSTER	The explicit cluster name of the keyed sequential data set (KSDS) that needs to be fingerprinted. This is a required parameter.
AM (Access Method)	FULLTRACK is the default access method. This is a proprietary access method used for maximum performance as compared to standard IDCAMS I/O. It utilizes full cylinder I/O techniques. STANDARD is required if the VSAM KSDS file is compressed, or if it is a special format file such as IAM. This method performs a record-by-record read, which requires more resources, and does not provide the performance of FULLTRACK.
DD	The DD that references a VSAM fingerprint data set specified in the JCL. This parameter is mutually exclusive with the DSN parameter (either DD or DSN must be specified).
DSN	The name of a pre-allocated VSAM fingerprint data set that contains the result of the fingerprinting operation. This parameter is mutually exclusive with the DD parameter (either DD or DSN must be specified). The DCB attributes for a VSAM fingerprint data set are: DCB=(DSORG=PS, RECFM=U, LRECL=0, BLKSIZE=4096)

Parameter	Description
RECORDTYPE	<p>Optional. Enables you to define a specific record type or types, or all records "*" that are to be processed. If not specified, each entire record will be considered for fingerprinting.</p> <p>Multiple RECORDTYPEs can be specified. RECORDTYPE has the following additional sub-parameters:</p> <p style="padding-left: 40px;">COLUMN and VALUE are required sub-parameters, unless an "*" is specified as the first sub-parameter to indicate any record type.</p> <p style="padding-left: 40px;">FIELDS is a required sub-parameter composed of a set of paired numbers. This defines the areas of the record that are to be considered during the fingerprinting process. All other data in the record will be excluded.</p> <p style="padding-left: 40px;">The first specification in the pair indicates the starting column of the field in the record. The second number indicates the length of the field. The starting field positions must be in ascending order without overlapping subsequent field and length specifications. No limits exist to the number of field and length specifications. Their command statements may continue on the next line.</p>
SUBTYPE	<p>SUBTYPE is an optional sub-parameter of the RECORDTYPE parameter, which can be utilized to further qualify a record for selection.</p> <p>Additional sub-parameter specifications available with SUBTYPE:</p> <p style="padding-left: 40px;">COLUMN, VALUE, and FIELDS.</p> <p style="padding-left: 40px;">COLUMN and VALUE are required sub-parameters, unless an "*" is specified as the first sub-parameter to indicate any record type.</p> <p style="padding-left: 40px;">FIELDS is a required sub-parameter composed of a set of paired numbers. This defines the areas of the record that are to be considered during the fingerprinting process. All other data in the record will be excluded.</p> <p style="padding-left: 40px;">The first specification in the pair indicates the starting column of the field in the record. The second number indicates the length of the field. The starting field positions must be in ascending order without overlapping subsequent field and length specifications. No limits exist to the number of field and length specifications. Their command statements may continue on the next line.</p>

VSAMFGP Example 1

The following command fingerprints a VSAM KSDS and saves the result in a VSAM fingerprint data set. If the DSN parameter is not specified, a syntax error message is generated. When a VSAM file is fingerprinted, the results must always be saved in a VSAM fingerprint data set (a physical sequential file).

```
VSAMFGP=(CLUSTER=PAYROLL . CLUSTER,
          DSN=PAYROLL . CLUSTER. VSFGP)
```

VSAMFGP Example 2

The following commands will fingerprint three VSAM clusters and save the results of each in a separate fingerprint data set.

The three DDs must be provided in the JCL and each must point to a physical sequential fingerprint data set.

Allocate these data sets sufficiently large and specify the RLSE parameter to release the over-allocated spaces. The DCB information of these files is internally overlaid by ChangeMan SSM. In the JCL, SPACE is the only required parameter.

```
VSAMFGP=(CLUSTER=somnode.VSAM1,DD=DD1)
VSAMFGP=(CLUSTER=somnode.VSAM2,DD=DD2)
VSAMFGP=(CLUSTER=somnode.VSAM3,DD=DD3)
```

A more detailed example, including JCL and command syntax, is located in the member VSFGP in the ChangeMan SSM SAMPLES distribution library.

VSAMFGP Example 3

This example demonstrates a simple use of the RECORDTYPE parameter. Once a record is read, the specified position is tested for the VALUE. If the test is satisfied, the designated fields are passed to the fingerprinting operation. Therefore, any changes in the specified areas would indicate that the record has changed. Changes in any other parts of the record would not affect the record-level token.

In this example, only RECORDTYPEs "A" are fingerprinted according to the specified fingerprinting rule. Any other record types in the file are fingerprinted in their entirety (the standard process).

```
VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,
          DSN=somnode.KSDS.CLUSTER.FGP,
          RECORDTYPE=(COL=9,VALUE='A',
                      FIELDS=(10,50,100,5)))
```

VSAMFGP Example 4

In this example, several RECORDTYPEs have been specified. Each has its own FIELDS definitions. Any other record types in the cluster are fingerprinted in their entirety (the standard process).

```
VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,
          DSN=somnode.KSDS.CLUSTER.FGP,
          RECORDTYPE=(COL=9,VALUE='A',FIELDS=(10,50,100,5)),
          RECORDTYPE=(COL=9,VALUE='B',FIELDS=(10,60,100,5,200,5)),
          RECORDTYPE=(COL=9,VALUE='C',FIELDS=(10,70,100,5,200,5)))
```

VSAMFGP Example 5

This is similar to the previous example, with an additional catch-all specification. The last RECORD parameter indicates that any other record types "*" should be fingerprinted according to the FIELDS specification as supplied.

```

VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,
          DSN=somnode.KSDS.CLUSTER.FGP,
          RECORDTYPE=(COL=9,VALUE='A',FIELDS=(10,50,100,5)),
          RECORDTYPE=(COL=9,VALUE='B',FIELDS=(10,60,100,5,200,5)),
          RECORDTYPE=(COL=9,VALUE='C',FIELDS=(10,70,100,5,200,5)),
          RECORDTYPE=(*,FIELDS=(300,20)))

```

VSAMFGP Example 6

In this example, all RECORDTYPEs "A" are fingerprinted according to the FIELDS specifications. Once this record is selected, the record SUBTYPE further qualifies the record for selection.

