Using swap files with software suspend (swsusp)

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The Linux kernel handles swap files almost in the same way as it handles swap partitions and there are only two differences between these two types of swap areas: (1) swap files need not be contiguous, (2) the header of a swap file is not in the first block of the partition that holds it. From the swsusp's point of view (1) is not a problem, because it is already taken care of by the swap-handling code, but (2) has to be taken into consideration.

In principle the location of a swap file's header may be determined with the help of appropriate filesystem driver. Unfortunately, however, it requires the filesystem holding the swap file to be mounted, and if this filesystem is journaled, it cannot be mounted during resume from disk. For this reason to identify a swap file swsusp uses the name of the partition that holds the file and the offset from the beginning of the partition at which the swap file's header is located. For convenience, this offset is expressed in <PAGE_SIZE> units.

In order to use a swap file with swsusp, you need to:

1. Create the swap file and make it active, eg.:

```
# dd if=/dev/zero of=<swap_file_path> bs=1024 count=<swap_file_size_in_k>
# mkswap <swap_file_path>
# swapon <swap_file_path>
```

2) Use an application that will bmap the swap file with the help of the FIBMAP ioctl and determine the location of the file's swap header, as the offset, in <PAGE_SIZE> units, from the beginning of the partition which holds the swap file.

3. Add the following parameters to the kernel command line:

```
resume=<swap_file_partition> resume_offset=<swap_file_offset>
```

where <swap_file_partition> is the partition on which the swap file is located and <swap_file_offset> is the offset of the swap header determined by the application in 2) (of course, this step may be carried out automatically by the same application that determines the swap file's header offset using the FIBMAP ioctl)

OR

Use a userland suspend application that will set the partition and offset with the help of the SNAPSHOT_SET_SWAP_AREA ioctl described in Documentation/power/userland-swsusp.rst (this is the only method to suspend to a swap file allowing the resume to be initiated from an initrd or initramfs image).

Now, swsusp will use the swap file in the same way in which it would use a swap partition. In particular, the swap file has to be active (ie. be present in /proc/swaps) so that it can be used for suspending.

Note that if the swap file used for suspending is deleted and recreated, the location of its header need not be the same as before. Thus every time this happens the value of the "resume_offset=" kernel command line parameter has to be updated.