

READING AND JOINING KEY-SEQUENCED VSAM DATA IN THE MVS ENVIRONMENT

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ABSTRACT

The sequence of data in a Key-sequenced VSAM dataset(KSDS) is determined by a unique value, the KEY. The *primary* key can be one or more fields within the file (usually the first field (s) in the file). It identifies the record, and establishes the order of the records within the file. This paper addresses reading data from a KSDS, based on the primary key, and then joining those records to other KSDS files where there are one-to-one and one-to many matches on the key field or fields.

INTRODUCTION

In Key-sequenced VSAM DATA records are stored based on KEY values. VSAM is IBM's ® method of data access that stores and organizes records in a disc dataset. This enables you to read and join raw data based on Keys. Job performance is enhanced considerably using SAS's ® access method.

*ASSIGN FILEREFS FOR INPUT FILES;

```
FILENAME
MASTER 'SYSTEM.MASTER.PROD.FILE' DISP=SHR;
FILENAME
MASTER2 'SYSTEM.MASTER.PROD.INAC.FILE' SHR;
FILENAME
RELATE1 'SYSTEM.RELATE1.PROD.FILE' DISP=SHR;
FILENAME
RELATE2 'SYSTEM.RELATE2.PROD.FILE' DISP=SHR;
FILENAME
RELATE3 'SYSTEM.RELATE3.PROD.FILE' DISP=SHR;
```

*ASSIGN LIBREFS FOR DATASET;
LIBNAME DATA 'U36074.FLOW1.LIB' DISP=OLD;

```
DATA DATA.DATA1;
INFILE MASTER END=LAST1;      *this reads the active file and assigns
the last1 variable at
IF LAST1 THEN INFILE ACAPS2;  *end of file marker. Once it reaches
the end of file it reads
INPUT                          *next file.
@0001 ACCT_REF $015.
@0279 LOCATE $006.
@0406 DES PD05.
@0435 DATE PD05.
;
```

* CONVERT THE PACKED DATA TO A SAS® DATE FOR
CALCULATIONS;

```
STDATE = INPUT(PUT(DATE,8.),YYMMDD8.);
RUN;
```

*USING THE ACCT_REF FIELD, LINK TO THE RELATE1 (1 TO 1 MATCH.
DIFFERENT PRIMARY KEY);
*THE KEY IS COMPRISED OF THE ACCT_DEF AND THE RECORD TYPE;
*FILE IN ORDER TO OBTAIN TWENTILE INFORMATION ;

```
DATA DATA.DATA2(DROP = STATE COMPRESS=YES REUSE=YES);
*COMPRESSING THE DATA SAVES SPACE HERE!;
SET DATA.DATA1;
LENGTH FULLKEY2 $022.;

INFILE RELATE1 VSAM KEY=FULLKEY2 FEEDBACK=NOERROR;
FULLKEY2 = ACCT_REF || ' 20';
INPUT @;
```

```
IF _IORC_=0 AND NOERROR = 0 THEN DO;
INPUT
@0585 LST_PD PD3.
;

END;
ELSE IF _IORC_ = 12 THEN DO;
_ERROR_ = 0;
PUT ' PHYSICAL ERROR HAS OCCURRED FOR ' FULLKEY2
'IORC = ' _IORC_;
INPUT;
RETURN;
END;
ELSE IF NOERROR NE 0 THEN DO;
_ERROR_ = 0;
PUT ' LOGICAL ERROR HAS OCCURRED FOR ' FULLKEY2
'FEEDBACK CODE IS ' NOERROR;
NOERROR = 0;
INPUT;
_ERROR_ = 0;
NOERROR = 0;
END;
```

*READ THE RELATE2 FILE (ONE TO MANY MATCH) Using Skip Sequential
Processing (a combination of direct and sequential data read);

```
DATA DATA.DATA3(COMPRESS=YES REUSE=YES);
SET DATA.DATA2;
LENGTH
PARTKEY $15.;
RETAIN I;
IF _N_ = 1 THEN DO;
I = 0;
END;
INFILE RELATE2 VSAM KEY = PARTKEY GENKEY SKIP
FEEDBACK=SASRC;
PARTKEY = APP_ID;
INPUT @;
IF SASRC = 4 OR SASRC = 16 THEN DO;
_ERROR_ = 0;
IF SASRC = 4 THEN DO;
PUT 'PROCESSING STOPPED';
STOP;
END;
ELSE DO;
SASRC = 0;
PUT 'THERE ARE NO RECORDS FOR ' PARTKEY;
RETURN;
END;
END;
INPUT
@0001 ACCT_REF $015.
@0016 SEQ 005.
;
DO WHILE (PARTKEY = APP_ID);
OUTPUT DATA.DATA3;
INPUT @;

IF SASRC = 4 OR SASRC = 16 THEN DO;
_ERROR_ = 0;
IF SASRC = 4 THEN DO;
PUT 'PROCESSING STOPPED';
STOP;
END;
ELSE DO;
```

```
SASRC = 0;
PUT 'THERE ARE NO RECORDS FOR ' PARTKEY;
RETURN;
END;
END;
INPUT
  @0001 ACCT_REF  $015.
  @0016 SEQ      005.
  ;
END;
RUN;
```

When reading many to many matches SAS® creates 1 observation for every occurrence in the file.

De-duping can be achieved via usual SAS® methods.

Return codes are useful in determining what may go wrong. Common return codes are:

16- A logical error has occurred. This occurs when there are no matches for the key in the file you are reading.

12- This usually means that a system error has occurred or the file has a problem.

4- You reached the end of the file and your maximum key is greater than the maximum key in the VSAM file.

A list of return codes and their meanings is located in "SAS® Guide to VSAM Processing, Version 6: First Edition" pp. 119-120.

Other tidbits:

You can read the KSDS forward or Backward. Many VSAM files have alternate indexes.

It is essential that you use the same informat for the KEY in each read.

VSAM automatic variables:

ERROR - is set to 1 when an error is encountered. You need to reset it to 0 to continue processing.

IORC - set to the VSAM I/O return code

FDBK = set to VSAM feedback code

FEEDBACK= an option used to handle logical errors.

References:

SAS® Guide to VSAM Processing *Version 6: First Edition*

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