

FDREPORT

C O N C E P T S & F A C I L I T I E S G U I D E

FDREPORT

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INTRODUCTION

CONCEPTS & FACILITIES GUIDES

For more than 30 years, Innovation Data Processing has been producing high-quality Storage Management Software. Over the years, its products have evolved into today's ultra high-speed, safe, reliable storage management solutions for OS/390, z/OS, LAN and Open Systems Data.

It all started with the **FDR Storage Management Family**, of which over 5000 licenses have now been sold worldwide. The FDR Family is the complete Storage Management System for OS/390 and z/OS.

FDR has become the industry standard for fast, reliable backups of MVS OS/390 data.

ABR adds a layer of automation to the standard functions of FDR, providing advanced backup facilities like *Incremental Backup*, *Application Backup* and *Archiving*.

COMPAKTOR and **FDRREORG** further enhance the suite by adding intelligent and powerful reorganization processes, for whole DASD volumes and for Sequential, PDS and VSAM datasets.

FDREPORT provides extensive customized DASD Management Reporting to suit many needs and purposes.

FDRCLONE is an extension to ABR, providing the ability to "clone" volumes and/or datasets on a test or disaster recovery system. It includes **FDRDRP**, a utility that can reduce ABR full-volume recovery time by up to 80%.

FDRINSTANT enables FDR/ABR to take *non-disruptive backups* of offline volumes, created by the latest DASD Subsystem features like StorageTek/IBM SnapShot Copy, EMC² TimeFinder/BCV, HDS ShadowImage and IBM FlashCopy.

FDRPAS (FDR Plug and Swap) allows for the non-disruptive movement of OS/390 disk volumes from one disk device to another. When new disk subsystems are installed, active online disk volumes can be swapped to drives in the new subsystem without disrupting normal operations or requiring a re-IPL. This allows a 24 x 7 installation, with no window for major re-configurations and hardware changes, to install and activate new hardware.

THE FDR/UPSTREAM Family of Products builds on the strengths of the FDR Storage Management Family providing a fast, safe and reliable solution to backing up Open Systems data from file servers and workstations, across a network connection to disk or tape on the OS/390 host. If the Open Systems data is resident on an EMC² Symmetrix with Enterprise Storage Platform (ESP), **FDRSOS** and **FDR/UPSTREAM/SOS** products provide additional performance enhancements to the backup and restore process by utilizing high-speed mainframe channels.

IAM is Innovation's alternative to VSAM KSDS, ESDS and (as a cost option) AIX files. It eliminates VSAM performance bottlenecks and reduces VSAM file sizes by more than 50%.

FATS/FATAR and **FATSCOPY** are a set of multi-purpose tape subsystem Media Integrity tools that allow for online tape certification, verification and erasure, as well as the ability to analyze and copy tapes.

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Each of the Innovation products are described in a range of Concepts & Facilities Guides that have been created by the Innovation UK office, but which are available *free of charge* from your local office (see back cover for details).

In this particular guide, we take a look at **FDREPORT**.

At any computer installation, staff at a variety of levels need to be able to refer to accurate and timely information about the use of DASD resources. Accurate information is the only basis for sound decision making and future planning. Without this, it is impossible to determine how efficiently DASD space is being utilized, or predict how needs will grow. Accurate information is also essential for solving existing problems and for preventing problems from arising in the first place.

This Concepts and Facilities Guide discusses some of the general issues revolving around the use of DASD Management reporting, and gives a detailed explanation of the facilities that are provided by **FDREPORT**.

Any comments or suggestions regarding this guide can be directed to:
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Introduction

1.1 The Importance of DASD Management Reporting

Ideally, every computer installation will actively monitor its DASD usage to ensure that their DASD Management policy is being correctly implemented and that expensive DASD space is being used effectively. A reporting tool is essential to help obtain this information. However, because all installations are different, there is no single approach to DASD Management, and thus no single set of reports that is universally correct and applicable.

In practice, the variety between different installations' DASD Management policies is a result of many factors—including the size and history of the installation, the way it has grown, and the needs of its user community. DASD Management policy is implemented in the number and type of the DASD devices which are installed, by a large variety of local standards, and by the way space is allocated to users—either by a volume-ownership or a pooling scheme. This will be mirrored by the diverse range of reports that need to be run, both on a regular basis to monitor space usage, and for ad-hoc problem solving. For these reasons the report generators employed must be flexible and easy-to-use, but also provide comprehensive and accurate information.

With these needs in mind, reports might be described as falling into two categories—*summary* and *detail*, as follows:

Summary reports would be used by Management, such as Data Processing Managers, and by Capacity Planners who would need to see overall figures to help them evaluate and predict growth trends. With these summary reports, it should be possible to predict the effect of changes in DASD requirements caused by alterations in the DASD Management policy, or in the general increase (or decrease!) of DASD space usage (*i.e.* new applications being introduced or removed).

The outcome of using a good DASD Management Reporting Program is that DASD usage can be made as efficient as possible. Purchases of new DASD can be closely matched to requirements, not lagging behind or leading them. Purchasing new DASD too early can be a mistake and prove to be very expensive. Purchasing new DASD too late can be very disruptive.

Detail reports can be used by a wider range of staff, from end-users to Management, to confirm that the DASD Management policy is being correctly implemented on an individual volume or dataset basis. For example, detail reports can show:

- Whether space is being wasted in over-allocated datasets
- If datasets are on incorrect volumes
- Any datasets which do not conform to installation standards
- If freespace on DASD is badly fragmented

Detail reports are also helpful to Performance Analysts. Since the configuration and I/O loading of the DASD subsystem has a fundamental effect on the overall system performance, Performance Analysts need to be aware of DASD contents and their usage. It is sometimes necessary to move data around to balance DASD I/O loads and Channel Utilization and a good reporting tool makes this task much simpler.

At another level, detail reports can also be used by systems programming or support staff to monitor the overall 'health' of the DASD subsystem. Running appropriate reports at regular intervals can help to detect volumes or sensitive datasets (such as VTOCs, VVDSs and VTOC Indexes) which are becoming dangerously full, or which require corrective action.

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1.2 Pooling Systems

The need for a good DASD Management Reporting System is magnified when a DASD Pooling mechanism is being used. Pooling is implemented either by simple UNITNAME specification or, more comprehensively, by DFSMS and other OEM allocation control packages. Pooling has two main effects that are significant.

Firstly, it eliminates the practice of volume ownership, where typically one or more disks are given to a project team for their exclusive use. This 'traditional' volume ownership can result in DASD space being used inefficiently, with volumes being very underutilized. It does, however, have the advantage that applications can be very self-contained and users can be made more directly responsible for the DASD space they consume. For example, a team would have to explicitly request and justify the use of another disk if the first one they were allocated was filled.

Under pooling systems, a larger number of volumes can be shared between many project teams or applications. This has the effect of relieving the space constraints on each team. It also removes their level of responsibility for managing the media. This becomes the responsibility of the DASD Administrator, who will ensure that space is not being wasted and that individual application teams are not using excessive amounts of DASD.

The second effect of pooling is that it makes it difficult to predict exactly where datasets will be allocated at any given time. This can sometimes be regarded as an advantage, but it also presents problems when doing the type of I/O tuning mentioned earlier. Also, in disaster-recovery situations, it becomes harder to recover from DASD problems when it is not clear what data has been lost.

A final point about pooling is that it is essentially a 'pro-active' system, whereby datasets are allocated in accordance with rules established by the DASD Administrator. However, dataset requirements can be very individual and they can change with time, so it is impossible to eliminate the possibility that datasets will be created that are outside the scope (and capabilities) of the established rules. It is very likely that such exceptional datasets will be allocated on inappropriate DASD volumes or with incorrect attributes. To detect these problems, and to allow them to be corrected, it is essential to use a reporting system on a 're-active' basis.

So, in summary, all levels of staff need to be able to obtain information related to DASD usage—from Managers and Capacity Planners, to DASD Management personnel, Performance Specialists, Systems Programmers, Disaster Recovery planners, and pooling or SMS Administrators. FDREPORT is just the tool they need to achieve this.

1.3 FDREPORT Introduction

FDREPORT is an extremely powerful and flexible DASD Management report generator. It is designed to enable users to create their own *customized* DASD Management reports. Unlike other reporting programs, FDREPORT collects the 'raw' data from the various sources *and* it also then performs the actual report generation.

FDREPORT is capable of displaying almost any field from the VTOC, VVDS, and Catalog, and using these fields as the basis for the report selection criteria. Users of Innovation's ABR DASD Management system can utilize FDREPORT to access and report on information contained in the ABR control files. DFHSM users can benefit from the same power and flexibility, by accessing and reporting on information stored in the MCDS and BCDS control datasets. FDREPORT also provides volume-related information and can generate other information that is not directly available from any of the above sources.

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In the report generation process, users have the ability to control the report contents, layout, spacing, control breaks, and summaries. With this wide range of information available and because of the control over report contents, FDREPORT can generate an almost infinite variety of reports that meet the most demanding user requirements.

With this immense power and flexibility, FDREPORT can do simple things, like provide basic information on selected datasets or clusters. Alternatively, it can be used for more complex tasks, such as isolating certain datasets that do not conform to standards, or for Disaster Recovery planning.

Here are just a few examples of the kinds of report that can be generated with FDREPORT:

- A list of datasets with a given prefix
- A list of TSO LIST datasets
- VSAM datasets on selected volumes
- Poorly blocked datasets
- Datasets backed up or migrated by DFHSM
- PDSs that are full
- Poorly organized VSAM clusters
- Datasets likely to suffer Sx37 abends
- Multi-Volume datasets
- Dataset SMS information
- Datasets ineligible for SMS
- DASD volumes with a large amount of spare capacity
- DASD volume Mount and SMS status
- Wasted Space on volumes
- DASD Volumes with potential VTOC or VVDS problems

As FDREPORT has such flexibility, it follows that users will code a number of control statements and parameters to define what the report should contain and what its layout should be. The remainder of this Concepts and Facilities Guide describes how FDREPORT is used and highlights some of its key features.

Sample control statements are shown to illustrate how the reports can be generated and some of the sections of this Guide also show sample report output. Since users can fully control their own report contents and layout, the samples should not be regarded as exactly representing the reports that are generated in practice.

Important: This Guide is not intended to be a complete description of FDREPORT. For full details, users should refer to the FDR user manual, Section 54.

1.4 Sources of Information and Types of Output

As outlined in the preceding section, FDREPORT obtains information from DSCBs in DASD VTOCs, from BCS User Catalogs, and from VVDS datasets. In addition, it can also generate extra information (such as %FREE figures) which may not be directly available in the above locations, but can be derived or calculated.

FDREPORT can also obtain PDS directory information, volume-related information, and information from the ABR Incremental Backup and Archive recording mechanisms and from DFHSM's MCDS and BCDS control datasets.

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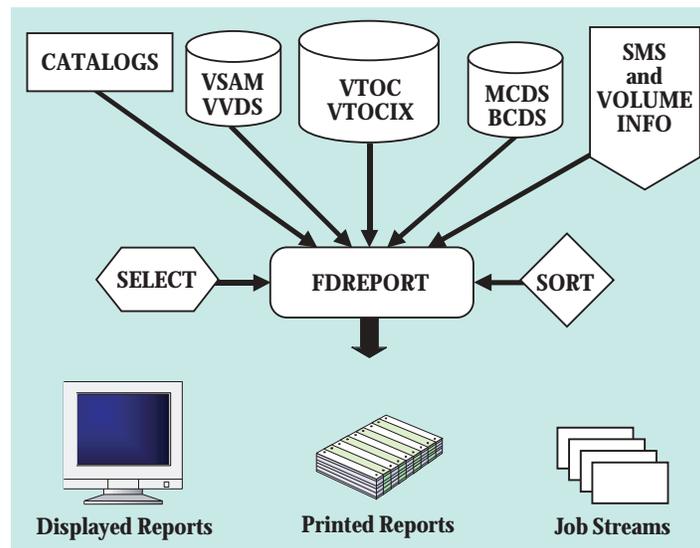
Details of approximately 250 fieldnames that FDREPORT uses and the data entities to which they refer are shown in the Appendix of this guide and in section 54.31 of the FDREPORT manual. These fieldnames represent entities that can be displayed, most of which can also be used as selection or exclusion criteria.

By default, FDREPORT first scans disk VTOCs to obtain dataset records. It then obtains additional information from VVDSs and Catalogs for datasets found in the VTOCs.

As an alternative, users can direct FDREPORT to:

- Extract dataset records directly from the catalog
- Extract dataset records from the catalog, then get additional information from disk VTOCs
- Extract dataset records from the catalog, then get additional information from the ABR Archive Control File
- Extract dataset records directly from the ABR Archive Control File
- Extract volume-related information
- Extract information from the DFHSM MCDS and/or BCDS control datasets
- Use dataset records already collected and accumulated in an **Extract File**

This Guide will primarily deal with the default operation, but some of the alternative sources of information will also be discussed in later sections.