Byte 20 of the selected records are tested for the hexadecimal values (as shown). The specified FIELDS are then fingerprinted to generate the tokens for the records. All other record types not equal to A are fingerprinted in their entirety.

Regardless of the number of bytes fingerprinted, a six-byte token is generated representing the record contents. Although none, or multiple SUBTYPEs, may be specified, the FIELDS specification is required for each SUBTYPE.

```

VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,
          DSN=somnode.KSDS.CLUSTER.FGP,
          RECORDTYPE=(COL=9,VALUE='A',
                      SUBTYPE=(COL=20,VALUE=X'00',FIELDS=(200,5)),
                      SUBTYPE=(COL=20,VALUE=X'01',FIELDS=(200,10)),
                      SUBTYPE=(COL=20,VALUE=X'02',FIELDS=(200,20)))

```

VSAMFGP Example 7

In this example, all RECORDTYPEs "A" are fingerprinted according to the FIELDS specifications. Once this record is selected, the record SUBTYPE further qualifies the record for selection.

Byte 20 of the selected records are tested for the hexadecimal values (as shown). The specified FIELDS are then fingerprinted to generate the tokens for the records. All other record types are fingerprinted in their entirety, using the catch-all specification:

```

RECORDTYPE=(*,FIELDS=(1,999))

```

This specification indicates that all other record types are to be included in the fingerprinting process, and will be fingerprinted in their entirety (Catch all other records).

Regardless of the number of bytes fingerprinted, a six-byte token is generated representing the record contents. Although none, or multiple SUBTYPEs may be specified, the FIELDS specification is required for each SUBTYPE.

```

VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,
          DSN=somnode.KSDS.CLUSTER.FGP,
          RECORDTYPE=(COL=9,VALUE='A',
                      SUBTYPE=(COL=20,VALUE=X'00',FIELDS=(200,5)),
                      SUBTYPE=(COL=20,VALUE=X'01',FIELDS=(200,10)),
                      SUBTYPE=(COL=20,VALUE=X'02',FIELDS=(200,20)))
          RECORDTYPE=(*,FIELDS=(1,999))

```

If a RECORDTYPE=(*,FIELDS=(200,20)) was specified in the above example, all the non-A type records would be fingerprinted using the data in byte 200, for a length of 20.

IAM Data Structure

In the releases prior to 6.1.0, VSAM fingerprinting was performed using full track read. Once a track was read in memory, records in the CIs were processed to generate the record-level fingerprint tokens. Starting with release 6.1.0, an additional I/O routine was provided to fingerprint a VSAM cluster using the standard VSAM I/O. Specifying this mode of operation enables users to fingerprint VSAM compatible clusters such as IAM (and BMC compressed clusters).

The VSAMEXPORT and VSAMIMPORT commands have always used the standard VSAM I/O routines. Therefore, a VSAM change basket created as such, can be used to update one or multiple IAM data sets locally or remotely.

The following example demonstrates the use of the AM parameter to fingerprint a VSAM cluster using the standard I/O routines such as IAM.

```
VSAMFGP=(CLUSTER=somnode.IAM.FILE,
          DSN=somnode.IAM.FILE.FGP,
          AM=STANDARD)
```

VSAMCOMPARE

The VSAMCOMPARE command compares two pre-generated fingerprint data sets and produces a report. Each VSAM fingerprint data set represents the contents of a VSAM cluster at a definite time. This approach can determine the changes introduced in a VSAM cluster over a period of time. VSAM fingerprint data sets may also represent two local or remote clusters that are required to be verified for synchronization.

When comparing VSAM fingerprint files, they represent the state of the VSAM cluster when the fingerprints were generated.

VSAMCOMPARE SAFEGUARD

When a fingerprint data set is created, a header record is written in the beginning of the file. The comparison of two fingerprint data sets will only proceed if these two data structures match. Otherwise, an "incompatible fingerprints" message will halt the compare process. This feature is important to avoid any false indications of update, in a VSAM cluster.

The general format of the command is:

```
VSAMCOMPARE = ( BASEDD= _ | BASEDSN= _ ,
                TARGDD= _ | TARGDSN= _ ,
                REPORT=( _,... ) )
```

The following table describes the VSAMCOMPARE command parameters.

Parameter	Description
BASEDD	DD name of the pre-generated VSAM fingerprint data set referenced in the JCL. A base VSAM fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the pre-generated VSAM fingerprint data set. A VSAM base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates the desired level of detail reporting. If the REPORT parameter is not specified, a summary report is produced. See "VSAMCOMPARE REPORT Parameter" on page 51 for specifications.
TARGDD	DD name of the pre-generated VSAM fingerprint data set referenced in the JCL. A target VSAM fingerprint data set must be referenced either by this parameter or the TARGDSN parameter. This parameter is mutually exclusive with the TARGDSN parameter.
TARGDSN	Name of the pre-generated VSAM fingerprint data set. A target VSAM fingerprint data set must be specified either by this parameter or the TARGDD parameter.

VSAMCOMPARE Example 1

The following command compares fingerprint data sets of two KSDS files and reports the keys of the records being added. The statistical summary is also produced by default.

```
VSAMCOMPARE=(BASEDSN=APPL2.VSFGP1,
              TARGDSN=APPL2.VSFGP2,
              REPORT=ADD)
```

VSAMCOMPARE Example 2

The following stacked commands compare two sets of VSAM fingerprint data sets. Each set is identified by their respective DDs in the JCL. Because the REPORT parameter is not specified, only the summary report will be produced. No detail reporting will be generated.

```
VSAMCOMPARE=(BASEDD=DD1, TARGDD=DD2)
VSAMCOMPARE=(BASEDD=DD3, TARGDD=DD4)
```

A more detailed example, including JCL and command syntax, is located in member VSCOMP1 in the ChangeMan SSM SAMPLES distribution library.

