z/OS UNIX Soft Shutdown

This document provides information how to take down z/OS UNIX cleanly in a system that participates in z/OS UNIX file system sharing in a sysplex or for a z/OS Single System. Being part of a file system sharing environment means that z/OS UNIX has been initialized with BPXPRMxx setting "SYSPLEX(YES)". A z/OS UNIX single system environment (SYSPLEX=NO) has its own file system hierarchy independent of all other systems in a z/OS sysplex.

A clean shutdown of z/OS UNIX system services is called a "z/OS UNIX soft shutdown". If you do not (normally) wait for the end of this shutdown processing the system may be taken too fast out of the XCF sysplex. This does not mean that z/OS UNIX cannot handle this in the sysplex sharing environment but it needs much longer to do a cleanup processing done by one of the remaining systems in the sysplex sharing group ending with following message...

```
BPXN002I UNIX SYSTEM SERVICES PARTITION CLEANUP COMPLETE
FOR SYSTEM SYSX
```

Here SYSX is the name of the system that leaves the sysplex via normal shutdown (or even in case of a system crash). However, if no clean z/OS UNIX soft shutdown is done this can lead to some trouble with file systems that need to get unmounted (system specific file systems) or moved (file systems mounted as automovable).

- In case of HFS you might loose data at least.
- In case of zFS recovery processing might be needed.
- In any case automovable file systems may be quiesced for a longer time and applications from other systems may have problems when trying to access data in such a file system.

Before starting the real soft shutdown processing it is normal to take down all applications running locally and using z/OS UNIX. This step includes DB2 and TCP/IP. Automation program products like SA (System Automation) may have special requirements and force to use the more complex way of a z/OS UNIX soft shutdown.

Then you should take down all z/OS UNIX daemon processes that are still running.

If you are driving the NFS client file system type you should then stop the NFS client via MVS system command `F OMVS,STOPPFS=NFS` and when done you have two choices for doing the z/OS UNIX soft shutdown.

Using "F BPXOINIT,SHUTDOWN=FILEOWNER"

This is a more complex way than the possibility discussed afterwards, the OMVS shutdown. It is intended for environments where another application blocks the ideal "F OMVS,SHUTDOWN" command. Following the sequence of the actions to be done...

Enter MVS system command `F BPXOINIT,SHUTDOWN=FORKS` and then wait for the following message before doing the next step.

```
*BPXI032E FORK SERVICE HAS BEEN SHUTDOWN SUCCESSFULLY.
 ISSUE F BPXOINIT,RESTART=FORKS TO RESTART FORK SERVICE.
```

You should also see message " `BPXM036I BPXAS INITIATORS SHUTDOWN.`" which means that all BPXAS address spaces are gone. On "D OMVS" you should see the status "FORK SHUTDOWN".

You can now enter the MVS system command depending on whether the system is part of z/OS UNIX file system sharing group or not...

- Using z/OS UNIX sysplex sharing: `F BPXOINIT,SHUTDOWN=FILEOWNER`
- z/OS UNIX single system: `F BPXOINIT,SHUTDOWN=FILESYS`

In the sysplex sharing situation you need to answer the following reply message with "Y".

```
*70 BPXM055D THIS SYSTEM WILL BE DISABLED AS A FILESYSTEM OWNER. REPLY
 'Y' TO CONTINUE OR ANY OTHER KEY TO EXIT.
```

Afterwards you need to wait for the following message in normal processing.

```
BPXM044I BPXOINIT FILESYSTEM SHUTDOWN COMPLETE
```

When seeing this message you are done and can go to the next step of system shutdown processing. In a

special situation you might see the following message instead.

```
BPXM048I BPXOINIT FILESYSTEM SHUTDOWN INCOMPLETE.
nn FILESYSTEM(S) ARE STILL OWNED BY THIS SYSTEM.
```

This only happens in z/OS sysplex sharing if you have mounted without intention automovable file systems below system specific file systems. So, this is an exceptional situation.

You can use MVS system command **D OMVS,F,O=*SYSX*** from another system in sysplex sharing with full functioning z/OS UNIX system services to list the file systems that are still mounted on the system SYSX that is going down. Based on that you could continue to look for file systems mounted below such file systems and moved to another system already.