The above diagram summarizes the main FDREPORT facilities. Once extracted, the data can then be sorted and formatted for several types of output:

- Printed as a normal report
- Formatted for display on screen
- Printed in IEHLIST format
- Written to an Extract File or Machine-Readable File
- Used for JCL Creation

This Guide will concentrate on the first of these types of output, but the other types will be discussed in later sections.

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1.5 Basic Selection Criteria

Basic selection criteria can be used to determine which datasets are to be included in the FDREPORT generated report. As has already been mentioned, the Appendix of this Guide and Section 54.31 of the manual show the fieldnames that can be used as selection criteria.

Some additional criteria are also available under the XSELECT control statement, as documented in section 54.13 of the manual.

As an example of using these selection criteria, if a report is required for just a single dataset, the *dataset name* would be used as the main selection criterion:

```
XSELECT DSN=ABC.MYDATA
```

To display information about a *group* of datasets that have a similar name, a Groupname parameter (DSG) could be used:

```
XSELECT DSG=PIK,VOLG=PROD
```

The statement above would display information about all datasets that have names starting with the characters 'PIK' (not necessarily as a fully qualified level), and which are on a volume with a volser starting 'PROD'.

Let's now suppose that the user wants to display information about any ICF-VSAM datasets that reside on volumes beginning with PROD, which are 1000 tracks or more in size, and which are in four or more extents.

The XSELECT control statement to locate these datasets would be as follows:

```
XSELECT DSORG=EF,VOLG=PROD,SIZE>=1000,NOEXTENT>=4
```

The next example assumes that the user is doing an SMS conversion and he wants to identify any datasets that are ineligible for SMS. He is looking for any datasets on his PROD volumes that are either not cataloged, are cataloged but to the wrong volume, or which are unmoveable:

```
XSELECT CATALOG=NO,VOLG=PROD      (Uncataloged Datasets)
XSELECT CATALOG=ERR,VOLG=PROD      (Datasets cataloged to wrong volumes)
XSELECT DSORG=(U),VOLG=PROD        (Unmoveable Datasets)
```

FDREPORT also accepts XEXCLUDE statements. Suppose it has been decided that the volume PRODTS is not going to be converted to SMS. Taking the previous example, the user would alter the report so that it *excludes* datasets from PRODTS:

```
XEXCLUDE VOL=PRODTS
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
```

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1.6 Extended Selection and SMS Information

So far, we have only shown some very basic selection with the XSELECT parameter. However, as described in section 54.13 of the FDREPORT manual, this parameter can also be used to do significantly more complex selection, providing extra facilities in three main areas.

Firstly, in combination with the XDSN operand, XSELECT allows users to select on dataset names by using very powerful 'wild character' and 'wild level' filtering. From something as basic as the following to select all files beginning with 'TAB':

```
XSELECT XDSN=TAB**
```

to more complex filtering, where datasets are being selected if they have a three-character first level qualifier beginning 'T', and the characters 'YM' in any position in any other qualifier:

```
XSELECT XDSN=T//.**YM**
```

Also included in the XSELECT parameter is the ability to select by a specific or masked DASD unit address, or generic or esoteric unit names. Expanding the above example, a user could report on the same filtered dataset name, but only on certain volumes:

```
XSELECT XDSN=T//.**YM**,UNIT=140      Specific Unit Address
or
XSELECT XDSN=T//.**YM**,UNIT=14*      Masked Unit Address
or
XSELECT XDSN=T//.**YM**,UNIT=3390     Generic Unitname
or
XSELECT XDSN=T//.**YM**,UNIT=SYSDA    Esoteric Unitname
```

The second type of extended selection in XSELECT is the ability to use logical operators such as 'GT' (greater than), 'LT' (less than), and 'NE' (not equal), rather than just 'equals'. The full set of available operators is given in section 54.13 of the FDREPORT manual, which also confirms which of the logical operators apply to each of the fieldnames. Users should note that this includes DSN, DSG, XDSN, VOL, VOLG, STORGRP and UNIT parameters.

Extending the previous example further, a user could use logical operators to narrow the selection by selecting just those datasets that are between 100 and 200 tracks in size:

```
XSELECT XDSN=T//.**YM**,SIZE.GE.100,SIZE.LE.200
```

Alternatively, taking the 'ineligible SMS datasets' example from earlier, a 'Not Equal' test (expressed as '.NE.' or '≠') can be used to select ineligible datasets, including Non-ICF VSAM:

```
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
XSELECT DSORG=(AM),DSORG≠(EF),VOLG=PROD
```

The third and final set of extra facilities is related to SMS. XSELECT can use SMS CLASS names and STORAGE GROUP names as selection criteria. Having used FDREPORT to isolate datasets that are ineligible for conversion to SMS, users can then use FDREPORT to confirm that the remaining datasets were correctly converted. Any of the SMS class names stored in a datasets VVDS entry can be used as a selection criterion.

For example, to report on all datasets that now have an SMS Management Class of 'LATEMIG' and which reside on volumes in Storage Group 'DBPROD':

```
XSELECT STORGRP=DBPROD,MGMTCLAS=LATEMIG
```

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1.7 Specifying Which Fields To Display

The XSELECT statement is used to determine *which datasets* will be included in the report. To specify *what information* is to be printed for those datasets, a REPORT FIELD statement is coded. This allows users to generate reports containing only the information required. Any of the fields in tables 1-7 in the Appendix can be chosen, and they will be displayed in the order listed in the FDREPORT FIELD statement. Fields can be STACKed, so that one column can contain two fields, placed one on top of the other on adjacent lines.

An earlier example showed the isolation of datasets on PROD volumes that were not eligible for SMS management. For these datasets, if the user wished to display the dataset names, the volume they are on, and the last reference date, the full example becomes:

```
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
XSELECT DSORG=(AM),DSORG=(EF),VOLG=PROD
REPORT FIELD=(DSN,VOL,LRDATE)
```

The report produced would resemble:

DATA SET NAME	VOLSER	LRDATE
-----	-----	-----
UNCAT . DATASET	PROD01	2000 . 100
UNMOVEABLE . DSET	PRODAA	2000 . 135

As another example, consider the report that selected all datasets that are on Storage Group DBPROD and have Management Class LATEMIG. Possibly the user might want to find out what Data Class they have:

```
XSELECT STORGRP=DBPROD,MGMTCLAS=LATEMIG
REPORT FIELD=(DSN,DATACLAS)
```

Or possibly some small datasets have accidentally been assigned a Data Class of 'BIGFILES', which should only apply to sequential files over 500 tracks. The user needs to find out their secondary allocation and type, their DSORG, and the type of DASD they reside on:

```
XSELECT DATACLAS=BIGFILES,SIZE<500
REPORT FIELD=(DSN,SECALLOC,SECAFLAG,DSORG,DEVTYPE)
```

The above XSELECT statement selects datasets that have the Data Class of BIGFILES, and which are less than 500 tracks in size. The report from this would be as follows:

DSN	SECAL	SECAF	DSORG	DEVTYPE
---	-----	-----	-----	-----
SMALL . TEST	4	CYL	PS	3390-2
ODD . DATA	0	TRK	PS	3390-3
MY . TEST . LIB	15	CYL	PO	3390-3

This final example of an XSELECT shows a report of datasets beginning with 'CRITICAL' that have been used in the last four days. Included in the report are the Creation Date and the Last Reference Date:

```
XSELECT XDSN=CRITICAL **,VOLG=PROD1,LRDAYS<4
REPORT FIELD=(DSN,CRDATE,LRDATE)
```

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1.8 Setting Defaults and the Print Command

FDREPORT has a large number of additional processing options, most which can be controlled by parameters coded on either a DEFAULT or PRINT control statement. These are described in the manual in sections 54.10 and 54.19 respectively. Some options are unique to the DEFAULT statement only.

If no parameters are coded, many will assume a default value which has been defined in the FDREPORT Global Options table, or which has been hard-coded into FDREPORT itself.

Some of the available options are:

BYTEFORMAT to express dataset size in Bytes, Kb or Mb.
DATEFORMAT to specify the format of printed dates.
LINECNT to control the number of lines per page.
PAGEWIDTH to control the number of characters per line.
DATATYPE to set the source of input data (see section 2.1 later).
RPTYPE to request the type of report output required (see section 2.4 later).

Users should note that while the DEFAULT statement is optional (and is usually one of the first control statements coded), the PRINT statement is mandatory. PRINT causes the actual data collection and report generation to proceed as controlled by all preceding control statements. For this reason, PRINT is usually the last control statement coded.

So, to continue building our 'ineligible SMS datasets' report example, let's assume that the user wants to print 50 lines per page, left-align the title, but not print a timestamp on the report:

```
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
XSELECT DSORG=(AM),DSORG=(EF),VOLG=PROD
REPORT FIELD=(DSN,VOL,LRDATE)
PRINT LINECNT=50,TITLE=LEFT,TIMESTAMP=NO
```

1.9 Sorting The Listing

We've already seen how the XSELECT and REPORT FIELD control statements are the ones that control most of FDREPORT's processing. However, some additional statements are required to add some extra features and to fully customize the report output.

The SORT control statement is probably the most useful of these, allowing the report output to be sorted in whichever order is required.

Taking the example report from the end of section 1.7, let's suppose that the user now wishes to ensure that the most recently referenced datasets are listed first. This is done by asking for the report to be sorted in descending order (SEQUENCE=D) of the LRDATE:

```
XSELECT XDSN=CRITICAL**,VOLG=PROD1,LRDAYS<4
REPORT FIELD=(DSN,CRDATE,LRDATE)
SORT FIELD=LRDATE,SEQUENCE=D
PRINT
```

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Taking another earlier example, this time the 'datasets ineligible for SMS' report, the following alteration will sort the report into dataset name order:

```
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
XSELECT DSORG=(AM),DSORG=(EF),VOLG=PROD
REPORT FIELD=(DSN,VOL,LRDATE)
SORT FIELD=DSN,SEQUENCE=A
PRINT
```

This could produce:

DATA SET NAME	VOLSER	LRDATE
EXISTING.UNCAT.DATA	PRODXX	2000.123
RECENT.WRONG.CAT.DS	PRODCI	2000.142
UNMOVEABLE.FILE	PRODTS	2000.134
VERY.OLD.DATASET	PRODOL	1998.100

The SORT control statement has another parameter (BREAK=) with which a user can request the insertion of **Control Breaks**. This parameter also specifies what action occurs at the control break, such as a page eject, a one line space or the printing of summary subtotals. The control break occurs whenever the data in the corresponding SORT FIELD changes.

As an example, suppose a user wishes to list all datasets on a particular volume, sorted by DSORG and dataset name, with control breaks inserted to separate the different DSORGs. In this case the control break just consists of one blank line, as controlled by the BREAK=(SP) parameter:

```
XSELECT VOL=IDPV50
REPORT FIELDS=(DSORG,DSN,SIZE)
SORT FIELDS=(DSORG),SEQUENCE=(A),BREAK=(SP)
PRINT
```

This could produce:

DSORG	DSN	SIZE
EF	VSAM.DATASET1	100
EF	VSAM.DATASET2	200
IS	PROD.PAYROLL.G001	20
IS	PROD.PAYROLL.G006	30
IS	ALPHA.PARTS.LIST	15
IS	ZERO.INVOICE.REPL	60
PO	MY.DATASET.CNTL1	20
PO	MY.DATASET.LOAD	30
PO	OTHER.PO.DATASET	60
PS	DATA.FILE.REAL1	20
PS	OLD.SMALL.FILE	15
PS	BIG.SEQ.FILE	90
PS	OTHER.PS.FILE	10

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1.10 Summaries

FDREPORT also provides the facilities for including **summaries**. A summary consists of column totals for fields that are numeric and occurrence counts for non-numeric fields.

The SUMMARY command, which is used to state the fields that are to be summarized, defaults to printing the summary at the end of the listing. Extra summaries can also be produced as subtotals at control breaks if required. This is controlled by the BREAK parameter on the SORT command.