VSAMCOMPARE REPORT Parameter

The REPORT parameter indicates the desired level of detail reporting. If the REPORT parameter is not specified, a summary report is produced.

The general format of the REPORT parameter follows (minimum abbreviation is R):

```
REPORT = ( ADD ,
           UPDATE ,
           DELETE ,
           EQUAL ,
           NONE ,
           ALL )
```

The following table describes the REPORT subparameters.

Parameter	Description
ADD	Reports the keys of the added records.
ALL	Turns on all other non-conflicting values (ADD, DELETE, UPDATE, EQUAL). This value is mutually exclusive with any other value specification.
DELETE	Reports the keys of the deleted records.
EQUAL	Reports the keys of identical records.
NONE	Default. Turns off the detail reporting. Only summary reports will be produced. This value is mutually exclusive with any other value.

VSAMCOMPARE REPORT Example

This is the simplest form of the VSAMCOMPARE command. The two fingerprint representations are compared, and all added records are reported.

```
VSAMCOMPARE=(BASEDD=DD1 ,
              TARGDD=DD2 ,
              REPORT=ADD)
```

VSAMEXPORT

The VSAMEXPORT command is used to compare two pre-generated fingerprint data sets and produce a VSAM change basket.

VSAMEXPORT SAFEGUARD Feature

If two fingerprint files that were generated using the RECORD and FIELD parameters (field-level fingerprinting) are compared, the safeguard feature ensures that both files have been fingerprinted with the same rules. The safeguard feature is also implemented during the creation of the VSAM change basket.

If the intention is to offload the changes introduced to a VSAM cluster, the initial fingerprint representation data set (before the update), and the fingerprint representation data set (after the update) must have followed the same rules.

The general format of the command is:

```
VSAMEXPORT = ( BASEDD= _ | BASEDSN= _ ,
               BASKETDD= _ | BASKETDSN= _ ,
               REPORT= Y | N ,
               TARGDD= _ | TARGDSN= _ )
```

The following table describes the VSAMEXPORT command parameters.

Parameter	Description
BASEDD	DD name of the pre-generated VSAM fingerprint data set referenced in the JCL. A base fingerprint DD must be specified either by this parameter, or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the pre-generated VSAM fingerprint data set. A base fingerprint data set must be referenced either by this parameter or the BASEDD parameter.
BASKETDD	DD that points to a basket data set.
BASKETDSN	Name of a VSAM change basket data set that contains the changes. This is a physical sequential data set with the DCB information overlaid by the software.
REPORT	The specification of this parameter turns on the detailed reporting of the export process. REPORT=N is the default.
TARGDD	DD name of the pre-generated VSAM fingerprint data set referenced in the JCL. A target fingerprint data set must be referenced either by this parameter or by the TARGDSN parameter. This parameter is mutually exclusive with the TARGDSN parameter.
TARGDSN	Name of the pre-generated VSAM fingerprint data set. A target fingerprint DSN must be specified either by this parameter, or by the TARGDD parameter.

ChangeMan Integration

VSAM change baskets created by ChangeMan SSM can be used in a ChangeMan environment to manage the updates. Two programs (HPSUNBLK and HPSREBLK) are available that enable you to edit a VSAM change basket using the ISPF edit. This facility allows you to implement partial changes required for specific packages. Refer to VSUNBLK and VSREBLK jobs in the SAMPLE data set for more detail.

Examples

VSAMEXPORT Example 1

Two VSAM fingerprint representations are used to create the VSAM change basket. The change basket is a single physical sequential file that is a repository of all the differences.

The BASEDD refers to a new VSAM KSDS cluster (after updates). The TARGDD refers to an old representation of the same cluster (before the update).

All the added, deleted, and updated records are extracted and exported to the change basket. This file can be shipped to multiple local or remote environments to synchronize the clusters.

```
VSAMEXPORT=(BASEDD=DD1,  
             TARGDD=DD2,  
             REPORT=Y,  
             BASKETDD=DD3)
```

VSAMEXPORT Example 2

This example demonstrates a VSAM change basket generation. A VSAM KSDS cluster is first fingerprinted using the selective (field level) VSAM fingerprinting process. This process restricts the fingerprinting operation to the specified records and fields.

In the second step, it is updated with an online or batch application program.

In the third step, the cluster is re-fingerprinted with the same RECORD definitions.

Finally, in the fourth step, the changes are offloaded to a VSAM change basket data set (a physical sequential data set). If the record definitions are not identical, the EXPORT process will stop with an error message indicating the conflict.

```
//STEP1... (Fingerprint the cluster)  
VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,  
         DD=DD1,  
         RECORDTYPE=(COL=9,VALUE='A',  
                     FIELDS=(10,50,100,5)))  
  
//STEP2... (Update the cluster)  
online or batch application program  
  
//STEP3... (Re-Fingerprint the cluster after update)  
VSAMFGP=(CLUSTER=somnode.KSDS.CLUSTER,  
         DD=DD2,  
         RECORDTYPE=(COL=9,VALUE='A',  
                     FIELDS=(10,50,100,5)))  
  
//STEP4... (Export the differences: ADDs, DELETEs, UPDATEs to the  
VSAM Change Basket data set)  
VSAMEXPORT=(BASEDD=DD2,NEW  
           TARGDD=DD1,OLD  
           BASKETDD=DD3)
```

VSAMIMPORT

VSAMIMPORT applies a VSAM change basket to a target cluster. Target clusters may reside in a local or remote environment. The general format of the command is:

```
VSAMIMPORT = ( APPLY | SIMULATE,  
             BASKETDD= _ | BASKETDSN= _ ,  
             TOCLUSTER= _ ,  
             REVERSE,  
             REVERSDD= _ | REVERSdsn= _ )
```

The following table describes the VSAMIMPORT command parameters.

