

[OpenVMS] Explanation Of RMS-F-DME, Dynamic Memory Exhausted Error
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PRODUCT: OpenVMS VAX All Versions
 OpenVMS AXP All Versions

COMPONENT: Record Management Services (RMS)

SOURCE: Digital Customer Support Center

QUESTION:

An application or command procedure terminates execution with the following error:

```
%RMS-F-DME, dynamic memory exhausted
```

What is the meaning of this error message?

ANSWER:

RMS is unable to allocate additional process memory for the given request. This is usually a \$OPEN or \$CONNECT RMS System Service call. The memory requirements from a request are generally for a large number of buffers, large buffer sizes or a combination of the two.

For sequential files, the size of an individual buffer is determined by the multi-block count (MBC) value. For indexed and relative files, the buffer size is determined by the value of the largest bucket size of the file. The number of pages a process requires for buffers is determined by the number of buffers (MBF) times the buffer size (MBC).

To correct this situation either increase the amount of available process memory or decrease the size or number of requested buffers.

For process permanent files (those created by the DCL OPEN command, DCL Command Procedures, as well as SYS\$INPUT, SYS\$OUTPUT, SYS\$ERROR and Batch log files), the size of available memory is governed by the SYSGEN parameter PIOPAGES.

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> SHOW PIOPAGES
Parameter Name  Current  Default  Min.    Max.    Unit  Dynamic
-----
PIOPAGES        320     320     10      -1      Pages
```

The number of buffers and their respective sizes is controlled by the DCL command SET RMS_DEFAULT. For example:

```
$ SHOW RMS_DEFAULT
MULTI-|          MULTIBUFFER COUNTS          | NETWORK
BLOCK |Indexed Relative      Sequential      | BLOCK
COUNT |          Disk  Magtape  Unit Record  | COUNT
Process 0 | 0          0          20          0          0          | 0
System 16 | 0          0          0          0          0          | 8

Prolog  Extend Quantity
Process 0          0
System  0          0
```

In the above SHOW RMS_DEFAULT command, there are 20 buffers allocated for Sequential Disk files. With a default buffer size of 16 blocks (Multi-Block Count), a total of 320 pages of memory is needed to open a file. Since this total is greater than PIOPAGES, an "RMS DME" error is returned.

For image files, process memory is governed by the user's authorization file (UAF) parameter PGFLQUOTA and the SYSGEN parameters VIRTUALPAGECNT and PQL_MPGFLQUO. The size and number of buffers is controlled by the application and/or SET RMS_DEFAULT. For example, if a program opens an indexed file with a bucket size of 9 and requests 20 buffers, then RMS requests $9 * 20 = 180$ pages of memory to accommodate those buffers.

How much memory is used by the process or image can be determined from the command SHOW PROCESS/ACCOUNTING. For example:

```
$ SHOW PROCESS/ACCOUNTING
11-DEC-1991 09:52:28.23  User: USERNAME      Process ID: 2080507F
                          Node: NODES        Process name: "USERNAME"

Accounting information:
Buffered I/O count:      313  Peak working set size:      367
Direct I/O count:        0   Peak virtual size:          10113
Page faults:             345  Mounted volumes:              0
Images activated:         1
Elapsed CPU time:        0 00:00:00.94
Connect time:            0 00:00:03.05
```

The field 'Peak virtual size', determines how near to their limit for PGFLQUOTA the user has come. If a file's bucket size is 10 blocks and the number of buffers that the user requests is 200, then 2000 pages are going to be deducted from the user's PGFLQUOTA values.

Image buffer space is also controlled with the Linker option of IOSEGMENT. This is used to determine the amount of fixed RMS memory allocated and in what process region it is allocated from. If an image is linked with the option, 'IOSEGMENT=100, NOPOBUFS', it is not allowed to allocate buffers from the users process region. The image can not allocate more that 100 pages of memory for RMS. For example:

```
$ ANALYZE/IMAGE (image)
```

Fixed Header Information

```
image format major id: 02, minor id: 05
header block count: 1
image type: executable (IHD$K_EXE)
I/O channel count: default
I/O page count: 100
linker flags:
(0) IHD$V_LNKDEBUG      0
(1) IHD$V_LNKNOTFR     0
(2) IHD$V_NOPOBUFS     1
(3) IHD$V_PICIMG       1
(4) IHD$V_POIMAGE      0
(5) IHD$V_DBGDMT       1
(6) IHD$V_INISHR       0
(7) IHD$V_IHSLONG      1
```

The number of pages is determined for 'I/O page count' if P0 buffers are allowed from the value of 'IHD\$V_NOP0BUFS'. A value of 1 indicates that the user is not allowed to allocate buffers from the P0 address space. The program is limited to the 100 pages for all RMS functions.

For more information on IOSEGMENT, please refer to the "VMS Linker Utility Manual", April 1988, (AA-LA62A-TE), (for OpenVMS Version 5.n) and "OpenVMS Linker Utility Manual", May 1993, (AA-PV6CA-TK) (for OpenVMS Version 6.n)