So, extending the previous example still further, let's alter the report so that it produces a summary on all fields printed in the report—both at control breaks and at the very end of the report. The 'BREAK=(SSP)' parameter on the SORT statement indicates that control breaks are to consist of one blank line and sub-totals. The SUMMARY statement defines which fields are to be summarized each time, and also creates a summary at the end of the report:

```
XSELECT VOL=IDPV50
REPORT FIELDS=(DSORG,DSN,SIZE)
SORT FIELDS=(DSORG),SEQUENCE=(A),BREAK=(SSP)
SUMMARY FIELD=(DSORG,DSN,SIZE)
PRINT
```

The report on this occasion would look like the following example. Notice how the DSORG and DSN fields are summarized by occurrence, while the SIZE field is summarized as a total:

DSORG	DSN	SIZE
EF	VSAM.DATASET1	100
EF	VSAM.DATASET2	200
SUBTOTAL -- DSORG--EF		
DSN-----2	SIZE-----300	
IS	PROD.PAYROLL.G001	20
IS	PROD.PAYROLL.G006	30
IS	ALPHA.PARTS.LIST	15
IS	ZERO.INVOICE.REPL	60
SUBTOTAL -- DSORG--IS		
DSN-----4	SIZE-----125	
PO	MY.DATASET.CNTL1	20
PO	MY.DATASET.LOAD	30
PO	OTHER.PO.DATASET	60
SUBTOTAL -- DSORG--PO		
DSN-----3	SIZE-----110	
PS	DATA.FILE REAL1	20
PS	OLD.SMALL.FILE	15
PS	BIG.SEQ.FILE	90
PS	OTHER.PS.FILE	10
SUBTOTAL -- DSORG--PS		
DSN-----4	SIZE-----135	
FINAL TOTALS		
VALUE SUMMARY OF DSORG --- TOTAL NUMBER OF VALUES ----4		
DSORG --- EF (2) IS (4) PO (3) PS (4)		
DSN-----13	SIZE-----670	

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Another useful application of SORT and SUMMARY is summarizing reports according to the prefix (or other index levels) of the dataset name. This works by a combined use of the INDEX parameter on the SORT/SUMMARY command and the INDEXNUM parameter on the PRINT or DEFAULT statement.

For example, to list some datasets and then summarize by high level prefix:

```
XSELECT VOL=IDPV50
REPORT FIELDS=(DSN,SIZE)
SORT FIELDS=(INDEX),SEQUENCE=(A),BREAK=(SSP)
SUMMARY FIELD=(INDEX,SIZE)
PRINT INDEXNUM=1
```

Alternatively, to run the same report but summarize by the third level index:

```
XSELECT VOL=IDPV50
REPORT FIELDS=(DSN,SIZE)
SORT FIELDS=(INDEX),SEQUENCE=(A),BREAK=(SSP)
SUMMARY FIELD=(INDEX,SIZE)
PRINT INDEXNUM=3
```

1.11 Adding Customized Titles to the Report

Most reports are of little use unless they contain a title. It is sometimes also necessary to provide a better explanation of some/all of the columns in the report. These things can be done with the TITLE and HEADING commands. The report layout can further be improved with the SPn parameter on the REPORT FIELD statement, which can be used to override the default spacing between individual columns.

So, taking the 'ineligible SMS datasets' example we used earlier:

```
TITLE LINE=' SMS PROJECT—SUMMARY OF INELIGIBLE DATASETS'
HEADING LINE(1)='ODD DATASET          -
                RESIDES ON   LAST USED ON'
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
XSELECT DSORG=(AM),DSORG=(EF),VOLG=PROD
REPORT FIELD=(DSN,VOL,SP6,LRDATE)
SORT FIELD=LRDATE,SEQUENCE=A
```

A title has now been added to the report and the column headings for the DSN, VOL and LRDATE fields have been altered to 'ODD DATASET', 'RESIDES ON' and 'LAST USED ON' respectively. Up to three heading lines could be used over each column. Note also the use of 'SP6' to request six spaces between the last two columns, to space it correctly under the new (longer) customized heading.

The resulting report is now much clearer and its meaning more apparent:

SMS PROJECT - SUMMARY OF INELIGIBLE DATASETS		
ODD DATASET	RESIDES ON	LAST USED ON
-----	-----	-----
VERY.OLD.DATASET	PRODOL	1998.100
UNMOVEABLE.DSET	PRODTS	2000.101
EXISTING.UNCAT.DATA	PRODXX	2000.123
RECENT.WRONGCAT.DS	PRODCI	2000.142

FDREPORT FUNDAMENTALS

1.12 Running The Supplied “Health Check” Reports

When the FDREPORT program library is installed from the product tape, it is also accompanied by another PDS, called the JCL library, which contains a copy of each example job in the product manual.

In addition to the members containing these JCL examples, there are also some members in the library called HCHECKx, where ‘x’ is a number from 0-8. These contain some additional FDREPORT examples. Their purpose is two-fold:

To provide real-life examples of the facilities available within FDREPORT

As well as the standard features, like Selection, Sorting and Summarizing, the HCHECKx members also make extensive use of some of the more advanced FDREPORT features that we will be discussing in PART TWO of this Guide.

You’ll see examples of various ‘DATATYPE=’ settings, as discussed in section 2.1 and you’ll also see the extensive utilization of the combination of RPTYPE=DATA and DATATYPE=EXTRACT to create and use Extract files, as discussed in section 2.5.

Some of the HCHECKx members also use the Punch facility that we look at in section 2.6 to create complete JCL streams.

To provide a HEALTH CHECK on your installed DASD.

All of the HCHECKx reports have been designed to look for specific problems, both at the dataset level and the volume level. See the tables on the next page for a list of the type of problems that are reported.

The HCHECKx reports have been created so that they can be run with a minimum of change—they usually only require the addition of an appropriate job card.

All of the reports default to reporting against all ONLINE DASD volumes. However, because they are constructed using standard FDREPORT control statements and JCL, they can easily be tailored to provide more specific or targeted reporting, if required.

When run as a complete suite, the HCHECKx reports really can give your installed DASD System a complete and very thorough Health Check!



PART ONE

FDREPORT FUNDAMENTALS

The following lists give you an idea of the types of reports produced by the HCHECKx jobs. See section 54.02 in the FDREPORT manual for complete information on all the Health Check reports.

HCHECK0

- This initial job carries out a simple FDREPORT internal parameter check.

HCHECK1—DASD With Potential Problems:

- Disk Volumes More Than 80% Full
- IBM Fragmentation Index, Worst First
- VTOCs More Than 80% Full
- VVDS More Than 80% Full
- VVDS In Multiple Extents
- VTOCIX's More Than 80% Full
- Volume Mount & Use Status, SMS, VTOCIX Status
- VVDS's with Logical Errors
- VTOCs Logical Errors

HCHECK2—Reports For SMS Administrator

- SMS Volume status
- SMS Volumes with disabled VTOCIX's
- Dataset's SMS Attributes
- Information On PDSE Datasets
- Uncataloged Datasets On SMS Volumes
- Non-Managed Datasets On SMS Volumes
- Datasets Ineligible For SMS Management

HCHECK3—Reports For Performance Analyst

- Disks With Potential Performance Problems
- Multi-Extent VSAM Datasets
- Multi-Extent Non-VSAM Datasets
- Datasets Likely To Get Sx37 Abends
- Multi-Volume Datasets

HCHECK4—Reports For Capacity Analyst

- Disks With Potential Wasted Space
- Total Space Available, allocated and used
- Overallocation In All Datasets
- Datasets Not Referenced in 60 Days
- Datasets With Inefficient Blocksizes
- Volumes with More Than 45% Freespace
- VTOC/VVDSs with more than 45% Freespace

HCHECK5—Reports For VSAM Tuning Analyst

- Space Occupied By Largest VSAM Files
- Busiest VSAM Files (by EXCP Sort)
- Multi-Volume VSAM Files
- Clusters With High Inserts
- Multi-Extent Clusters
- Clusters with high CI/CA splits
- Clusters With 3 Or More Index Levels
- Overallocated Clusters

HCHECK6—Reports On PDS Efficiency

- Basic Stats On PDS Datasets
- Multi-Extent PDS Datasets
- PDS's With Limited Freespace
- PDS's With Limited Free Directory Blocks
- PDS's With Excess Free Space
- Basic Stats On PDSE Datasets
- Space Reclaimable By PDS Compression

HCHECK7—Datasets That Offend Standards

- Uncataloged Datasets
- Wrongly Cataloged Datasets
- Datasets With Undefined DSORG
- Empty PS, PO, VSAM Datasets
- Unmoveable Datasets
- Datasets existing as only a catalog entry

HCHECK8—Project Or Dasd Mgmt Reports

- Summary Of Dataset Types
- Space Occupied By An Application
- Space Occupied By SYS1 & SYS2 Datasets
- Space Summarized By Index
- DASD Utilization By Esoteric Unit Name
- DASD Utilization By SMS Storage Group
- DASD Utilization By Volser Group
- DASD Utilization By Device Type

ADVANCED FDREPORT

2.1 Accessing Other Sources Of Information

As discussed earlier, FDREPORT is capable of obtaining information from many sources, in addition to its default of initially scanning disk VTOCs. The user can determine the source of the data by coding a **DATATYPE=** parameter on either a DEFAULT or a PRINT control statement.

The DATATYPE settings that are available for selection are as follows:

DATATYPE=VTOC

This is the default, and it tells FDREPORT to initially scan the contents of VTOCs of the disks selected by either DISKx DD's, the VOL/VOLG parameters coded on XSELECT statements, or all the online volumes, if ENABLE=ONLINE has been coded on a DEFAULT or PRINT statement.

For datasets found in these VTOCs, FDREPORT will then refer to BCS catalog or VVDS, as required, to process the XSELECT, REPORT, and SORT statements.

With this selection, *all* of the report fields in Tables 1-7 in the Appendix are available and the fields from Table 4 that refer to the ABR Incremental Backup system.

DATATYPE=CATALOG

With this setting, FDREPORT will scan the system catalogs for dataset entries that match the selection criteria. Only the information which is in the *catalog entry itself* is available (principally the dataset name, the OWNER, the volume serial and the device type).

DATATYPE=CATVTOC

This option extends DATATYPE=CATALOG by making the same initial scan of the system catalogs, but then extracting additional information from the VTOCs and VVDSs.

DATATYPE=ARCHIVE

ABR users who have implemented an Archiving/Migration system, or who are using Application Backup, can run reports against the control files used in these systems by using DATATYPE=ARCHIVE.

This parameter allows the user to create reports by using the fields in Table 4 in the Appendix, as well as some fields from Tables 1 and 5 that are saved in the control files (*i.e.* the disk volser and the dataset's DSORG, BLKSIZE, LRECL, SIZE and SIZEFREE).

Note: Although ABR incorporates its own utility for reporting information about these datasets (program FDRABRP), FDREPORT has greater flexibility in selection and report layout.

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ADVANCED FDREPORT

DATATYPE=CATARCH

ABR users can use this option to select datasets via the catalog (like DATATYPE=CATALOG), but then obtain additional information on those datasets from the ABR Archive Control File.

This option can be useful for cross-checking the information held by the ABR Archiving system against the MIGRAT catalog entries for datasets which have been archived/migrated by ABR and are available for auto-recall.

DATATYPE=EXTRACT

This option allows FDREPORT to obtain its information from an Extract File which has previously been created via RPTYPE=DATA.

For more information on creating and using Extract files, see Section 2.5 later.

DATATYPE=VOLDATA

All of the previous settings of 'DATATYPE=' involve directing FDREPORT to various sources of information about *individual* datasets. DATATYPE=VOLDATA, on the other hand, allows FDREPORT to gather and report information on whole DASD Volumes.

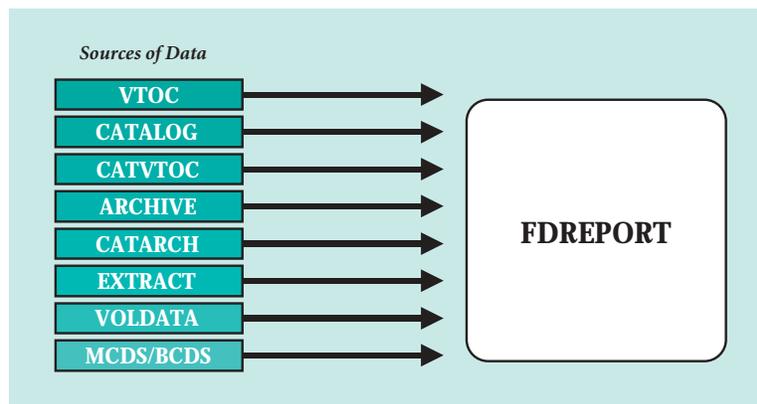
For more information on using DATATYPE=VOLDATA, see Section 2.2 later.

DATATYPE=MCDS/BCDS

Users of DFHSM can instruct FDREPORT to gather and report on information stored in the MCDS and BCDS control datasets.

This is done by coding DATATYPE=MCDS or DATATYPE=BCDS.

For more information on reporting on DFHSM control files, see Section 2.3 later.



PART TWO

ADVANCED FDREPORT

2.2 Volume Level Reporting (Datatype=Voldata)

As mentioned in the previous section, FDREPORT can produce reports for volumes as well as individual datasets. This is done with a combination of DATATYPE=VOLDATA and the 'VLxxxxxx' fields listed in Table 8 in the Appendix.