Parameter	Description
APPLY	Causes the changes contained in the VSAM <i>change basket</i> to be applied.
BASKETDD	DD that points to a VSAM <i>change basket</i> data set.
BASKETDSN	Name of a VSAM <i>change basket</i> data set that contains the changes.
REVERSE	Optional. If specified, it reverses the changes that have been imported to a cluster by a previous VSAM IMPORT (APPLY) command. The BASKETDD in this case would point to a VSAM reverse change basket.
REVERSDD	DD that points to the VSAM reverse change basket data set, to undo the previously-applied changes.
REVERSDSN	Name of a VSAM reverse change basket data set that contains the changes to undo the previously-applied changes.
SIMULATE	Simulates the synchronization process without updating the target cluster.
TOCLUSTER	Name of the target cluster if it is different than what has been specified in the VSAM change basket.

VSAMIMPORT Example 1

This example shows how a VSAM change basket is applied to a target cluster.

```
VSAMIMPORT=(BASKETDD=DD1 ,APPLY)
```

VSAMIMPORT Example 2

This example shows how a VSAM reverse change basket is created during the import process. This basket can be used to backout the applied changes (if required).

```
VSAMIMPORT=(BASKETDD=DD1 ,
             REVERSDD=DD2 ,
             APPLY)
```

VSAMIMPORT Example 3

This example shows how a VSAM reverse change basket that was created during a previous VSAM import process can be applied to reverse the changes by providing a proper DD, and specifying the REVERSE parameter.

```
VSAMIMPORT=(BASKETDD=DD1 ,REVERSE)
```

Data Extraction Commands - Flat Files

Using fingerprinting technology, ChangeMan SSM provides a comprehensive solution in the area of non-VSAM local or remote file comparison and data extraction. By comparing a current fingerprint or file with a previous fingerprint or another file, ChangeMan SSM quickly identifies what records were added, deleted, or updated in the file. ChangeMan SSM can then generate a change basket to be transferred to other locations to synchronize those files.

Full regression testing is imbedded in the design to ensure data integrity. This facility can be used in centralized maintenance (SMP/E CSI synchronization), disaster recovery, and the propagation of VSAM changes across multiple LPARs or sites.

Each fingerprint data set represents the contents of one file or PDS member, whereas each change basket contains the changes for one file or PDS member.

DATACOMPARE

DATACOMPARE compares any two PDS members, PS, or DA files.

The general format of the command is:

```
DATACOMPARE = ( BASEDD=_ | BASEDSN=_ ,
                BASEMEM=_ ,
                TARGDD=_ | TARGDSN=_ ,
                TARGMEM=_ ,
                REPORT=(SBS= YES | NO ,
                       COMPLETE= YES | NO ,
                       ADD,UPDATE,DELETE,EQUAL | ALL | NONE ,
                       WARN))
```

The following table describes the DATACOMPARE parameters.

Parameter	Description
BASEDD	DD name of the base data set referenced in the JCL. A base data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the base data set. A base DSN must be specified either by this parameter or the BASEDD parameter.
BASEMEM	Optionally restrict comparison to a single member. Specify the name of the member to compare. Can be used to compare a member with a PS or DA file.
REPORT	Optional. Specify the desired level of detail reporting. If the REPORT parameter is not specified, a summary report is produced. See " REPORT Sub-parameters " on page 57 for a complete list of available sub-parameters.

Parameter	Description
TARGDD	DD name of the target data set referenced in the JCL. A target data set must be referenced either by this parameter or the TARGDSN parameter. This parameter is mutually exclusive with the TARGDSN parameter.
TARGDSN	Name of the target data set. A target data set must be specified either by this parameter or the TARGDD parameter.
TARGMEM	Optional. Restrict the comparison to a single member. Specify the name of the member to compare. Can be used to compare a member with a PS or DA file.

REPORT Sub-parameters

Parameter	Description
SBS	Print records side by side. The target records display on the left, and the base records on the right. SBS=YES (or SBS) specifies side by side reporting. No specification, or SBS=NO indicates the default horizontal reporting.
COMPLETE	Display the entire record. By default, only the part of a record that will fit on a single line is displayed. COMPLETE=YES specifies that as many lines as necessary will be printed to display the entire record. During CSECT processing, the entire CSECT will be printed.
ADD	Display added records. This includes moved records.
ALL	Display all records in the files being compared. This is mutually exclusive with ADD, DELETE, EQUAL, UPDATE, and NONE.
DELETE	Display deleted records. This includes moved records.
EQUAL	Display equal records. These are records that have not been changed.
NONE	Do not display any records; display summary information only. This is mutually exclusive with ADD, ALL, DELETE, EQUAL, and UPDATE.
UPDATE	Display updated records.
WARN	Causes differences to be identified with suffix W on message HPS1617 and return code = 4. If this subparameter is omitted, message HPS1617 is issued with suffix I and return code = 0.

Examples

DATACOMPARE Example 1

This example shows how to compare two text files. The report specifications result in a line-by-line report, with only the first 72 characters of each record displayed. Unchanged

records are not displayed.

```
DATACOMPARE=(BASEDSN=somnode.TEXTFILE.VER31,
              TARGDSN=somnode.TEXTFILE.VER32,
              REPORT=(SBS=NO,
                     COMPLETE=NO,
                     ADD,UPD,DEL))
```

DATACOMPARE Example 2

This example shows how to compare two PDS Members. The first 32 characters of each record are shown in a side-by-side report. Only updated records are shown. To show the entire record, specify COMPLETE=YES.

```
DATACOMPARE=(BASEDSN=somnode.DEV1.PANELS,
              BASEMEM=HPSADM1,
              TARGDSN=somnode.DEV2.PANELS,
              TARGMEM=HPSADM1,
              REPORT=(SBS=YES,
                     COMPLETE=NO,
                     UPDATE))
```

DATACOMPARE Example 3

This example shows how to compare a PDS member with a text file. ALL records are shown in their entirety (COMPLETE=YES). The records are displayed in a side-by-side report.

```
DATACOMPARE=(BASEDSN=somnode.PTF,
              BASEMEM=PMR62014,
              TARGDSN=PMR62014.TXT,
              REPORT=(SBS=YES,
                     COMPLETE=YES,
                     ALL))
```

MLC

MLC (Matching Line Count) sets the number of lines that must match to re-sync during the text compare processing.

