

**Hands-on Lab  
Infrastructure Suite for z/VM and Linux:**

**Backup and Restore Manager for z/VM  
Lab Exercises**

**August/September 2015**

## Reference information for all labs:

You each have a copy (in PDF format) of the Administration Guide and the User Guide for Backup and Restore Manager for z/VM. The following chapter and page numbers will help you find documentation on each of the commands or options used in these labs:

<b>status</b>	<b><i>Admin Guide</i></b>	<b><i>Chapter 7, page 89</i></b>
<b>bkrlist</b>	<b><i>User Guide</i></b>	<b><i>Appendix A, page 27</i></b>
<b>bkruser</b>	<b><i>User Guide</i></b>	<b><i>Appendix A, page 30</i></b>
<b>bkrjob</b>	<b><i>User Guide</i></b>	<b><i>Appendix A, page 23</i></b>
<b>bkrvol</b>	<b><i>User Guide</i></b>	<b><i>Appendix A, page 33</i></b>
<b>review</b>	<b><i>Admin Guide</i></b>	<b><i>Chapter 7, page 97</i></b>
<b>submit</b>	<b><i>Admin Guide</i></b>	<b><i>Chapter 7, page 99</i></b>
<b>config</b>	<b><i>Admin Guide</i></b>	<b><i>Chapter 6, page 63</i></b>
<b>console</b>	<b><i>Admin Guide</i></b>	<b><i>Chapter 6, page 75</i></b>

All Backup and Restore Manager commands that you issue from your user ID to the any of the Backup and Restore Manager service machines must be preceded by:

**MSG <server userid>**

For example, to issue the STATUS command from your user ID, type:

**MSG BKRBKUP STATUS**

In these labs, we'll be using the following user IDs on the system TIVLP3:

- **USER01** through **USER20** – you'll each be assigned one of these user IDs to use during class. Your **password** is **IBMCLASS**.
- **CLASSADM** – this will be used by the instructor
- **BKRBKUP** – the master server for Backup and Restore Manager
- **BKRCATLG** – the catalog server for Backup and Restore Manager
- **BKRWRK01** through **BKRWRK04** – the worker service machines for Backup and Restore Manager

We'll also be using Operations Manager for z/VM to view the backup server consoles.

## **Lab 1: Become familiar with the panel interfaces for finding data that has been backed up and is available for restore**

### **Background:**

The backup catalog is housed in Shared File System (SFS). You can use the panel interfaces provided by Backup and Restore Manager to review the catalog contents from various starting points:

- **BKRLIST** is what end users will typically use to find their own data. For performance reasons, this command should not be used from a user ID that has administrator privileges on large systems.
- **BKRUSER** is what administrators will typically use to find and restore individual files for a specific user ID.
- **BKRJOB** is what administrators will typically use to find and restore data associated with a specific job and instance.
- **BKRVOL** is what administrators will typically use to find and restore data associated with a specific DASD volume.

On each of these panel interfaces you have the opportunity to enter filters. To understand the filters, it's important to remember how wildcard characters work in z/VM:

\* means 0 to n characters

% means one and only one character. You can use multiple of these to represent, for example, exactly 2 characters

# means one and only one numeric character (0-9)

@ means one and only one hex character (0-9, A-F, a-f)

& means one and only one alphabetic character (A-Z, a-z)

Continue with the step by step instructions for the lab on the following page.

## Steps for Lab 1:

1. To find any data owned by your user ID in the backup catalog:  
**bkruser**
2. Put your cursor on your user ID and press F11. You will see the list of your disks that have been backed up.  
  
Press F4 to go back to the list of users.
3. You can also filter the list of users by entering data (including wildcards) in the "Ownerid" filter field. Refer to wildcard characters available on the previous page.  
  
For example, in this field enter:  
**u\***
4. Now put your cursor on your user ID again, and press F11.
5. Put your cursor on one of the disks and press F11 to "drill down further" in the catalog. You will now see the list of backup jobs which contain data for your user ID.
6. Put your cursor on one of the jobs/instances and press F11. You will now see everything that was backed up in that job.
7. Put your cursor on one of the files in the list (press F8 to scroll forward if needed) and press F10 to restore that file.
8. You are now on the restore panel, which has many options for the target location of the restore: minidisk, SFS, reader.
9. We'll restore to your reader (rather than replacing the file on disk.)
10. Tab to the "RDR of userid" field and type in your user ID.
11. Press F10 to restore the file. The file will be sent to your VM reader queue. Press F3 to exit the panels.
12. To find the file Backup Manager sent you, type:  
**rdrlist**
13. You will see (at least) 2 files: the file you requested, plus a copy of the console of the Backup Manager service machine that performed the restore (in case there was an error.)
14. To see the contents of either file, put your cursor on the file in the list and press F11 for PEEK.
15. Press F3 to exit PEEK.
16. PEEK the other file if you wish. F3 to exit PEEK.