In this example, DATATYPE=VOLDATA is used to look at production volumes (VOL=PROD*), reporting on the VOLSER, Unit Address and Device Type, together with the percentage used for the VOLUME (%TU), the VTOC (%DU), the VTOCIX (%IU), and the VVDS (%VU):

```
TITLE          LINE='PRODUCTION VOLUME USAGE'
XSELECT       VOL=PROD*
SORT          FIELD=(VLVOLSER)
REPORT        FIELD=(VLVOLSER,VLUNIT,VLDEVTYP,VL%UTRKS,
                   VL%UDSCB,VL%UINDX,VL%UVVDS)
PRINT        DATATYPE=VOLDATA
```

PRODUCTION VOLUME USAGE						
VOLSER	UAD	DEVTYPE	%TU	%DU	%IU	%VU
-----	---	-----	---	---	---	---
PROD07	143	3390	37	42	12	45
PROD12	148	3390	76	17	6	15
PROD18	14F	3390	66	35	23	78

In this next example, we are reporting on the MOUNT, the USAGE and the SMS volume STATUS of every online volume:

```
TITLE          LINE='VOLUME STATUS REPORT'
REPORT        FIELD=(VLVOLSER,VLUNIT,VLDEVTYP,VLUUSEATR,
                   VLMOUSTA,VLSTAT,VLMSVST)
PRINT        ENABLE=ONLINE,DATATYPE=VOLDATA
```

VOLUME STATUS REPORT						
VOLSER	UADR	DEVTYPE	USEATTR	MOUNT	SMSSTATUS	VOLUME STATUS
-----	-----	-----	-----	-----	-----	-----
TSO123	0252	3390	STORAGE	RESIDENT	NONE	NONE
DBLRG1	3175	3390	PRIVATE	RESIDENT	MANAGED	ENABLED
DBLRG3	3176	3390	PRIVATE	RESIDENT	MANAGED	ENABLED

In this final example, we look at volumes with disabled VTOC Indexes (VLINDSTA=YES):

```
TITLE          LINE='DISABLED VTOC INDEXES'
XSELECT       VLINDSTA=YES
REPORT        FIELD=(VLVOLSER,VLINDSTA)
PRINT        ENABLE=ONLINE,DATATYPE=VOLDATA
```

DISABLED VTOC INDEXES	
VOLSER	VTOCIX
-----	-----
TSO134	YES
MVS002	YES
DB2RES	YES

ADVANCED FDREPORT

2.3 Reporting on the DFHSM control files (Datatype=MCDS/BCDS)

As mentioned earlier, users of DFHSM can also use FDREPORT to report on information stored in the DFHSM control datasets—the MCDS and the BCDS. This is done using the DATATYPE=MCDS or DATATYPE=BCDS parameters, together with the fields listed in Tables 9 and 10 in the Appendix.

In this first example, we are using DATATYPE=MCDS to instruct FDREPORT to report on DFHSM migrated datasets, as recorded in the MCDS (Table 9).

Information such as the date and time that the dataset was migrated by HSM is included in the report, together with details of the original dataset's DSORG and allocation. Only datasets beginning with 'USER1' will be included in the report. The MCDS, which has been named on the MCDSCLUSTER parameter, will be dynamically allocated:

```
TITLE          LINE='HSM MIGRATED DATASETS'  
DEFAULT       MCDSCLUSTER=HSM.MCDS  
XSELECT      XDSN=USER1**  
REPORT       FIELD=(DSN,VOL,DSORG,SIZE,SIZEFREE,ADATE,ATIME,ADAYS)  
PRINT        DATATYPE=MCDS
```

HSM MIGRATED DATASETS							
DATASET NAME	VOLSER	ORG	ALLOC	FREE	ADATE	ATIME	ADAYS
-----	-----	---	-----	-----	-----	-----	-----
USER1.TEST.ESDS	SMS802	EF	1	0	1999.116	11.54.49	1055
USER1.OTHER	SMS001	PS	100	95	1999.101	13.02.45	1070

And in the next example, we are using DATATYPE=BCDS to instruct FDREPORT to report on datasets backed up by DFHSM, as recorded in the BCDS (Table 10).

Information such as the date and time that the dataset was backed up by HSM is included in the report, together with details of the original dataset's DSORG and allocation and the volume on which it resided when it was backed up. Again, only datasets beginning with 'USER1' will be included in the report.

The BCDS has been named on the BCDSDD card within the JCL:

```
//BCSDSDD      DD  DISP=SHR, DSN=HSM BCDS  
//SYSIN       DD  *  
TITLE        LINE=' HSM BACKUP OF DATASETS'  
XSELECT      XDSN=USER1**  
REPORT       FIELD=(DSN, VOL, DSORG, SI ZE, ADATE, ATI ME, ADAYS)  
PRINT        DATATYPE=BCDS
```

HSM BACKUP OF DATASETS						
DATASET NAME	VOLSER	ORG	ALLOC	ADATE	ATIME	ADAYS
-----	-----	---	-----	-----	-----	-----
USER1.FILE1	SMS800	PS	5	2000.048	20.15.35	16
USER1.ANOTHER	SMS010	EF	4	2000.044	18.23.55	20

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ADVANCED FDREPORT

2.4 Other Forms Of Output

As well as a traditional printed report, FDREPORT also allows for other forms of output to be created. This is controlled with the **RPTYPE=** parameter on either a **DEFAULT** or a **PRINT** command. The RPTYPE settings that are available for selection are as follows:

RPTYPE=GENERATE

This is the default (and hence rarely coded). It causes FDREPORT to generate the report as specified by the **REPORT FIELDS** and other formatting statements.

RPTYPE=NONE

RPTYPE=NONE causes the detail report to be suppressed. Only the summaries are printed.

RPTYPE=OSVTOC

With this option, the detail report of the selected datasets is printed showing the same information as shown on **IEHLIST LISTVTOC** (although the layout is different).

RPTYPE=TABLE

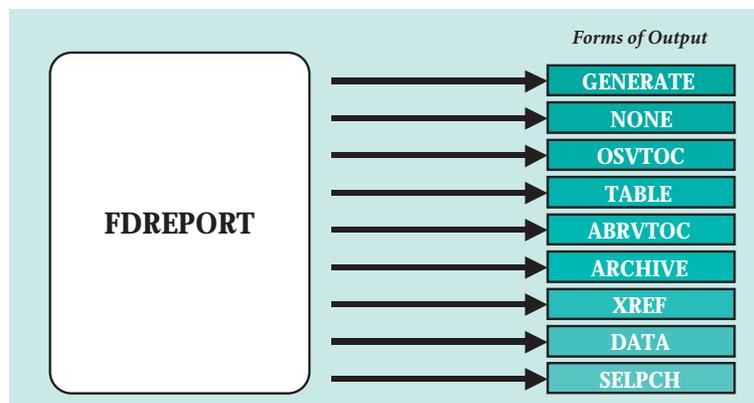
This generates a report that is designed to be written to a dataset and later read by some other text-processing program. The **XSELECT** and **REPORT FIELD** statements are still honored, but the report is written without page titles and column headings and with just a single space between columns.

RPTYPE=ABRVTOC

This produces a report in the same format as the **PRINT VTOC** command of the **FDRABRP** program (one of the reporting utilities of **ABR**). **XSELECT** statements are honored but **REPORT FIELDS** and other formatting statements are ignored.

RPTYPE=ARCHIVE

This option is intended for use when **DATATYPE=ARCHIVE** is also specified, and results in the report being generated in the same format as the **PRINT ARCHIVE** command of **FDRABRP**. As above, **XSELECT** statements are honored but **REPORT FIELDS** and other formatting statements are ignored.



ADVANCED FDREPORT

RPTYPE=XREF

RPTYPE=XREF causes FDREPORT to print the report in the same format as the PRINT BACKUP,XREF command of FDRABRP. Again, XSELECT statements are honored but REPORT FIELDS and other formatting statements are ignored. Users may refer to the FDR User Manual (section 53) for examples of the FDRABRP report layouts.

RPTYPE=DATA

This is similar to RPTYPE=NONE in that no actual report is produced. However, FDREPORT creates an EXTRACT FILE containing the dataset records of all datasets selected in this execution. The extract file is written to SYSUT2 in an internal Innovation format.

See section 2.5 for more information on creating and using Extract Files.

RPTYPE=SELPCH

This is also similar to RPTYPE=NONE and RPTYPE=DATA in that no actual report is produced. However, with this option, you can write (or *punch*, as it is known) information on each dataset selected within the report. This information can then be combined with additional pieces of free format text.

See section 2.6 for more information on creating and using Punch Output.

2.5 Using Extract Files To Generate Multiple Reports

So far, this Guide has only shown examples of creating one report per execution of FDREPORT. Several reports can, however, be printed each time. This is achieved by coding additional sets of PRINT and other control statements.

The following example prints a 'disaster recovery' report and then an 'ineligible SMS datasets' report, in one execution of FDREPORT. Notice the presence of the CANCEL command between the two reports. This cancels all of the previous FDREPORT statements:

```
TITLE LINE=' DISASTER RECOVERY PROJECT - RECENTLY USED DATASETS'  
HEADING LINE(1)='DATASET NAME  CREATION DATE  WHEN USED LAST'  
XSELECT XDSN=CRITICAL**,VOLG=PROD1,LRDAYS<4  
REPORT FIELD=(DSN,CRDATE,LRDATE)  
SORT FIELD=LRDATE,SEQUENCE=D  
PRINT  
CANCEL  
TITLE LINE=' SMS PROJECT - SUMMARY OF INELIGIBLE DATASETS'  
HEADING LINE(1)='ODD DATASET  
RESIDES ON  LAST USED ON'  
HEADING LINE(2)='_____  
XSELECT CATALOG=NO,VOLG=PROD  
XSELECT CATALOG=ERR,VOLG=PROD  
XSELECT DSORG=(U),VOLG=PROD  
XSELECT DSORG=(AM),DSORG=(EF),VOLG=PROD  
REPORT FIELD=(DSN,VOL,SP6,LRDATE)  
SORT FIELD=CRDATE,SEQUENCE=A  
PRINT LINECNT=50,SUM=INDEX,TITLE=LEFT,TIMESTAMP=NO
```

When running several reports that use the same source of information and which select the same datasets, it is better to reduce the overheads by creating and using an **Extract File**.

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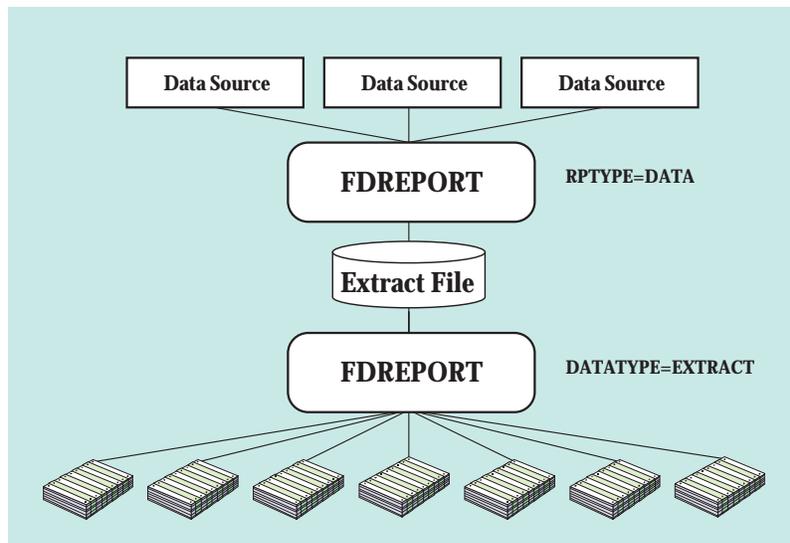
ADVANCED FDREPORT

Let's suppose that an SMS administrator wishes to isolate some critical uncataloged datasets from volumes beginning PROD1. He wants to list them by dataset name, showing the volume they reside on and sorting them by dataset name. However, he also then wants to list them *again*, but this time showing the dataset organization and sorted by creation date:

```
XSELECT XDSN=CRITICAL**,VOLG=PROD1,CATALOG=NO
PRINT RPTYPE=DATA                    <--- to create the Extract File

REPORT FIELD=(DSN,VOL)
SORT FIELD=DSN,SEQUENCE=A
PRINT DATATYPE=EXTRACT              <--- to use the Extract File

REPORT FIELD=(DSN,DSORG,CRDATE)
SORT FIELD=CRDATE,SEQUENCE=A
PRINT DATATYPE=EXTRACT              <--- to use the Extract File again
```



2.6 Punch Output

Another extremely useful feature in FDREPORT is the ability to create card images as output, instead of a printed report. These card images can contain a mixture of fixed text and data extracted from report fields. There are numerous potential uses for this, including the generation of simple control statements for later processing by other utilities, or the creation of complete JCL streams.