The general format of the command is:

```
MLC = n
```

where *n* is a number between 0 and 32. The value 0 resets the MLC to the default value of 2.

MLC Example

This example shows how to compare two text files, using MLC=5. The report specifications result in a line-by-line report, with only the first 72 characters of each record displayed. Unchanged records are not displayed.

After an out-of-sync record (added, updated or deleted) is encountered, at least five records must match before a synchronization point is reached.

```

MLC=5
DATACOMPARE=(BASEDSN=somnode.TEXTFILE.VER31,
              TARGDSN=somnode.TEXTFILE.VER32,
              REPORT=(SBS=NO,
                     COMPLETE=NO,
                     ADD,UPD,DEL))

```

KEYEDFGP

KEYEDFGP generates a fingerprint data set for a PS or DA file that has an internal key field, or that is accessed positionally.

The general format of the command is:

```

KEYEDFGP = ( DSN =_ ,
              VOLSER =_ ,
              FGPDSN =_ | FGPDD =_ ,
              KEYED = ( RKP,KEYLENGTH ) ,
              RECORDTYPE = (COL =_ ,VALUE =_ ,FIELDS =(_)) ,
              SUBTYPE=(COL=_ ,VALUE=_ ,FIELDS=(_ ,_ ,...)) )

```

The following table describes the KEYEDFGP parameters.

Parameter	Description
DSN	Name of the data set to be fingerprinted
VOLSER	Volume that corresponds to an uncataloged data set.
FGPDSN	DSN of the pre-generated fingerprint data set. A target data set must be referenced either by this parameter, or by the FGPDD parameter.
FGPDD	DD name of the pre-generated fingerprint data set referenced in the JCL. A target fingerprint data set must be referenced either by this parameter or by the FGPDSN parameter. This parameter is mutually exclusive with the FGPDSN parameter.
KEYED	Specify relative key position (RKP) and keylength for a file with an embedded key, or specify positional. Positional uses the relative record numbers as the record key.
RECORDTYPE	Specify fields to fingerprint, and filtering options. See RECORDTYPE on page 47 for more details.
SUBTYPE	SUBTYPEs can be used to further qualify a record for selection. See SUBTYPE on page 47 for more details.

KEYEDFGP Example

This example shows how to generate a fingerprint data set from a keyed file. The key begins in column 4 (RKP), and has a key length of 8.

```
KEYEDFGP=(DSN=ACCT.COMP.INV,
          FGPDD=DD1,
          KEYED=(4,8))
```

KEYEDCOMPARE

KEYEDCOMPARE compares two fingerprint data sets representing a KEYED or POSITIONAL file.

The general format of the command is:

```
KEYEDCOMPARE = ( BASEDD=_ | BASEDSN=_ ,
                 TARGDD=_ | TARGDSN=_ ,
                 REPORT= YES | NO )
```

The following table describes the KEYEDCOMPARE parameters.

Parameter	Description
BASEDD	DD name of the pre-generated VSAM fingerprint data set referenced in the JCL. A base VSAM fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the pre-generated VSAM fingerprint data set. A VSAM base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates the desired level of detail reporting. If the REPORT parameter is not specified, a summary report is produced.
TARGDD	DD name of the pre-generated VSAM fingerprint data set referenced in the JCL. A target VSAM fingerprint data set must be referenced either by this parameter or the TARGDSN parameter. This parameter is mutually exclusive with the TARGDSN parameter.
TARGDSN	Name of the pre-generated VSAM fingerprint data set. A target VSAM fingerprint data set must be specified either by this parameter or by the TARGDD parameter.

KEYEDCOMPARE Example

This example shows how to compare two KEYED or POSITIONAL files. The report can be detailed or a summary.

```
KEYEDCOMPARE=(BASEDSN=ACCT.MAILING.LIST.OCT10.FGP,
              TARGDSN=ACCT.MAILING.LIST.SEP14.FGP,
              REPORT=YES)
```

KEYEEXPORT

KEYEEXPORT creates a change basket for changed records from a keyed or positional file.

The general format of the command is:

```
KEYEEXPORT = ( BASEDD =_ | BASEDSN =_ ,
               TARGDD =_ | TARGDSN =_ ,
               BASKETDD =_ | BASKETDSN =_ ,
               REPORT = YES | NO )
```

The following table describes the KEYEEXPORT parameters.

Parameter	Description
BASEDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates the desired level of detail reporting. If REPORT is not specified, a summary report is produced.
TARGDD	DD name of the target fingerprint data set referenced in the JCL. A target fingerprint data set must be referenced either by this parameter or the TARGDSN parameter. This parameter is mutually exclusive with the TARGDSN parameter.
TARGDSN	Name of the target fingerprint data set. A target fingerprint data set must be specified either by this parameter or the TARGDD parameter.
BASKETDD	DD that points to a change basket data set.
BASKETDSN	Name of a change basket data set that contains the changes. This is a physical sequential data set with the DCB information overlaid by the software.

KEYEEXPORT Example

This example shows how to compare two text files.

```
KEYEEXPORT=(BASEDSN=ACCT.MAILING.LIST.OCT10.FGP,
             TARGDSN=ACCT.MAILING.LIST.SEP14.FGP,
             BASKETDD=DD1,
             REPORT=YES)
```

POSFGP

POSFGP command is used to generate a fingerprint data set for a positional file.

The general format of the command is:

```
POSFGP = ( DSN =_ ,
           VOLSER=_ ,
           FGPDSN=_ | FGPDD =_ ,
           RECORDTYPE=(COL =_ ,VALUE =_ ,FIELDS =( ) ,
           SUBTYPE=(COL=_ ,VALUE=_ ,FIELDS=( , , . . . ) )
```

The following table describes the POSFGP parameters.

