Legac-E Education

Difference between SPACE request and Extents

There is often confusion through the incorrect use of terminology when discussing the z/OS JCL SPACE parameter, because people use the word "extent" when they mean "request" and the two are very different. *Requests and Extents are only synonymous if there is a sufficient large area of free space to satisfy the request.*

The following example uses a DD statement parameter of SPACE=(CYL,(15,5)) for a new **non-VSAM data set**. VSAM data sets are managed differently with the space information being held in the VSAM Volume Data Set (VVDS) with each volume having its own such data set.

The 15,5 is the request for space, with the 15 being the primary request, and the 5 being the secondary request. The secondary is provided for situations where the number of records exceeds the capacity of the primary request, and allows the data set to expand accordingly.

With non-VSAM data sets, the file label, known as the **Data Set Control Block (DSCB)** is held in the disk volume's **Volume Table of Contents (VTOC).** The **principal DSCB is the Format 1** which can hold the locations of 3 areas of disk space, known as extents, i.e:

Format 1 DSCB

Data set name + attributes	Extent[1]	Extent[2]	Extent[3]

If a data set uses **more than 3 locations of disk space**, then **a Format 3 DSCB is created** to hold a **maximum of 13 more extents**, giving a total of 16.

FORMAT 3 DSCB

E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16

If more than 16 extents are needed then an additional volume will be required.

If any given request for SPACE was satisfied by the allocation of a single area of disk then there would be no confusion between requests and extents, but that is not the way the Storage Management routines work.

The example which follows illustrates the process.

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Scenario 1 - Emtpy Disk + SPACE=(CYL,(15,5))

In this scenario, each request for space can be satisfied with 1 extent so the space allocated will be:

```
Extents        Allocation
 1 x 15 =       15 Cyls  Primary request
15 x  5 =       75 Cyls  Secondary requests
16              90 Cyls  Total space available, in 16 extents
```

Scenario 2 - Badly Fragmented disk + SPACE=(CYL,(15,5))

In this scenario, any request for space cannot be satisfied with 1 extent, and worse the management routine has to use the maximum 5 extents to satisfy each request:

```
Extents        Allocation
 5 x  3 =       15 Cyls  Primary request
10 x  1 =       10 Cyls  Secondary requests
15              25 Cyls  Total space available, in 15 extents
```

This second scenario is illustrated diagrammatically as follows:

Format 1 DSCB

Data set name + attributes	P	P	P

FORMAT 3 DSCB

P	P	S1	S1	S1	S1	S1	S2	S2	S2	S2	S2	

Notice that with a badly fragmented disk each request for space has been satisfied with 5 extents, the maximum possible per request and that the last extent bucket in the Format 3 DSCB is unused as this situation is likely to yield **an SB37 is likely** when trying to satisfy the third request for secondary allocation.

The Effect of CONTIG

The system will allocate the PRIMARY request in 1 extent whenever possible. If the free space is fragmented the system will attempt to allocate the request in up to 5 extents. If the primary request cannot be satisfied, in up to 5 extents, then the job will fail JCL error, "Space Requested Not Available". To force a a PRIMARY request into a single extent, use CONTIG in the space parameter, i.e. SPACE=(CYL,(15,5),,CONTIG). Be aware that using CONTIG risks a higher incidence of JCL error, "Space Requested Not Available", but this may be preferable to an SB37 during execution.