In this next example, a user wants to catalog all of his currently non-cataloged datasets. He will run FDREPORT to find these uncataloged datasets (using CATALOG=NO) and then, instead of producing a report, he will use the Punch feature to automatically generate the IDCAMS 'DEFINE NONVSAM' control statements required to catalog them. In his FDREPORT JCL, he will code a SYSPUNCH to point to a Punch dataset where the card images will be written:

```
//SYSPUNCH DD DSN=punch. output, DI SP=(,CATLG),
//          SPACE=(TRK,(5)), UNIT=SYSALLDA
```

His control statements would then be as follows...

RPTYPE=SELPCH instructs FDREPORT to create Punch output instead of a normal report:

```
XSELECT CATALOG=NO,VOLG=DEV
REPORT FIELD=(DSN,VOL,DEVTYPE)
PRINT RPTYPE=SELPCH
```

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ADVANCED FDREPORT

By default, card images for datasets selected would be written to SYSPUNCH in the format:

```
SELECT DSN=datasetname,VOL=volser
```

These statements could be used by ABR. However, the format can be altered using a **Punch Mask**. Below we see a Punch Mask being used to create the DEF NVSAM statements our user requires to catalog his non-cataloged datasets:

```
DEF NVSAM (NAME(<DSN>),DEVICETYPE(<DEVTYPE>),VOLUMES(<VOL>))
```

When the card images are written to SYSPUNCH, the values between the chevrons ('<' and '>') will be substituted with the FDREPORT supplied data. If, for example, one of the uncataloged datasets was called 'UNCAT.DSET' and it resided on volume SCR999 (which is a 3390), then the following card image would be written to the Punch dataset:

```
DEF NVSAM (NAME(UNCAT.DSET),DEVICETYPE(3390),VOLUMES(SCR999))
```

Several hundred of the above control statements may have been created. These statements can then be used as SYSIN to an IDCAMS job to actually perform the cataloging operation.

Punch Mask definitions can be stored as members in a PDS. To use a Punch Mask, the user simply has to code an FDRLIB DD in the JCL to point to the PDS and a PUNCH MASK statement in the FDREPORT control statements to select the actual Punch Mask member:

```
//SYSPUNCH DD DSN=punch.output,DISP=(,CATLG),SPACE=(TRK,(5)),UNIT=SYSALLDA
//FDRLIB DD DSN=punch.masks.file,DISP=SHR
//SYSIN DD *
XSELECT CATALOG=NO,VOLG=DEV
REPORT FILED=(DSN,VOL,DEVTYPE)
PUNCH MASK=MASK1,ECHO
PRINT RPTYPE=SELPCH
```

In our next example a user wants to create the IDCAMS JCL to delete some old VSAM files:

```
//IDCDEL EXEC PGM=FDREPORT,REGION=OM
//SYSPRINT DD SYSOUT=*
//SYSPUNCH DD SYSOUT=(A,INTRDR)
//FDRLIB DD DSN=USER1.FDREPORT,DISP=SHR
//SYSIN DD *
XSELECT XDSN=OLDFILES.**
PUNCH MASK=IDCDEL,ECHO
PRINT DATATYPE=CATALOG,RPTYPE=SELPCH
```

The IDCDEL member in the USER1.FDREPORT library would contain the following statements which would produce one occurrence of the lines between the ')PREFIX' and ')ENDPREFIX' commands and then one 'DELETE PURGE' line for each selected dataset, thus creating a single IDCAMS job to do all the deletes.

```
)PREFIX
//DELETE JOB (ACCT),CLASS=M,MSGCLASS=X
//DELETE EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
)ENDPREFIX
DELETE <NAME> PURGE
```

ADVANCED FDREPORT

2.7 Using Pre-Defined Reports

Another advanced function of FDREPORT is the ability to allow users to generate comprehensive reports by specifying only one control statement. This is done using the 'EXECUTE' statement, which causes FDREPORT to execute a set of control statements that have previously been created and then stored in a PDS member.

This facility allows DASD Administrators, for example, to set up a wide range of different report definitions that can then be run by end-users, without requiring them to have any special training in FDREPORT.

The EXECUTE statement has only two parameters:

EXECUTE REPORT=reportname,FDRLIB=libraryddname

The '*reportname*' is the name of a member within a library, which is named on a DD statement pointed to by FDRLIB=libraryname (defaults to FDRLIB). The member can contain any FDREPORT control statements.

As an example, an SMS administrator could easily obtain a report of datasets that are ineligible for SMS conversion, sorted by dataset name, simply by specifying:

EXECUTE REPORT=NOTSMS

The NOTSMS member in the library pointed to by the FDRLIB DD would contain all the FDREPORT statements required to locate the ineligible datasets and print the sorted list:

```
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
REPORT FIELD=(DSN,VOL,LRDATE)
SORT FIELD=DSN,SEQUENCE=A
PRINT
```

The EXECUTE statement can be preceded by XSELECT statements, allowing for the flexible selection of datasets, but in a fixed and pre-determined report format:

```
XSELECT CATALOG=NO,VOLG=PROD
XSELECT CATALOG=ERR,VOLG=PROD
XSELECT DSORG=(U),VOLG=PROD
EXECUTE REPORT=NOTSMS
```

In this case, the NOTSMS member would only contain:

```
REPORT FIELD=(DSN,VOL,LRDATE)
SORT FIELD=DSN,SEQUENCE=A
PRINT
```

As well as simplifying FDREPORT control statements and JCL, this facility can also be used to run reports in TSO foreground. A set of ISPF panels is supplied with ABR and it includes a reporting option (panel A.1). Option 6 on the reporting panel permits a TSO user to enter the name of a 'canned' report, much like the REPORT= parameter in the examples above. The FDRLIB library defaults to an installation determined library name, and FDREPORT output is displayed on the screen.

Any dataset name or groupname parameters, and any volume or volume group parameters that are specified in other fields on the reporting panel are used as additional XSELECT statements to the FDREPORT execution.

PART THREE

FDREPORT/SRS PANELS

3.1 Introduction To S.R.S.

In section 2.7 we mentioned the basic ISPF panels that allow end-users to run ‘canned’ reports. We are now going to take a look at a much more powerful and flexible way of running FDREPORT in TSO foreground—the **Search, Reporting and Services** dialog, or **SRS** for short.

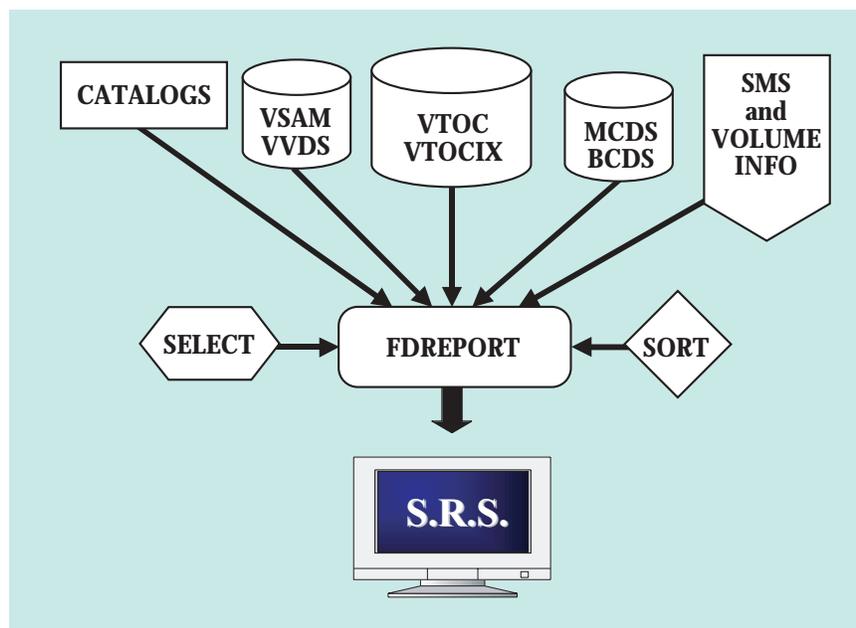
The SRS panels permit a ‘menu-driven’ execution of FDREPORT, and enable the end-user to exploit the same wide range of selection criteria as a batch-driven FDREPORT. Data can be extracted from the same sources and the user has the same control over the layout of the report, the data that is displayed, and the sort order.

A report containing the selected datasets and the desired information is immediately presented to the user as a Dataset List panel (rather than being printed, as in the case with a standard batch-driven report). The Dataset List panel contains a command field, allowing TSO commands such as EDIT or BROWSE, Clists, or ABR backup/restore commands to be entered and executed.

The SRS user can save his selection criteria and re-use them later. The Dataset List can also be saved and re-displayed, as well as being printed.

As an alternative to obtaining dataset information, SRS can also use the volume-related criteria that we looked at in section 2.2 (DATATYPE=VOLDATA) to display information in a Volume List. Again, the user can determine the information that is to be displayed in the list, together with the eventual layout of the list and the order of entries contained within it.

It is not possible in a document such as this to present SRS in any great detail, or to show many samples of the panels that can be used. However, although a comprehensive description can be found in sections 54.50 to 54.60 of the product manual, we will now attempt to give you a brief introduction to its power and flexibility.



PART THREE

FDREPORT/SRS PANELS

3.2 Dataset Reporting

Producing a dataset report with SRS begins at the **SRS Dataset Selection Panel**. This is a multi-screen menu that has the dataset name and the other FDREPORT selection field names (from tables 1-7 in the Appendix) in the form of prompts in the left-hand column:

```
----- S R S DATASET SELECTION -----
COMMAND ==>                                SCROLL ==> PAGE
FIELD                SELECTION VALUE      REPORT    SORT
-----
SOURCE/FIELDS
DSNAME               ==> _____
VOL                  ==> _____
SOURCE               ==> CATALOG (Catalog Volume Arc..)
CATALOGN             ==> _____
ARCDSN               ==> _____
VTOC FIELDS
DEFAULTS             ==> _____
UNIT                 ==> _____
DEVTYPE              ==> _____
VOLSQ                ==> _____
DATES                 ==> _____
CRDATE               ==> _____
```

To use a particular selection criterion, the user just enters the desired value against the appropriate prompt under the SELECTION VALUE heading. This includes the use of a full or masked dataset name. For example, on the panel below the user selects all those datasets that have a name beginning RTS and that reside on 3390-3 DASD.

The SOURCE field allows the user to state the source of the data, equivalent to the DATATYPE parameter. Available settings are CATALOG (CATVTOC), VOLUME (VTOC), EXTRACT (EXTRACT), and ARCHIVE (ARCHIVE). In the last two cases, the user can name the Extract File or ABR Archive Control File he wishes to report from. This has an added advantage in that users can also report from a named ABR Application Control File.

As in batch FDREPORT, the SRS user can specify the information that is to be displayed and the order in which it is to be sorted. This is achieved by entering a report position in the REPORT field and a sort parameter in the SORT field. In the panel below, the report will contain the dsname, creation date and volser (with the columns in that order) and the report will be sorted by creation date in ascending order (oldest-to-newest).

```
----- S R S DATASET SELECTION -----
COMMAND ==>                                SCROLL ==> PAGE
FIELD                SELECTION VALUE      REPORT    SORT
-----
SOURCE/FIELDS
DSNAME               ==> RTS**                1
VOL                  ==> 3
SOURCE               ==> CATALOG (Catalog Volume Arc..)
CATALOGN             ==> _____
ARCDSN               ==> _____
VTOC FIELDS
DEFAULTS             ==> _____
UNIT                 ==> _____
DEVTYPE              ==> 3390-3
VOLSQ                ==> _____
DATES                 ==> _____
CRDATE               ==> _____                2                1A
```

PART THREE

FDREPORT/SRS PANELS

The result of the selections in the previous panel would then be displayed on the user's screen in the **SRS Dataset List Panel**. Note that the selected fields of Dsname, Crdate and Volser are being displayed and the entries are sorted by ascending Crdate, as requested.

```
----- S R S DATASET SELECTION -----
COMMAND ==>                                SCROLL ==> PAGE
COMMAND      DATASET NAME                CRDATE      VOLSER
-----
RTSAL.FDREPORT.CNTL    1998.036     MVS001
RTS.JOB.CNTL           1998.234     TSO004
RTS.OLD.FILE           1999.010     DEV020
RTS.VSAM.FIL           1999.156     MIGRAT
RTS.DUMP.DSN           1999.254     DEV017
RTS1.OTHER.FILE       1999.315     TSO010
RTS.PDS                2000.003     DEV012
RTS.PDSE.DSN           2000.121     MIGRAT
```

On the far left-hand side of the panel, you will see that there is a COMMAND field, just like a normal ISPF display. This command field can be used to invoke a variety of functions for one or more of the datasets that are being displayed on the dataset list.

These commands include:

- SRS services, such as 'I' (Info), 'M' (Member List).
- FDR/ABR services, such as REORG, RECALL, COPY
- Normal ISPF functions, like Edit and Browse.
- TSO commands, including DELETE, LISTDS, LISTCAT and RENAME
- CLISTs and REXX execs.