Parameter	Description
DSN	Name of the data set to be fingerprinted
VOLSER	Volume that corresponds to an uncataloged data set.
FGPDSN	Name of the pre-generated fingerprint data set. A fingerprint data set must be referenced either by this parameter or the FGPDD parameter
FGPDD	DD name of the pre-generated fingerprint data set referenced in the JCL. A fingerprint data set must be referenced either by this parameter or the FGPDSN parameter. This parameter is mutually exclusive with the FGPDSN parameter.
RECORDTYPE	Specify fields to fingerprint, and filtering options. See RECORDTYPE on page 47 for more details.
SUBTYPE	SUBTYPEs can be utilized to further qualify a record for selection. See SUBTYPE on page 47 for more details.
DSN	Name of the data set to be fingerprinted

POSFGP Example 1

This example shows how to create a fingerprint data set for a positional file.

```
POSFGP=(DSN=somnode.V710.LIST,
        FGPDSN=somnode.V710.LIST.FGP)
```

POSFGP Example 2

This example shows how to create a fingerprint data set for a positional file using RECORDTYPE filtering. See the VSAMFGP examples on [page 47](#) for more examples.

```
POSFGP=(DSN=somnode.V710.LIST,
        FGPDSN=somnode.V710.LIST.FGP,
        RECORDTYPE=(COL=9,VALUE='A',FIELDS=(10,50,100,5)))
```

POSCOMPARE

POSCOMPARE compares a fingerprint data set for a positional file with the current positional file. The positional file DSN is stored internally in the fingerprint data set, and does not need to be specified.

The general format of the command is:

```
POSCOMPARE = ( BASEDSN =_ | BASEDD =_ ,
                FGPDSN =_ | FGPDD =_ ,
                REPORT = (ADD,
                          DELETE,
                          UPDATE,
                          EQUAL,
                          ALL|NONE))
```

The following table describes the POSCOMPARE parameters.

Parameter	Description
BASEDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
FGPDD	DD name of the pre-generated fingerprint data set referenced in the JCL. A fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
FGPDSN	Name of the pre-generated fingerprint data set. A fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates what types of changes to report. If REPORT is not specified, a summary report is produced. See " REPORT Sub-parameters " on page 57.

POSCOMPARE Example

This example generates a comparison report for a positional text file, and a fingerprint representation of the text file. The REPORT sub-parameters indicate that only records with ADD, DELETE, and UPDATE events shall be displayed.

```
POSCOMP=(BASEDSN=somnode.TEXT1,
          FGPDSN=somnode.TEXT1.FGP,
          REPORT=(ADD,DEL,UPD))
```

POSEXPORT

POSEXPORT generates a change basket for a positional file.

The general format of the command is:

```
POSEXPORT = ( BASEDSN =_ | BASEDD =_ ,
              FGPDSN =_ | FGPDD =_ ,
              BASKETDD =_ | BASKETDSN =_ ,
              REPORT = YES | NO )
```

The following table describes the POSEXPORT parameters.

Parameter	Description
BASEDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
FGPDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
FGPDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates the desired level of detail reporting. If REPORT is not specified, a summary report is produced.
BASKETDD	DD that points to a change basket data set.
BASKETDSN	Name of a change basket data set that contains the changes. This is a physical sequential data set with the DCB information overlaid by the software.

POSEXPORT Example

This example shows how to export the changes made to a text file since the creation of the fingerprint data set. The changed records are offloaded into the pre-allocated change basket pointed to by BASKETDSN.

```
POSEXPORT=(FGPDSN=somnode.PANELS.NOV10.FGP,
           BASKETDSN=somnode.PANELS.BASKET,
           REPORT=NO)
```

TEXTFGP

TEXTFGP generates a fingerprint data set for a text file.

The general format of the command is:

```
TEXTFGP = ( DSN = _ ,
            VOLSER = _ ,
            FGPDSN = _ | FGPDD = _ ,
            RECORDTYPE = (COL = _ , VALUE = _ , FIELDS = ( _ ) ) ,
            SUBTYPE = (COL = _ , VALUE = _ , FIELDS = ( _ , _ , ... ) ) )
```

The following table describes the TEXTFGP parameters.

Parameter	Description
DSN	Name of the data set to be fingerprinted
VOLSER	Volume that corresponds to an uncataloged data set.
FGPDSN	Name of the pre-generated fingerprint data set. A fingerprint data set must be referenced either by this parameter or the FGPDD parameter
FGPDD	DD name of the pre-generated fingerprint data set referenced in the JCL. A fingerprint data set must be referenced either by this parameter or the FGPDSN parameter. This parameter is mutually exclusive with the FGPDSN parameter.
RECORDTYPE	Specify fields to fingerprint, and filtering options. See RECORDTYPE on page 47 for more details.
SUBTYPE	SUBTYPE(s) can be utilized to further qualify a record for selection. See SUBTYPE on page 47 for more details.

TEXTFGP Example 1

This example shows how to create a fingerprint data set for a text file.

```
TEXTFGP=(DSN=somnode.V620.LIST,
          FGPDSN=somnode.V620.LIST.FGP)
```

TEXTFGP Example 2

This example shows how to create a fingerprint data set for a text file using RECORDTYPE filtering.

See the VSAMFGP examples starting on [page 47](#) for additional information.

```
TEXTFGP=(DSN=somnode.V710.LIST,
          FGPDSN=somnode.V710.LIST.FGP,
          RECORDTYPE=(COL=9, VALUE='A', FIELDS=(10, 50, 100, 5)))
```

TEXTCOMPARE

TEXTCOMPARE compares a fingerprint data set for a text file with the current text file. The text file DSN is stored internally in the fingerprint data set, and does not need to be specified.

The general format of the command is:

```
TEXTCOMPARE = ( BASEDSN =_ | BASEDD =_ ,
                FGPDSN =_ | FGPDD =_ ,
                REPORT = ALL ,
                ADD ,
                DELETE ,
                UPDATE ,
                EQUAL ,
                NONE )
```

The following table describes the TEXTCOMPARE parameters.

Parameter	Description
BASEDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
FGPDD	DD name of the pre-generated fingerprint data set referenced in the JCL. A fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
FGPDSN	Name of the pre-generated fingerprint data set. A fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates changes to report. If REPORT is not specified, a summary report is produced. See " REPORT Sub-parameters " on page 57.