17. Press F3 to exit RDRLIST

18. Now that you understand how the panels work in general, you can explore the other catalog interfaces that Backup Manager provides.

19. To see the list of all files owned by your user ID in the backup catalog, use one of the following methods:

- Issue **BKRLIST**
- Issue **BKRLIST \* \* \* \*** then use the Owner field in the top right of the panel to filter on your userid.
- Issue **BKRLIST \* \* \* USERnn** replacing the *nn* with your user number.

20. You will see all the files owned by your user ID in the backup catalog. The date and timestamp on each file is the timestamp of the actual file when it was backed up. It is **not** when the backup was completed.

21. If you wish, you can select a file and press F10 to do a restore, following the same steps outlined above.

When done, press F3 to exit.

22. To see a list of all backup jobs that have been run:  
**bkr job**

23. Select one of the rows which represent one instance of one job for one disk and press F11.

24. Again, you see a list of files that were included in that instance of that job. You can select a file for restore if you wish using the steps already described above (put your cursor on a row and press F10.)

25. When done, press F3 to exit the Backup Manager panel interface.

26. To see a list of volumes that contain data that has been backed up on your system:  
**bkrvol**

27. Again, use F11 multiple times to navigate through the volume backup details and find the files on a minidisk on that volume that has been backed up.

Use F3 to exit.

\*\*\*\*\* **End of Lab 1** \*\*\*\*\*

## **Lab 2: Perform a backup of your A-disk**

We'll use a sample job template to create your own backup job that will only back up your A-disk. The backup will be written to disk (rather than tape.)

Many options will already be selected for you. (We'll review those options in future labs.) In this lab you'll only specify which disk is backed up.

For the class, all active job templates will be stored in an SFS directory. This allows Backup Manager to always have access to the latest files and allows each student to update his/her own file in the directory.

You have this SFS directory accessed as filemode E.

### **Steps for Lab 2:**

1. To see a list of files on your A-disk:

```
filelist
```

2. Review the list to verify your A-disk does not contain any large files (nothing over 10 blocks.) You can create one or more small files if you like.

F3 to exit FILELIST.

3. Copy the sample job template we've created for the class to your personal job template. Both will be in the SFS directory we have set up for job templates. Use your user ID or user number as the filename to ensure uniqueness:

```
copyfile labsamp template e <userid> template e
```

4. XEDIT your job template:

```
xedit <userid> template e
```

5. Scroll down (around line 93) or find the specification for the target media:

```
Config Bkr_Output_Spec
```

You'll notice that the value is **CMSFILE BACKUP DISKPOOL \***.

6. From the XEDIT command line, issue:

```
filelist backup diskpool *
```

7. You will see the file **BACKUP DISKPOOL.**

8. Use F11 to see its contents. You'll notice a list of **<userid> <diskaddress>** pairs. This tells Backup Manager where to write the backup data, since we are not writing to tape.

9. Type **QQUIT** in XEDIT and hit F3 from FILELIST until you are back in the XEDIT session for your job template.

10. Scroll down (around line 110) or find the specification for the job name:  
**Config Bkr\_Job\_Name.**

Change the value to match the filename of your job template: **USERnn**

11. You can optionally review other specified options. We'll work with them later.

12. Scroll down (around line 129) or find the **Job\_Header** section that contains **INCLUDE** and **EXCLUDE** statements.

13. Modify the **INCLUDE** statement to specify your user ID in the **INCLUDE** column and **0191** in the **VDEV** column. This will include only your 191 disk (or A-disk) in the backup job.

14. Save your changes and exit:  
**file**

15. Submit your job for review  
**msg bkrbkup review usernn**

Notice the messages you receive. Correct any errors.