These commands can all be used in the left-hand 'command' column:

```
----- S R S DATASET SELECTION -----
COMMAND ==>                                SCROLL ==> PAGE
COMMAND      DATASET NAME                CRDATE      VOLSER
-----
DELETE       RTSAL.FDREPORT.CNTL    1998.036     MVS001
RECALL       RTS.JOB.CNTL           1998.234     MIGRAT
I            RTS.OLD.FILE           1999.010     DEV020
REORG        RTS.VSAM.FIL           1999.156     MVS023
BACKUP       RTS.DUMP.DSN           1999.254     DEV017
EDIT         RTS1.OTHER.FILE       1999.315     TSO010
LISTCAT      RTS.OTHER.VSAM        2000.003     DEV012
RECALL       RTS.PDSE.DSN           2000.121     MIGRAT
```

PART THREE

FDREPORT/SRS PANELS

3.3 Volume Reporting

The other category of information available via SRS is volume data, and is equivalent to a DATATYPE=VOLDATA report in a batch execution of FDREPORT.

To create volume data reports under SRS, the user goes to the **SRS Volume Selection Panel**, which is a multi-screen menu containing *volser* and other volume selection field names (from Table 8 in the Appendix).

As before, the user can insert selection criteria and report layout and sorting parameters in the various Volume Selection panel fields. The following example reports on all volumes in SMS storage group GENERAL that have a volser starting PROD. The report will show the disk volser, the percentage of free space on the volume and the percentage of free space within the VTOC. The report will be sorted so that volumes with most freespace appear first.

```
----- S R S DATASET SELECTION -----
COMMAND ==>                                SCROLL ==> PAGE
FIELD          SELECTION VALUE          REPORT    SORT
-----
VLVOLSER       ==>  PROD*                1        _____
VLUNIT         ==>  _____                _____  _____
VLDEV TYP      ==>  _____                _____  _____
STORGRP        ==>  GENERAL                _____  _____

VL%FTRKS       ==>  _____                2        1D
VL%UTRKS       ==>  _____                _____  _____
VL%FDSCB       ==>  _____                3        _____
VL%UDSCB       ==>  _____                _____  _____
VL%FINDX       ==>  _____                _____  _____
VL%UINDX       ==>  _____                _____  _____
VLBYTRK        ==>  _____                _____  _____
VLALOTRK       ==>  _____                _____  _____
```

The resulting report will look like the one below. Clearly, the three volumes at the top of the report are very under-allocated and represent a potential waste of disk space. Another volume (PROD21) is only about half-full, but it has very limited free space remaining in the VTOC. It will soon be impossible to allocate new datasets on this volume, even though there are ample free tracks.

```
----- S R S DATASET SELECTION -----
COMMAND ==>                                SCROLL ==> PAGE
COMMAND        VOLSER          %FTRKS    %FDSCB
-----
                PROD42          95         80
                PROD83          91         67
                PROD03          89         54
                PROD82          56         36
                PROD21          46         03
                PROD45          31         25
                PROD03          25         76
                PROD05          20         11
```

SUMMARY

The FDREPORT product enables a huge range of DASD Management reports to be generated, for use by:

- *End Users*
- *DASD Administrators*
- *Disaster Recovery Planners*
- *Capacity Planners*
- *MIS Managers*

It provides technical reports that describe:

- *The current status of data on DASD*
- *The current status of the DASD themselves*

Free format reports:

- *Are easy to produce*
- *Provide customized reports*
- *Meet exact user needs*
- *Can be run as batch reports or under TSO via SRS*

The FDREPORT report generator:

- *Ensures DASD is used efficiently*
- *Minimizes waste*
- *Is Simple, Powerful And Comprehensive*

Appendix

The following tables list the fields that can be used by FDREPORT and the primary source of that information. See section 54.31 in the FDR User Manual for a full description of how each of these fields can be used for the various FDREPORT functions, such as Selection, Sorting, Summarizing and Punching.

Note: Some of the values in the 'Len' column are blank because the lengths of these fields (e.g. dates, byte etc) can be tailored by optional FDREPORT formatting Parameters

TABLE 1 lists the FIELDS available from the dataset's DSCB in the VTOC. If a VSAM cluster is being reported, some of the information may be found in the VVDS or catalog.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
DSN	DataSet Name/VSAM component name	44	CHAR	VTOC
SPLDSN	DataSet Name on two lines	27	CHAR	VTOC
SDSN	DataSet Name (First 20 bytes only)	20	CHAR	VTOC
NAME	DataSet Name or VSAM Cluster Name	44	CHAR	VTOC/VVDS
SPLNAME	DataSet Name or VSAM Cluster Name on two lines	27	CHAR	VTOC/VVDS
SNAME	DataSet Name or VSAM Cluster Name (First 20 bytes only)	20	CHAR	VTOC
GDGBASE	Generation Data Group base name	44	CHAR	VTOC
SPLGDGB	GDG base name on two lines	27	CHAR	VTOC
SGDGBASE	GDG base name (first 20 bytes only)	20	CHAR	VTOC
DEFAULTS	Includes: SPLDSN,VOL,DSORG,RECFM, BLKSIZE,LRECL,SIZE,SIZEFREE,%FREE	72	MIX	
DSSN	Volume serial – stored in DSCB***	6	CHAR	VTOC
VOLSQ	DataSet Volume Sequence Number	3	NUM	VTOC
DATES	Includes: CRDATE,EXPDATE,LRDATE	*	NUM	
CRDATE	Creation Date	*	NUM	VTOC/CAT
EXPDATE	Expiration Date	*	NUM	VTOC/CAT
LRDATE	Last Reference Date	*	NUM	VTOC/VVDS
NOEPV	Number of Extents for DataSet	3	NUM	VTOC
NOBDB	Number of Bytes in Last Directory Block	3	NUM	VTOC
SYSCODE	System Code Field in DSCB***	13	CHAR	VTOC
DCBINFO	Includes: DSORG,RECFM,BLKSIZE,LRECL	21	MIX	
DSORG	DataSet Organization: DA–BDAM PS– SEQUENTIAL AM– Non-ICF VSAM PO– PARTITIONED EF– ICF VSAM POE– PDS U– UNMOVABLE UN– UNDEFINED PSE–PS Extended Format (Striped) HFS–Hierarchical File System (Open Edition) IAM–Innovation Access Method	3	CHAR	VTOC
RECFM	Record Format	5	CHAR	VTOC
OPTCD	Option Code Byte	2	HEX	VTOC
BLKSIZE	DataSet Block Size	5	NUM	VTOC/VVDS
LRECL	DataSet Logical Record Size	5	NUM	VTOC/VVDS

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KEYLEN	DataSet Key Length	3	NUM	VTOC/VVDS
RKP	DataSet Relative Key Position	4	NUM	VTOC/VVDS
DSIND	DataSet Indicators - printed in hex; for selection use: LASTV - last volume (X'80') UPDAT - dataset updates (X'02') RACF - discrete profile (X'40') PASSW - write password (X'14') PASSA - read/write password (X'10')	2	HEX	VTOC
SECALLOC	Secondary Allocation Quantity	8	NUM	VTOC/VVDS
SECAFLAG	Secondary Allocation Flags: BLK - allocated in blocks FIV - 5 largest extents (ALX) CYL - allocated in cylinders RND - rounded to cylinders TRK - allocated in tracks (ROUND) CON - contiguous (CONTIG) MAX - largest extent (MXIG)	5	CHAR	VTOC/VVDS
SECXFLAG	Secondary Allocation extension flag ABL – average block length MBY – megabytes KBY – kilobytes BYT - bytes	3	CHAR	VTOC
SECXVALU	Secondary Allocation extension value	11	NUM	VTOC
LSTAR	DataSet Last Block Pointer; specify as LSTAR=X'ttttr'	6	HEX	VTOC
TRKBAL	DataSet Track Balance; remaining bytes on last track used	5	NUM	VTOC
EXTENTS	DataSet Extents; each extent will be stacked; up to 123 extents may be printed	15**	CHAR	VTOC
EXTENTSX	DataSet Extents (with extent type); each extent will be stacked, up to 123 extents may be printed	17**	CHAR	VTOC
CTFLD	Count Field of dataset DSCB (CCHHR)	10	HEX	VTOC
BPTR	Format 1 DSCB Pointer to Format 2/3 DSCB	10	HEX	VTOC
LMJOB	Last Modifying JOB (for ASM2 users)***	8	CHAR	VTOC

TABLE 2 lists the FIELDS available from the VVDS or ICF catalog for ICF VSAM clusters. This is in addition to the FIELDS available from the VTOC (TABLE 1). For non-VSAM datasets, these fields will contain blanks.

Those fields that show a source of IAM are also valid for IAM files; those that show IAM+ are valid only for enhanced IAM files.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
CLUSTER	ICF VSAM Cluster Name	44	CHAR	VVDS
SPLCLS	ICF VSAM Cluster Name on two lines	27	CHAR	VVDS
SCLUSTER	Cluster name (First 20 bytes only)	20	CHAR	VVDS
VSAMID	Includes: SPLCLS,SPLDSN,VOLSER	62	CHAR	
VSAMINFO	Includes: DSORG,RECFM,MAXLRECL,LRECL,CISIZE,TRKSCA,CICA,%CI,%CA,COMPATTR	68	MIX	
VSAMUSE	Includes: RECORDS,RETRIEVE,UPDATES,INSERTS,DELETES,HIALORBA,HIUSERBA,CISPLIT,CASPLIT	85	NUM	
TIMES	Includes: CRTIME,LRTIME	17	NUM	
CRTIME	Time of creation (hh.mm.ss)	8	NUM	VVDS/IAM
LRTIME	Time of last reference (hh.mm.ss)	8	NUM	VVDS/IAM
CATNAME	Name of the Catalog**	44	CHAR	VVDS/IAM
%CA	Free Percent in Control Area (CA)	3	NUM	VVDS/IAM
%CI	Free Percent in Control Interval (CI)	3	NUM	VVDS/IAM

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CICA	Number of Control Intervals per CA	3	NUM	VVDS
CISIZE	Control Interval (CI) Size	5	NUM	VVDS/IAM
BUFSIZE	VSAM Buffer Size	6	NUM	VVDS
MAXLRECL	VSAM Maximum Record Length	6	NUM	VVDS/IAM
TRKSCA	VSAM Number Tracks per Control Area	3	NUM	VVDS
CLUSATTR	VSAM Cluster Attributes ATL – Tape Volume Catalog ATTREXT – Extended Attribute (EA) EXTEND – Extended Format (EF) FORMAT – Formatted Pagespace PAGESPACE – Pagespace SWAPSPACE – Swapspace TIMESTAMP – Timestamps Exist VERIFYREQ – Verify is Required	24	CHAR	VVDS
COMPTYPE	VSAM Component type: DATA– Base cluster data INDEX– Base cluster index AIXDATA (AIXDA) – Alternate Index data AIXINDEX (AIXIN) – Alternate Index index	5	CHAR	VVDS
COMPATTR	VSAM Component Attributes IXD– Indexed NIXD– non-Indexed NUMD– Relative WCK– Write Check IMBD– Imbedded REPL– Replicate ORD– Ordered KRUNG– Key Range SPND– Spanned SPED– Speed RUS– Reusable ERAS– Erase RCVY– Recovery	24	CHAR	VVDS
VOLCFLAG	VSAM Volume Flag: CANDWSPACE (C – candidate with space) EXTENTSYNCH (S – extents do not match VTOC) GUARSPACE (G – SMS guaranteed space) OVERFLOWVOL (O – overflow volume) PRIMEVOLUME (P – prime volume) RELCIADDR (R – relative CI addressing)	8	CHAR	VVDS
DSNEIFLG	VSAM Dataset Extended Info Flag: G – extended addressability (>4GB) R – relative CI addressing	2	CHAR	VVDS
AMDATTR	VSAM Cluster Attributes from AMDSB: ESDS (ES) IMBED (IM) KEYRANGE (KE) KSDS (KS) ORDERED (OR) RRDS (RR) REPLICATE (RE) SPANNED (SP) WRITECHECK (WR)	24	CHAR	VVDS/IAM
AMDATTR3	VSAM Cluster Attributes from AMDSB: LINEAR (LI) LOADED (LO) NONUNIQUE (NO) SHRBCS (SH) – shared catalog VARIABLE (VA) - Variable RRDS	24	CHAR	VVDS/IAM
AIXATTR	Attribute of Alternate Index: AIX – this is an AIX UPGRADE - AIX with the UPGRADE attribute	7	CHAR	VVDS/IAM+
SHROPT	VSAM Share Options	3	CHAR	VVDS/IAM
PRIALLOC	VSAM Primary Allocation Quantity	8	NUM	VVDS/IAM
HIALORBA	VSAM High Allocated Relative Byte Address	10	NUM	VVDS/IAM+