TEXTCOMPARE Example

This example generates a comparison report for a text file, and a fingerprint representation of the text file. The REPORT sub-parameters indicate that only records with ADD, DELETE, and UPDATE events are displayed.

```
TEXTCOMP=(BASEDSN=somnode.TEXT1,
           FGPDSN=somnode.TEXT1.FGP,
           REPORT=(ADD,DEL,UPD))
```

TEXTEXPORT

TEXTEXPORT generates a change basket for a text file.

The general format of the command is:

```
TEXTEXPORT = ( BASEDSN =_ | BASEDD =_ ,
               FGPDSN =_ | FGPDD =_ ,
               BASKETDD =_ | BASKETDSN =_ ,
               REPORT = YES | NO )
```

The following table describes the TEXTEXPORT parameters.

Parameter	Description
BASEDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
BASEDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
FGPDD	DD name of the base fingerprint data set referenced in the JCL. A base fingerprint data set must be referenced either by this parameter or the BASEDSN parameter. This parameter is mutually exclusive with the BASEDSN parameter.
FGPDSN	Name of the fingerprint data set. A base fingerprint DSN must be specified either by this parameter or the BASEDD parameter.
REPORT	Optional. Indicates the desired level of detail reporting. If REPORT is not specified, a summary report is produced.
BASKETDD	DD that points to a change basket data set.
BASKETDSN	The name of a change basket data set that contains the changes. This is a physical sequential data set with the DCB information overlaid by the software.

TEXTEXPORT Example

This example shows how to export the changes made to a text file since the creation of the fingerprint data set. The changed records are offloaded into the pre-allocated change basket pointed to by BASKETDSN.

```
TEXTEXPORT=(BASEDSN=somnode.PANELS,
             FGPDSN=somnode.PANELS.NOV10.FGP,
             BASKETDSN=somnode.PANELS.BASKET,
             REPORT=NO)
```


Glossary

Alternate Group Administrator	A person assigned by an existing Group Administrator to perform the primary tasks of that Group Administrator in his/her absence.
BICT (Batch Interval Change Tracking)	A batch program (HPSGLOBE) that performs the change-capture process for all tracked Objects at specified intervals. It should be scheduled to run minimally, once every 24 hours. This is an alternative to RTCT (Real Time Change Tracking).
Change Basket (keyed, positional, or text)	<p>A single physical sequential data set that contains the changes between two keyed, positional, or text flat files. This file contains the changed data records. Add, update, and delete information is present, but is not currently used for synchronization by ChangeMan SSM.</p> <p>Definitions for file types:</p> <p>Keyed file: A physical sequential or direct access file that has a field in each record that can be used as a key. This key must be unique for each record in the file.</p> <p>Positional file: A physical sequential or direct access file containing records that are indexed by their physical position. For example, the first record is considered record 1, and the second is record 2.</p> <p>Text file: A physical sequential or direct access file with records that are in no particular order, and do not have a specific key.</p>
Change Basket (non-VSAM)	A single physical sequential data set that contains the changes to an environment over time, or differences between two environments. For example: Test/Prod, SYSRES/ALTRES, and LPAR/LPAR. This file holds the data and information required to synchronize two environments, or propagate change from one system to another, locally or remotely.
Change Basket (VSAM)	A single physical sequential data set that contains the changes/differences between two VSAM clusters. This file contains the data records and required information to synchronize two VSAM KSDS data sets, locally or remotely.
Delta Master	A ChangeMan SSM database that contains the initial base version, plus subsequent changed versions, of a PDS/PDSE member (for data sets defined to ChangeMan SSM with Delta Tracking). Backup members are stored in compressed format.
Department Administrator	A person assigned by a Site Master Administrator to manage the Object Master database.

**DSORG
(Supported
Types)**

DA indicates a direct access data set.

PO indicates a partitioned data set (PDS and PDS/E).

PO type Format-3 data sets provide support for DFSMS Binder, NPO Format-3 load modules, and stored IBM JAVA files.

PS indicates a physical sequential data set.

VS indicates a VSAM data set.

NOTE Data sets with no DSORG specified are not supported.

Extract/Export

Extract is the process that ChangeMan SSM uses to identify changes/differences, utilizing fingerprints and/or active data sets.

Export is the process that packages the changes/differences into a Change Basket data set.

Event

A change event when ChangeMan SSM detects a variance in content or status of a tracked data set or data set member. There are 23 types of events distinguished by the software.

**Fingerprint
Dataset**

A physical sequential data set containing all the data set and member tokens to identify the contents of that environment at the time the Fingerprint data set was generated. A Fingerprint data set can represent a single PDS member, or the contents of several DASD volumes.

**Fingerprint
Dataset (keyed,
positional, or
text)**

A physical sequential file that contains all the fingerprint tokens of all the records in a physical sequential file. This file represents a PS or DA file.

Definitions for file types:

Keyed file: A physical sequential or direct access file that has a field in each record that can be used as a key. This key must be unique for each record in the file.

Positional file: A physical sequential or direct access file containing records that are indexed by their physical position. For example, the first record is considered record 1, and the second is record 2.

Text file: A physical sequential or direct access file with records that are in no particular order, and do not have a specific key.

**Fingerprint
Dataset (VSAM)**

A physical sequential data set containing tokens for every record in a VSAM KSDS cluster. This file represents the contents of a VSAM cluster at the time the Fingerprint data set was generated.

**Fingerprint
Token**

A unique identity attribute for the content of a data set or data set member. The attribute is an eight-byte, hexadecimal value.

