Migrating WebSphere V.4.0.1 for z/OS Maintenance

Abstract:

Here is the approach we use at the Washington Systems Center for migrating our WebSphere Version 4.0.1 subsystems to a new level of maintenance on all members of our sysplex (z/OS R.2). This can usually be done without re-IPLing z/OS: (Written by John Hutchinson with a great deal of help from Brian Pierce.) The latest version of this document can be found on techdocs at http://www.ibm.com/support/techdocs/atsmastr.nsf/PubAllNum/TD100750

Set-up Assumptions: You must configure your system for this kind of "pull-push" maintenance:

- The WebSphere distribution HFS is in a separate HFS. In a sysplex environment using the Shared HFS support, it should be mounted at a shared mount-point, using a symbolic link at the usual path:

  ```
  /usr/lpp/Websphere401) -> /shared/Websphere401.
  ```

  For our HFS, we use:

  ```
  MOUNT FILESYSTEM('WAS401.WAS.SBBOHFS')
  MOUNTPOINT('/shared/WebSphere401') TYPE(HFS) MODE(RDWR)
  ```

- If you want to upgrade only one system in the sysplex at a time, then you can qualify both the HFS and the MVS datasets with the system name.

- We put the recommended datasets in LPA: SBBOLPA, SBBOLOAD. These are PDSE's so they can't be added to LPALSTxx. You must use Dynamic LPA update for this purpose. See the SETPROG commands below for an example.

- We put the recommended datasets in the Linklist: SBBOLD2, SBBOMIG (these are PDSE's).

- All WebSphere datasets have a common naming convention and are shared across the sysplex.

- Maintenance is done to a master set of datasets, separate from the production set.

Here are the steps:

1. Apply maintenance to a set of "master" target libraries using SMP/E. We do this on a separate system. However, you could do it on the same system using different HLQs for the maintenance and production sets, then doing a rename during the restore step below.

2. Carefully review all ++HOLD information in the PTF cover letters, and be prepared to do any extra steps required. Also insure that any co-requisite zOS and DB2 maintenance is installed on the target system.

3. Using DFDSS, dump the WebSphere target data sets to an 'unload' dataset. Here's the DUMP command we used:

   ```
   DUMP DATASET(INCLUDE( WAS401.WAS.SBBO*.**    -
   WAS401.WAS.SEJS*.** )) -
   COMPRESS  TOLERATE(ENQF) OUTDDNAME(DISK)
   ```

4. Transfer (using FTP, or whatever tool) the dump file to the target system. If different from the maintenance system.

5. Bring down (stop) all your WebSphere application and system servers on all systems.

6. Unmount the WebSphere distribution HFS from the /shared/WebSphere401/ mountpoint.

7. Make sure that all WebSphere data sets are unallocated. (except the PDSEs in LINKLIST which can't be unallocated.)

8. Logically restore the dumped datasets, including the HFS, using the REPLACE option, except for the special case below: Use the RENAMEU functions of DFDSS restore as needed.

9. For the PDSEs in the Linklist (LD2 and MIG), restore them to an intermediate dataset with a different name.

10. IEBCOPY the members of these PDSEs to their proper location in the existing SBBOLD2 and SBBOMIG datasets (with replace).

11. Remount the new HFS at the proper mount-point.

12. Refresh LLA with the MVS Modify command on all systems: `F LLA,REFRESH`

13. Delete the LPA modules (member-by-member) using a canned set of MVS operator commands on each system, using the SETPROG command for all of the members of SBBOLOAD and SBBOLPA that were dynamically added to LPA: (We use SOF, but any automation will do.)

```
SETPROG LPA,DELETE,MODNAME=BBO3MVS,FORCE=YES
SETPROG LPA,DELETE,MODNAME=BBO...
```

14. Add the new copies of LPA modules from these two PDSE's on all systems:

```
SETPROG LPA,ADD,MASK=*,DSNAME=WAS401.WAS.SBBOLOAD
SETPROG LPA,ADD,MASK=*,DSNAME=WAS401.WAS.SBBOLPA
```

15. Perform any ++HOLD actions that are indicated by the new maintenance level (see above).

16. Restart the WebSphere servers on each system, perform any migration actions called out in the Hold data above, and run the IVPs (and any other applications) to make sure everything is working okay.

Fall-Back:

If you need to fall back to an earlier version of service, you can keep prior versions of the dumped files, or you can regress the maintenance datasets (SMP/E RESTORE). Then use the same procedure to logically restore all the data sets.

Managing Multiple Maintenance Levels:

We do NOT keep an SMP/E environment on our target systems, although it would be a simple extension of the technique to include the SMP/E datasets. As an observation, it is difficult to do corrective service on the running system and keep things in sync. The technique described here assumes all members of the sysplex are running the same level of WebSphere code.

If you want some members/systems to be at higher/lower levels, then you need to have a different MVS data set naming schemes. For example, if you want the PRODx systems to be at an earlier level than the DEVx systems, then use a different high-level qualifier for the two environments. For example, the PRODx systems could use 'WAS401.PROD.**' and the DEVx systems use 'WAS401.DEV.**' as the high-level qualifier for the runtime files (including the OMVS data set containing the HFS). You will also have to be careful with several other things:

- Proclib members are shared and have DD statements for STEPLIBs. For these you could use system symbolic of &SYSNAME. or user-defined symbols defined in IEASYM that would resolve the second qualifier to 'WAS' for the PRODx systems, or to 'DEV' for the DEVx systems.

- You will need a different mountpoint for each WAS levels HFSs, and WAS Configuration files must use the different paths as needed. Also PARMLIB members that contain dataset names, like PROGxx and BPXPRMxx must be correctly setup to use the correct level datasets on each system.

- We recommend that you NOT run very long with a mixed maintenance environment if the PRODx systems are in the same WebSphere node/cluster as the DEVx systems. (Unfortunately, you are forced to keep them all in the same node if you want multiple systems in both the PROD and DEV environments.)

- Be very careful to review ++HOLD data for actions that affect the whole node.

- Careful naming conventions are also critical to making this work in smooth enough fashion so as not to invite confusion and messing up the two different levels of load modules. (Those kind of errors are very hard to diagnose.)

You may want to set up different SMP/E environments for each level so you can do selective maintenance, but you could also just use different target dataset names in the DFDSS restore process. (Always subject to humans knowing what they are doing and paying careful attention.)

References:

See the *WebSphere V4 for z/OS Installation and Customization* book in Chapter 6 about setting up WebSphere for different maintenance levels.