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HIKEYRBA	VSAM High Key Relative Byte Address	10	NUM	VVDS/IAM+
HIUSERBA	VSAM High Used Relative Byte Address	10	NUM	VVDS/IAM+
EXCPEXIT	VSAM Exception Exit *	8	CHAR	VVDS
OWNER	VSAM Owner Identification	8	CHAR	CAT
TIMESTMP	VSAM Time Stamp	16	HEX	VVDS/IAM
CASPLIT	Number of control Area (CA) Splits	8	NUM	VVDS
CASPLITR	CA Split Ratio (splits per 100 CAs)	6	NUM	VVDS
CISPLIT	Number of Control Interval (CI) Splits	8	NUM	VVDS
CISPLITR	CI Split Raption (splits per 100 CIs)	5	NUM	VVDS
INDEXLEV	VSAM Number of Index Levels	5	NUM	VVDS
EXCPS	VSAM Number of EXCPs	10	NUM	VVDS
DELETES	VSAM Number of Records Deleted	10	NUM	VVDS/IAM
INSERTS	VSAM Number of Records Inserted	10	NUM	VVDS/IAM
RECORDS	VSAM Number of Records in Cluster	10	NUM	VVDS/IAM
RETRIEVE	VSAM Number of Records Retrieved	10	NUM	VVDS
UPDATES	VSAM Number of Records Updated	10	NUM	VVDS/IAM
VSFREBYT	VSAM Number of Bytes Free	10	NUM	VVDS
CATVRBA	Relative Byte Address of VVR from catalog	8	HEX	CAT
VVRVRBA	Actual Relative Byte Address of VVR in VVDS	8	HEX	VVDS

TABLE 3 lists the additional FIELDS available for a dataset on an SMS-managed volume. For non-SMS datasets, these fields will be blank.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
SMSCLASS	Includes: STORCLAS,DATACLAS,MGMTCLAS	26	CHAR	
STORCLAS	SMS Storage Class*	8	CHAR	VVDS
MGMTCLAS	SMS Management Class*	8	CHAR	VVDS
DATACLAS	SMS Data Class*	8	CHAR	VVDS
STORGRP	SMS Storage Group on which the dataset resides*	8	CHAR	GEN
SMSFLAGS	SMS flag byte in DSCB: MANAGED (S) - SMS-managed NOBCS (N) - not cataloged REBLOCK (R) - reblockable DADSMCRT (D) - DADSM assigned blksize PDSE (I) - PDS Extended PDSEX (X) - HFS (Hierarchical File Sys) STRIPE (Z) - Extended Format (EF) ATTREXTN (E) - Extended Attribute (EA)	4	CHAR	VTOC
LASTBKUP	SMS last backup Date and Time (HSM)	13	CHAR	VVDS
NVSAMFLG	SMS NONVSAM Flags: ATTREXT- Extended Attribute (EA) EXTEND – Extended Format (EF)	7	CHAR	VVDS
NVSAMATR	SMS NONVSAM Attributes: ACTGDG - active GDG generation DEFGDG - deferred GDG generation ROLDGD - rolled-out GDG generation PDSE - PDS Extended POSIX - HFS (Hierarchical File Sys)	7	CHAR	VVDS

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STRIPECT	Stripe Count, for Extended Format (EF)	3	CHAR	VVDS
RECOVDTA	SMS Recovery Data	8	CHAR	VVDS
RESOROWN	SMS Resource Ownership	16	CHAR	VVDS
SUBCFLAG	SMS Subcell Flag Byte	17	CHAR	VVDS
SUBCVERS	SMS Subcell Version Number	3	NUM	VVDS
COMPDATA	Compress DataSet Size	10	NUM	VVDS
USERDATA	Original Size of Compressed DataSet	10	NUM	VVDS

Table 4 lists dataset backup information from the ABR system. If DATATYPE=ARCHIVE was specified, this information is from the archive control file, otherwise it is from the ABR backup subsystem. If COPY= or OLDBACKUP= was specified, there may be more than one line of this information available; REPORT will list them on multiple lines, SELECT/XSELECT will test against all copies of the fields.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
ABRGEN	Current ABR Generation Number	4	NUM	MODL
ARBCYCLE	Current ABR Cycle Number	3	NUM	MODL
ABRIND	ABR Indicators: A - Always backup/never archive B - Current ABR backup exists N - Normal backup/never archive R - Archive requested X - Exclude from ABR processing For reports only, not for selection: C - No current ABR backup exists I - Instant backup is pending; SNAP/SPLIT/PSPLIT/FCOPY has been done, but the point-in-time image has not yet been copied to a backup file (only in a report line for an ABR model DSCB) M - Multi-volume dataset T - old backup recording is enabled U - Updated since last ABR backup	5	CHAR	VTOC
ADATE	Archive Date	*	NUM	ARCH
BKTIME	FDRAPPL Backup time (hhmmss)	8	NUM	ARCH
ADAYS	# days since Archive	5	NUM	ARCH
ARCDSN	Archive Control File name	44	CHAR	GEN
ARCFLAGS	Includes: ARCFLAG1, ARCFLAG2			
ARCFLAG1	ARCHIVE control file flag 1 - FIVEVOL (F) - backup over 5 volumes MULTIVOL (M) - multi-vol dataset RESTORED (R) - restored from ARCHIVE	5	CHAR	ARCH
ARCFLAG2	ARCHIVE control file flag 2 - CLUSTER (C) - entry for ICF cluster DELETE (D) - entry flagged for deletion NOTCAT (N) - backup not cataloged RECALL (A) - archived for auto-recall	5	CHAR	ARCH
ARCTTR	TTR used for auto recall	6	HEX	ARCH
ACTTTR	Actual TTR of record in ARCHIVE ctl file	6	HEX	ARCH
BKINFO	Includes: BKDATE,BKSUFFIX,BKFILENO,BKVOL	*	CHAR	
TVTOCDSN	Input Backup dsn, for RPTYPE=TVTOC	44	CHAR	GEN
OLDBKUP	ABR Old Backup # of ABR backup displayed	2	NUM	GEN
BKCYCLE	Cycle # of ABR backup displayed	3	NUM	CAT

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BKGEN	Generation # of ABR backup displayed	4	NUM	CAT
BKDATE	Backup Date	*	NUM	CAT
BKDAY	# days since Backup	5	NUM	CAT
BKEXDATE	Backup or Archive expiration date	*	NUM	ARCH/CAT
BKEXDAY	# days until expiration of Backup or Archive**	5	NUM	ARCH/CAT
BKFILENO	File Seq Number of Backup or Archive	4	NUM	ARCH/CAT
BKSUFFIX	Backup or Archive DataSet Name Suffix. This is the last index level in the name***	8	CHAR	ARCH/CAT
BKTAPCNT	Number of Backup or Archive Volumes	2	NUM	ARCH/CAT
BKVOL	Volume Serials for the Backup/Archive (5)***	34	CHAR	ARCH/CAT
BKXVOL	Volume Serials for the Backup/Archive (20)	139	CHAR	ARCH/CAT
BKDEVCLS	Device class of backup (TAPE or DISK)	4	CHAR	ARCH/CAT
BKDEVTYP	Device type of backup	7	CHAR	GEN

TABLE 5 lists the FIELDS which can be generated by ABR from information contained in the VTOC, Catalog or the VVDS.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
SIZEINFO	Includes: SIZE, SIZEFREE, %FREE	15*	NUM	
SIZE	Size of the DataSet in Tracks	5*	NUM	GEN
BYTES	Size of the DataSet in bytes/KB/MB	**	NUM	GEN
MAXSIZE	Maximum size of DataSet in Tracks if all secondary allocations taken	5*	NUM	GEN
SIZEFREE	Number of Tracks Unused for DataSet – PS, PO and VSAM actual free tracks – all others zero (0)	5*	NUM	GEN
BYTESFRE	Bytes unused in the DataSet	**	NUM	GEN
SIZEUSED	Number of Tracks Used for DataSet – PS, PO and VSAM actual used tracks – all others total allocated space	5*	NUM	GEN
BYTESUSE	Bytes used in the DataSet	**	NUM	GEN
BLKSTRK	Number of Blocks per Track	5	NUM	VVDS/TRKC
BYTESTRK	Bytes per Track (BLKSIZE times BLKSTRK)	5	NUM	GEN
PRIBYTES	Bytes in primary allocation (ICF VSAM only)	**	NUM	GEN
SECBYTES	Bytes/KB/MB size of secondary allocation	**	NUM	GEN
TRACKCAP	Max Track Capacity of Device in Bytes	5	NUM	VTOC
CAPBYTES	Bytes size of allocated space if used at track capacity	**	NUM	GEN
%FREE	Percentage of Free Space in DataSet	3	NUM	GEN
%USED	Percentage of Used Space in DataSet	3	NUM	GEN
FREEEXT	Number of allocated extents containing no data	3	NUM	GEN
USEDEXT	Number of allocated extents containing data	3	NUM	GEN
%CAPUSED	Percentage of Capacity Utilization (based on allocation and BLKSIZE)	3	NUM	GEN
CATALOG	Indicates if DataSet is Cataloged This can be expensive to collect if a large number of datasets are to be reported. YES – cataloged to this volume NO – not cataloged at all	3	CHAR	CAT

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	ERR – cataloged to another volume ONL – only cataloged, not in VTOC UNK – error reading catalog CAN – cataloged to candidate volume DRF – disk read failure			
CATTTR	DSCBTTR from Catalog (used by ABR to indicate auto recall)	6	HEX	CAT
CATVOL	Volume to which dataset is cataloged	6	CHAR	CAT
CATVOLCT	Number of unique non-candidate volumes to which the dataset is cataloged	3	NUM	CAT
CANDVOLC	Number of unique non-candidate volumes to which the dataset is cataloged	3	NUM	CAT
CATVOLTL	Total number of unique volumes to which the dataset is cataloged	3	NUM	CAT
DSNALCNT	Number of catalog aliases for this dataset	5	NUM	CAT
DSNALIAS	An alias for this dataset (indexed by RELALCNT)	44	CHAR	CAT
RELALCNT	Relative alias number	5	NUM	CAT
GDGENTRY	GDG Active Entry Count	3	NUM	CAT
GDGFLAGS	GDG base flags: EMPTY/NOEMPTY/SCRATCH/NOSCRATCH	9	CHAR	CAT
GDGGENER	GDG generation number	4	NUM	VTOC
GDGLIMIT	GDG generation limit	3	NUM	CAT
GDGRELGN	GDG relative generation number	3	NUM	GEN
GDGVERSN	GDG version number	2	NUM	VTOC
CRDAYS	Number of days since creation	5	NUM	GEN
EXPDAYS	Number of days until expiration****	5	NUM	GEN
LRDAYS	Number of days since last reference	5	NUM	GEN
NOEXTENT	Number of Extents Used for DataSet	3	NUM	GEN
PROTECT	Reports on Type of Protection indicates if RACF or PASSWORD protected	4	CHAR	VTOC
RUNDATE	Date of FDREPORT execution	***	NUM	GEN
RUNTIME	Time of FDREPORT execution (hh.mm.ss)	8	NUM	GEN
VOL	Volume Serial DataSet resides on* * * * *	6	CHAR	VTOC
FILESEQ	File Sequence Number (tape only)	4	NUM	CAT
UNIT	Device address the dataset is on	3/4	CHAR	GEN
DEVTYPE	Type of Device DataSet resides on	7	CHAR	GEN
DEVCLASS	Class of Device DataSet resides on, "TAPE" or "DISK"	4	CHAR	GEN
UCBSTATS	UCB status: ONLINE/OFFLINE	7	CHAR	UCB
UCBID	4-byte UCB device type	8	HEX	CAT/UCB
INDEXNUM	# of Index Level in the dataset or cluster name that is extracted into field INDEX	3	NUM	USER
INDEX	Extracted level from dataset or Cluster name	8	CHAR	DSN/CLUS
NTMIGRAT	HSM only: number of times dataset has been migrated (MCDS) or backed up (BCDS)	8	CHAR	
SYSID	SMF system ID on which FDREPORT was run	4	CHAR	
SOURCE	Source of this data record (ARCHIVE, CATALOG, VTOC, VVDS, MCDS, BCDS)	8	CHAR	

Appendix

TABLE 6 lists the FIELDS which can be obtained from the directory of a Partitioned DataSet or an Extended Partitioned DataSet (via FAMS).