Fingerprint Token (keyed, positional, or text)	<p>A unique identity attribute for records of a keyed, positional, or text file. The attribute is a six-byte, hexadecimal value.</p> <p>Definitions for file types:</p> <p>Keyed file: A physical sequential or direct access file that has a field in each record that can be used as a key. This key must be unique for each record in the file.</p> <p>Positional file: A physical sequential or direct access file containing records that are indexed by their physical position. For example, the first record is considered record 1, and the second is record 2.</p> <p>Text file: A physical sequential or direct access file with records that are in no particular order, and do not have a specific key.</p>
Fingerprint Token (VSAM)	<p>A unique identity attribute for records of VSAM clusters. The attribute is a six-byte, hexadecimal value.</p>
Group Administrator	<p>A person assigned by a Department Administrator to manage one or more Object Groups.</p>
HFS Change Basket	<p>A single physical sequential data set that contains the changes/differences between two HFS files. This file contains the data records and required information to synchronize two HFS files, locally or remotely.</p>
HFS Fingerprint Dataset	<p>A physical sequential data set containing tokens for every record in an HFS file. This file represents the contents of an HFS file at the time the Fingerprint data set was generated.</p>
HFS Fingerprint Token	<p>A unique identity attribute for records of HFS files. The attribute is a six-byte, hexadecimal value.</p>
HFS Reverse Change Basket	<p>A single physical sequential data set created during an HFS Import operation. It contains the information and data to undo the effects of updates, as a result of an HFS Import operation. This file has an identical structure to an HFS Change Basket.</p>
Import	<p>Import is the process that ChangeMan SSM utilizes to apply the changes contained in a Change Basket data set, to target environments. During Import processing there are several parameters that can be specified to customize the apply process, as well as a SIMULATE feature, and the creation of a Reverse Change Basket.</p>
MLS (Member Level Security)	<p>This facility allows for the protection of PDS/PDSE members being updated. The software provides the capability for MLS Administrators to identify who is allowed to update specific members/member patterns for specified data sets, by specifying either TSO User IDs or a RACF profile name.</p> <p>If an attempt is made to update a protected member, ChangeMan SSM will either save the changes to an internally-generated member name or cancel the updates, depending on what option you selected for the RTORENAME parameter.</p>
MRT (Member Reference Tracking)	<p>This facility allows you to detect and report references to members of PDSs. Read and update access is tracked on existing members that you define to the MRT system, and where standard I/O routines are used.</p> <p>You can also define members to be excluded from MRT. This allows you to filter out references to high-activity members at the beginning of MRT processing, which greatly enhances performance.</p>

Non-user	A person unknown, or not defined by a Group Administrator to any Object Group, but allowed access to the Synchronization and Detection functions of ChangeMan SSM.
Notifications	A ChangeMan SSM facility that provides change notifications to specified users about changes to tracked data sets and PDS members. There are both TSO User ID and E-mail notification facilities that can be used separately or together.
Object	A data set defined to the Change Tracking component of the tracking software. An object of the tracking function.
Object (Delta Tracked)	<p>A PDS or PDS/E data set defined to the Change Tracking component, where Delta Tracking was specified during the initial define of the object. This specification creates an initial backup of all members into the Delta Master database. Subsequently, only changed members, and additions are backed up in compressed format.</p> <p>NOTE Sequential data sets cannot be delta-tracked; if they are defined as DELTA=Y, the object is defaulted to DELTA=N.</p>
Object Group	A group of conceptually related data sets (Objects) that are associated for tracking, change detection, and reporting. There are no restrictions on mixing data set types in a group.
Object Master	A ChangeMan SSM database connected to the Site Master database, which contains definitions of all the Object Groups, their associated Group Administrators, and users defined to the Change Tracking environment.
RTO (Real Time Option)	<p>RTO was the name used for Real Time Change Tracking (RTCT) for ChangeMan SSM Version 8.1 and earlier.</p> <p>See RTCT.</p>
RTCT (Real Time Change Tracking)	The task of capturing data set or data set member information that allows the software to detect and identify change in real time.
Recall	A ChangeMan SSM facility to allow the recall of a backup version of selected (Delta Tracked) PDS or PDS/E members to a compatible data set. Expansion is performed automatically.
Recover	A ChangeMan SSM facility to allow the recovery of a Delta Tracked PDS or PDS/E data set, as it existed in some previous point in time, to a compatible data set. Expansion is performed automatically.
Redundancy Detection	A ChangeMan SSM facility that identifies duplicate data sets and PDS/PDSE members by content. A comprehensive reporting facility allows for the identification of duplicates to facilitate the deletion of those having duplicate content. This allows for recovery of DASD space and enhanced integrity (only one copy). This facility also assists in library cleanup and consolidation.
Restore	A ChangeMan SSM facility to allow the restore of a backup version of selected (Delta Tracked) PDS or PDS/E members to the original data set. Expansion is performed automatically.
Reverse Change basket	A single physical sequential data set, created during an Import operation, which contains the information and data to undo (entirely or partially) the effects of updates as a result of an Import operation. This file has an identical structure to a Change Basket.

Reverse Change Basket (VSAM)	A single physical sequential data set created during a VSAM Import operation. It contains the information and data to undo the effects of updates, as a result of a VSAM Import operation. This file has an identical structure to a VSAM Change Basket.
Site Master	The main ChangeMan SSM VSAM database, which contains information for all tracked data sets and their detected events.
Site Master Administrator	A person assigned (during installation) to manage the Site Master and define departments.
SMS	System Managed Storage. Enhanced data management software for MVS mainframes from IBM. Provides functions such as automatically allocating data, which prevents most out-of-space errors when disk volumes become full.
Snapshot	<p>A ChangeMan SSM facility that interrogates the VTOC and VVDS to identify data sets existing on one or several volumes, and capture information about these data sets and their attributes. This information is stored in a SNAPSHOT data set, which can be used to compare to another SNAPSHOT data set generated at a different location. This comparison can verify that all data sets are available, and check for differences in any data set attributes or space allocations.</p> <p>The SNAPSHOT function is especially useful as a pre-step to performing DR testing, to verify that all the production data sets are available. In addition, it allows pre-screening to eliminate potential x37 type abends, where a data set was expanded at the source site, but not at the target, when applying maintenance.</p>
Tracking	The function of monitoring a data set or data set member for events in real time (RTCT), or over a period of time (BICT).
User	A person defined to the Change Tracking component as a User in one or more groups by a Group Administrator, and allowed controlled access to its functions.

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