Note that there exists a utility available from Github as well and named DREMSFSS (Display REMote Sub File SystemS) that allows to list such remote sub file systems via an SYSREXX routine. You would use **F AXR,DREMSFSS *SYSX*** to do so, if desired.

Normally you can take the message BPXM048I simply as a second indication for the end of the z/OS UNIX soft shutdown and do not wait for message BPXM044I any longer.

If neither of these two messages occur you must find a system specific time frame that you allow the soft shutdown to end normally before going on as you cannot wait forever, of course. Normally you will get one of these final messages.

Using "F OMVS,SHUTDOWN"

This is the preferred and easier z/OS UNIX soft shutdown command that can be used if no application like DB2 or TCP/IP still blocks it. As mentioned before it is normal to take down these applications first anyway.

The MVS system command **F OMVS,SHUTDOWN** is the only one needed here as OMVS monitors and controls the z/OS UNIX shutdown processing completely.

Note, this does not mean that OMVS itself is taken down as z/OS cannot exist without OMVS being active. It is "z/OS UNIX" that is taken down.

At any time you can look for the status of z/OS UNIX via "D OMVS", even when it is completely shutdown. So, this command is the way to keep track of the z/OS UNIX shutdown processing in this case.

You should wait for the following message that shows that the shutdown is complete.

```
*BPXI056E OMVS SHUTDOWN REQUEST HAS COMPLETED SUCCESSFULLY
```

In case of some trouble with automovable file systems mounted accidentally below system specific file systems mounted as UNMOUNT or NOAUTOMOVE (note that NOAUTOMOVE is no longer recommended) as described under the first z/OS UNIX shutdown processing you can get the following messages first.

```
*BPXI066E OMVS SHUTDOWN COULD NOT MOVE OR UNMOUNT ALL FILE SYSTEMS
 BPXI070E USE SETOMVS ON ANOTHER SYSTEM TO MOVE NEEDED FILE SYSTEMS, THEN
 REPLY WITH ANY KEY TO CONTINUE SHUTDOWN.
```

Just as with the other soft shutdown menthod you can continue If you have no time to investigate on this at that moment. Simply provide an empty reply to message BPXI070E. The automovable file systems below the system specific ones will be unmounted as well and processing continues with finally showing message BPXI056E.

In addition you must find again a system specific time frame that you allow the soft shutdown to end normally before going on as you cannot wait forever, but this problem normally does not occur.

Some final comments

Do not mix these soft shutdown possibilities as this can lead to some hang-up situations. If you would like to run "F OMVS,SHUTDOWN" after using "F BPXOINIT,SHUTDOWN=..." you can do it, but wait until the first method has ended.

Simply do not use "F OMVS,STOPPFS=ZFS" in parallel or before USS soft shutdown processing as this can have some further bad effects and also cause similar problems like mixing the z/OS UNIX soft shutdown techniques. Taking down the zFS PFS during shutdown is absolute not needed (when the system was processing fine at that time).

It is recommended to take down all applications that block OMVS shutdown processing like TCP/IP or DB2 before you start to take down z/OS UNIX. Otherwise you might see messages like the following...

```
*BPXI064E OMVS SHUTDOWN REQUEST DELAYED
 BPXI060I TCPIP RUNNING IN ADDRESS SPACE 0052 IS BLOCKING SHUTDOWN OF
 OMVS
```

You can simply stop the shutdown processing to keep the full functionality of z/OS UNIX...

```
 F OMVS,RESTART
 BPXI058I OMVS RESTART REQUEST ACCEPTED
*BPXI061E OMVS SHUTDOWN REQUEST ABORTED
 D OMVS
 BPXO042I 18.54.18 DISPLAY OMVS 136
 OMVS     000F ACTIVE             OMVS=(xx,yy)
```

Now take down the blocking application and restart the shutdown once more.

There may be more problems during an z/OS UNIX Soft Shutdown but this document does not claim it provides a complete set and does not want to that. It just wants to provide the suggested processing and some very closely related errors that can happen.