16. You should also receive at least one file from BKR BKUP: the resolved job template. To see the file:  
**rdrlist**

17. To see the contents of the resolved job template, put your cursor on the file in the list and press F11 for PEEK.

18. Find the **Job\_Header** section and verify that you have only the following statement:  
**DUMPDYN <userid> 0191 \$\$DRIVER\$\$**

If you do not see this statement, return to step 3 and correct any errors.

19. Press F3 to exit PEEK and F3 again to exit RDRLIST.

20. Submit your job for backup:  
**msg bkrbkup submit usernn**

Notice you receive the same messages as you received in Step 15, plus additional information about which worker the job has been sent to.

21. Using Operations Manager, view the console of that worker to see your job being processed:  
**viewcon bkrwrknn**

Keep in mind that the job may complete quickly and others in the class are also submitting jobs. You can scroll up (F7) or use the reverse find (\) command when viewing the console to find your user ID.

Exit the console using F3.

22. Using Operations Manager, view the console of the catalog server to verify your backup data has been cataloged.  
**viewcon bkrcatlg**

You can search for messages like the following:

**BKRBUI9047I --- Owner - VDEV: <userid> - 0191**

Exit the console using F3.

23. Based on your experiences in Lab 1, use the **BKRUSER** command to find your data that has just been backed up. Remember to select an item and use F11 to drill down. You may have to drill down several levels to find the list of files you can restore.

24. Choose a file and request a restore of the file to your reader. Verify the file is in your reader.

**\*\*\*\*\* End of Lab 2 \*\*\*\*\***



## **Lab 3: Practice INCLUDE/EXCLUDE options**

Advanced users can continue with this exercise to practice other options in backup jobs. You won't perform any actual backups. Instead, you'll practice specifying multiple **INCLUDE/EXCLUDE** statements to see how they affect each other. You will also specify various values for each of the available fields on the **INCLUDE/EXCLUDE** statements.

You'll also specify multiple workers for the job to see how Backup Manager divides the job amongst the workers. You'll then use the REVIEW function to verify your results. Again, we won't actually submit any backup jobs for execution.

When specifying the various options on the **INCLUDE/EXCLUDE** statements, remember how wildcard characters work in z/VM. Refer to the Background information before Lab 1 in this document.

### **Steps for Lab 3:**

1. XEDIT your job template:  
**xedit <userid> template e**
2. Find the specification for the number of workers: **Config Bkr\_Job\_Workers**. Change the value to **2**.
3. Find the **Job\_Header** section that contains **INCLUDE** and **EXCLUDE** statements.
4. Modify the **INCLUDE** and **EXCLUDE** statements.

**Note:** To specify SFS and DASD volume information, uncomment and use the **INCLUDE/EXCLUDE SFS** and **INCLUDE/EXCLUDE RDEVVOL** statements instead of **INCLUDE/EXCLUDE MINIDISK**.

For example, you can try any or all of the following.

- Exclude all minidisks on the system
  - Include all minidisks owned by any user ID starting with MAINT
  - Include all users' minidisks with a virtual address ending in 91
  - Exclude all minidisks that are 50 cylinders or more in size
  - Exclude everything in the SFS filepool BKRSFS (note, use the EXCLUDE SFS statement)
  - Include everything in the SFS filepool BKRSFS owned by BKRADMIN (Backup Manager job templates)
  - Include all DASD volumes with a volser that starts with VMAL
  - Exclude all DASD volumes with a volser that end with 3
5. Save your changes and exit  
**file**

6. Submit your job for **review**:  
**smsg bkrbkup review <job template filename>**

Do **not** use the submit option to actually run the backup job.

Notice the messages you receive. Correct any errors.

7. Use the **RDRLIST** command and the **PEEK** function key to review the resolved job templates. You'll have one file for each worker you specified.
8. Find the **Job\_Header** section in the first file (the filename ends in **00**) and notice the **DUMPxxx** statements, based on your **INCLUDE** and **EXCLUDE** specifications. Remember, this will only list every other disk since you specified 2 workers.

If you do not see these statements, return to step 1 and correct any errors.

9. Find the **Job\_Header** section in the second file (the filename ends in **01**) and notice the **DUMPxxx** statements for the remaining disks and SFS filespaces.

If you do not see these statements, return to step 1 and correct any errors.

10. As time permits, repeat the above steps specifying different options on your **INCLUDE** and **EXCLUDE** statements. You can also change the number of workers.

\*\*\*\*\* **End of Lab 3** \*\*\*\*\*