NAME	DESCRIPTION	LEN	ATTR	SOURCE
DIRBINFO	Includes: DIRBLOCK,DIRBFREE,%DIRFREE		NUM	
DIRBLOCK	Number of PDS Directory Blocks	5	NUM	DIRB/FAMS
DIRBFREE	Number of Free PDS Directory Blocks	5	NUM	DIRB/FAMS
DIRBUSIED	Number of used PDS Directory Blocks	5	NUM	DIRB/FAMS
%DIRFREE	Percentage of PDS Directory Blocks not used	3	NUM	GEN
%DIRUSED	Percentage of PDS Directory Blocks in use	3	NUM	GEN
MEMBERS	Number of members in PDS	6	NUM	DIRB/FAMS

TABLE 7 lists the FIELDS available from IAM dataset Control Block for IAM datasets. This is in addition to the FIELDS available from the VTOC (TABLE 1) and the fields that are normally reserved for VSAM.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
IAMINFO	Includes: DSORG,RECFM,MAXLRECL, LRECL, BLKSIZE, CISIZE	33	MIX	
IAMUSE	Includes: RECORDS,UPDATES,INSERTS, DELETES,OVERFLOW,OVERUSED,%OVER	69	NUM	
IAMINDIC	IAM Indicators: ENHANCED (E) - Enhanced IAM format DATACOMP (D) - Data compressed KEYCOMP (K) - Keys compressed	5	CHAR	IAM
%PRIMEXT	Used Percent of the Prime Extension	3	NUM	IAM
PRIMEXTN	Number of Prime Extension Blocks allocated	8	NUM	IAM
PRIMEUSE	Number of used Prime Extension Blocks	8	NUM	IAM
%OVER	Used % of the Independent Overflow records	3	NUM	IAM
OVERFLOW	# of Independent Overflow records allocated	10	NUM	IAM
OVERUSED	# of used Independent Overflow records	10	NUM	IAM

TABLE 8 lists the FIELDS which can be obtained from the volume-level record. Data is gathered and summarized from the LSPACE SVC, VTOC, VTOC index, and VVDS.

NAME	DESCRIPTION	LEN	ATTR	SOURCE
VLDEFAULT	Volume report defaults, includes: VLVOLSER, VLDEVTYPE, VLUNIT, VLINDSTA, VLUSEATR, VLTRKVOL, VLUSERS, VLALOTRK, VL%UTRKS, VLFRETRK, VLLRGCYL, VLLRGRK, VLFREEXT and VLFRAGIN	83	MIX	
VLVOLSER	Volume Serial DataSet resides on ***	6	CHAR	VTOC
VLUNIT	Device address the volume is on	3/4	CHAR	GEN
VLUCBID	40byte UCB device type	8	HEX	UCB
VLDEVTYPE	Type of Device DataSet resides on	7	CHAR	GEN
VL%FTRKS	Percentage of disk volume free	3	NUM	VTOC
VL%UTRKS	Percentage of disk volume in use	3	NUM	VTOC
VL%FDSCB	Percentage of DSCBs free within the VTOC	3	NUM	VTOC
VL%UDSCB	Percentage of DSCBs used within the VTOC	3	NUM	VTOC
VL%FINDX	Percentage of VTOC Index Records free	3	NUM	VTIX
VL%UINDX	Percentage of VTOC Index Records used	3	NUM	VTIX

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VL%FVVD	Percentage of VVDS Control Intervals free	3	NUM	VVDS
VL%UVVD	Percentage of VVDS Control Intervals used	3	NUM	VVDS
VLALOCYL	Number of Allocated Cylinders	5	NUM	VTOC
VLALOTRK	Number of Allocated Tracks	5*	NUM	VTOC
VLALOBYT	Number of Allocated Bytes	**	NUM	VTOC
VLALTRKS	Number of Alternate Tracks on the volume	5	NUM	DEVT
VLAVGTRK	Average File Size in Tracks	5*	NUM	VTOC
VLAVGBYT	Average File Size in Bytes	**	NUM	VTOC
VLBYTRK	Track Capacity in bytes	5	NUM	DEVT
VLCYLVOL	Number of Cylinders per Volume	5	NUM	DEVT
VLTRKCYL	Number of Tracks per Cylinder	3	NUM	DEVT
VLBYTCYL	Number of Bytes per Cylinder	**	NUM	DEVT
VLTRKVOL	Number of Tracks per Volume	5*	NUM	DEVT
VLBYTVOL	Number of Bytes per Volume	**	NUM	DEVT
VLDIRBTR	Number of PDS Directory Blocks per Track	3	NUM	DEVT
VLDSCBTR	Number of VTOC DSCBs per Track	3	NUM	DEVT
VLDSCB	Total Number of DSCBs	5*	NUM	VTOC
VLDSCBU	Number of Used DSCBs	5*	NUM	VTOC
VLDSCB0	Number of FORMAT-0 DSCBs	5*	NUM	VTOC
VLDSCB1	Number of FORMAT-1 DSCBs	5*	NUM	VTOC
VLDSCB2	Number of FORMAT-2 DSCBs	5*	NUM	VTOC
VLDSCB3	Number of FORMAT-3 DSCBs	5*	NUM	VTOC
VLDSCB4	Number of FORMAT-4 DSCBs	5	NUM	VTOC
VLDSCB5	Number of FORMAT-5 DSCBs	5	NUM	VTOC
VLDSCB6	Number of FORMAT-6 DSCBs	5	NUM	VTOC
VLDSCB7	Number of FORMAT-7 DSCBs	5	NUM	VTOC
VLD SOAM	Number of non-ICF VSAM Data Spaces	5*	NUM	VTOC
VLD SODA	Number of Direct Access datasets	5*	NUM	VTOC
VLD SOEF	Number of ICF/VSAM Components	5*	NUM	VTOC
VLD SOIS	Number of Indexed Sequential datasets	5*	NUM	VTOC
VLD SOPO	Number of Partitioned datasets	5*	NUM	VTOC
VLD SOPOE	Number of PDSE datasets (SMS volumes)	5*	NUM	VTOC
VLD SOPS	Number of Physical Sequential datasets	5*	NUM	VTOC
VLD SOUN	Number of datasets with an Unknown dataset Organization	5*	NUM	VTOC
VLFRAGIN	IBM Fragmentation Index	4	NUM	LSPC
VLFRECYL	Number of Unused Cylinders	5	NUM	LSPC
VLFREBYT	Number of Unused Bytes	**	NUM	VTOC
VLFREEXT	Number of Unused Extents	5*	NUM	LSPC
VLFRETRK	Number of Unused Tracks	5*	NUM	VTOC
VLFREVC	Number of Unused VVDS Control Intervals	5	NUM	VVDS
VLUSEVC	Number of Used VVDS Control Intervals	5	NUM	VVDS
VLTOTVC	Total Number of VVDS Control Intervals	5	NUM	VVDS

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VLUSEVIR	Number of Used VTOC Index Records	5	NUM	GEN
VLTOTVIR	Total Number of VTOC Index Records	5	NUM	GEN
VLALOSTA	Volume Allocation Status: SYSRES - system residence volume ALLOC - allocated UNLOAD - unload pending ONLINE - online, not allocated or sysres	6	CHAR	UCB
VLINDSTA	Status of Indexed VTOC ACTIVE – Indexed VTOC Active NONE – No Indexed VTOC YES – Indexed VTOC Not Active	6	CHAR	LSPC
VLMOUSTA	Volume Mount Status RESERVED – Volume Dismountable RESIDENT – Volume Not Dismountable	8	CHAR	UCB
VLUSEATR	Volume Use Attribute PRIVATE – Allocated if specific PUBLIC – Temporary non-specific STORAGE – Non-temporary non-specific	7	CHAR	UCB
VLSMSTAT	Volume SMS State INITIAL – Volume Initialized for SMS MANAGED – Volume SMS Managed NONE – No SMS Processing	7	CHAR	VTOC
VLSMSVST	Volume SMS Status ENABLED NONE (non-SMS) QUIESCED ALL QUIESCED NEW DISABLED ALL DISABLED NEW	12	CHAR	SMS
VLSMSGST	Volume SMS Storage Group Status (same values as VLSMVST)	12	CHAR	SMS
VLSMSSTG	Volume SMS Storage Group name	8	CHAR	SMS
VLSMSHTR	Volume SMS High Threshold	3	NUM	SMS
VLSMSTR	Volume SMS Low Threshold	3	NUM	SMS
VLLRGCYL	Number of Cylinders in Largest Free Extent	5	NUM	LSPC
VLLRGTRK	Number of Tracks in Largest Free Extent	5*	NUM	LSPC
VLLRGBYT	Number of Bytes in Largest Free Extent	**	NUM	LSPC
VLUSERS	Number of Current Allocations to Volume	5	NUM	UCB
VLVTIXTR	Number of Tracks Allocated to the VTOC Index	5	NUM	VTOC
VLVTOCTR	Number of Tracks Allocated to VTOC	5	NUM	VTOC
VLVVDSTR	Number of Tracks Allocated to VVDS	5	NUM	VTOC
VLVVDSTXT	Number of Extents Allocated to VVDS	3	NUM	VTOC
VLBRGEN	Current ABR backup generation number	4	NUM	MODL
VLBRCYC	Current ABR backup cycle number	2	NUM	MODL
VLBRHTR	Volume ABR High Threshold	3	NUM	MODL
VLBRLTR	Volume ABR Low Threshold	3	NUM	MODL
VLBRPROPT	ABR Volume Processing Options: C – Cycle table is active N – Never Archive from this volume S – Scratch is permitted T – ABR thresholds are enabled X – Copy 1 expiration date active Y – Copy 2 expiration date active I – Instant backup attempted	7	CHAR	MODL
VLSYSID	SMF system id on which FDREPORT was run	4	CHAR	

Appendix

FDREPORT formatting parameters. In addition to the standard fields in Tables 1-8, users of DFHSM can also use FDREPORT to obtain and report on information from the MCDS and BCDS control datasets. The following two tables list the FDREPORT fieldnames that can be used and also show the MCDS/BCDS fieldname that provided the source of this information.

TABLE 9 lists the fields that can be obtained via DATATYPE=MCDS. The MCDS dataset record is described by the IBM MCD macro and the mapping is as follows

MCDS field name	FDREPORT field name	Field Description
MCK	DSN	Dataset name
MCDFRVSN	VOL	Volume Serial Number
MCDUCBTY	UCBID	UCB 4-byte device type(hex)
	DEVTYPE	Disk device type (e.g., 3390)
MCDFLGS	DSSN	MGRATx (x=migration level)
MCD DLC	CRDATE	Creation Date
	CRDAYS	Days since Creation (calculated)
MCDEXPDT	EXPDATE	Expiration Date
	EXPDAYS	Days since Expiration (calculated)
MCD DLR	LRDATE	Last Reference Date
MCD TLR	LRTIME	Last Referenced Time
	LRDAYS	Days since Last Reference (calculated)
MCD DMIG	ADATE	Date Archived (Migrated)
MCD TMIG	ATIME	Time Archived (Migrated)
	ADAYS	Days since Migration (calculated)
MCD DSORG	DSORG	DataSet Organization
MCD RECFM	RECFM	Record Format
MCD OPTCD	OPTCD	Option Code
MCD BLKSZ	BLKSIZE	Block Size
	BLKSTRK	Blocks/track (calculated)
	BYTESTRK	Bytes/track (calculated)
MCD KEYLN	KEYLEN	Key Length
MCD DSIND	DSIND	DataSet Indicators
MCD SIZE	SIZE	Allocated Tracks
	SIZEUSED	Used Tracks (calculated)
	SIZEFREE	Free Tracks (calculated)
MCD SIZEB	BYTES	Bytes Allocated
	BYTESUSE	Bytes Used (calculated)
	BYTESFRE	Bytes Free (calculated)
	%USED	Percentage used (calculated)
	%FREE	Percentage free (calculated)
	LSTAR	Last Used ttttrr
MCD SCNAM	STORCLAS	SMS Storage Class
MCD MCNAM	MGMTCLAS	SMS Management Class
MCD MDNAM	DATACLAS	SMS Data Class
MCD SMSFG	SMSFLAGS	SMS DataSet Flag Byte
MCD SCAL1	SECAFLAG	Secondary Allocation Flags
MCD SCAL3	SECALLOC	Secondary Allocation Quantity
MCD NMIG	NTMIGRAT	Number of times dataset was migrated
MCD VSN	HSMIGVOL	First migration volser
	SOURCE	'MCDS'

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TABLE 10 lists the fields that can be obtained via DATATYPE=BCDS. The BCDS dataset record is described by the IBM MCD macro and the mapping is as follows

BCDS field name	FDREPORT field name	Field Description
MCK	DSN	Dataset name
MCBFRVOL	VOL	Volume Serial Number
MCBDBU	ADATE	Date Backed Up
MCBTBU	ATIME	Time Backed Up
	ADAYS	Days since backup (calculated)
MCBDLRPD	LRDATE	Last Reference Date
	LRDAYS	Days since last reference (calculated)
MCBDSORG	DSORG	DataSet Organization
MCBRECFM	RECFM	Record Format
MCBBLKSZ	BLKSIZE	Block Size
MCBKEYLN	KEYLEN	Key Length
MCBDSIND	DSIND	DataSet Indicators
MCBSIZE	SIZE	Allocated Tracks
MCBSIZEB	BYTESUSE	Bytes Used
	BYTES	Bytes Allocated (calculated)
MCBNBC	NTMIGRAT	Number of times dataset was backed up
	SOURCE	'BCDS'



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