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Getting Started with IBM Backup and Restore Manager for z/VM

Originally presented at SHARE as Session 9145

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October 2007

Agenda

- **Assumptions**
- **Preparing to install**
- **Installing using VMSES/E**
- **Configuring**
- **Verifying installation and configuration**

Assumptions

- **DIRMAINT is installed for directory management**
  - MAINT is authorized to issue AMDISK commands
  - AUTOG is available for group USER for minidisk definitions
- **Shared File System is available**
- **Installation ID is 5697J06B**
  - No PPF overrides
- **3390 DASD**
- **REXX Library (5695-014) is installed and available**
  - Alternatively use free download of REXX Alternate Library at: http://www.ibm.com/software/awdtools/rexx/rexxzseries/altlibrary.html
- **Installing from tape (not an envelope file)**
- **Installing on minidisk (not SFS)**
- **Operations Manager is running on user ID OPMGRM1**
- **This is not the only way to perform the install**
  - Not all options are discussed
  - See product documentation for full details

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Preparing to Install

- Create installation ID
- Create an SFS server
- Prepare system for VMSES/E installation

Where do I Start ???

- **In the Program Directory ??**

- **In the Installation Guide ??**

- **Because we require SFS, we recommend you start with this presentation**

Define the Installation ID: 5697J06B

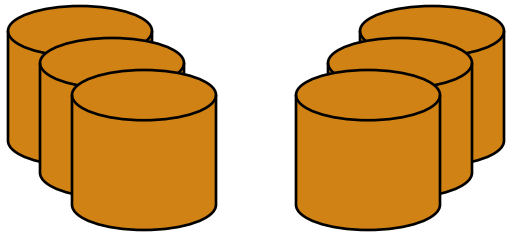
- **From MAINT**
  - Create a file called 5697J06B DIRECT

```
USER 5697J06B password 64M 256M BG
* 5697-J06 - SES install & admin for Backup Mgr V1.2
MACHINE ESA
IPL CMS
OPTION LNKNOPAS
CONSOLE 01F 3215
SPOOL 00C 2540 READER A
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A
LINK MAINT 190 190 RR
LINK MAINT 19D 19D R
LINK MAINT 19E 19E RR
LINK MAINT 51D 51D MR
LINK MAINT 5E5 5E5 RR
```

  - Issue the command

```
DIRM ADD 5697J06B
```

Define the Installation ID: 5697J06B



- **Add required minidisks**
  - From MAINT, issue

```
DIRM FOR 5697J06B AMD 191 3390 AUTOG 10 USER MR
DIRM FOR 5697J06B AMD 198 3390 AUTOG 2 USER MR
DIRM FOR 5697J06B AMD 199 3390 AUTOG 5 USER MR
DIRM FOR 5697J06B AMD 2A2 3390 AUTOG 1 USER MR
DIRM FOR 5697J06B AMD 2B2 3390 AUTOG 5 USER MR
DIRM FOR 5697J06B AMD 2C2 3390 AUTOG 2 USER MR
DIRM FOR 5697J06B AMD 2D2 3390 AUTOG 10 USER MR
DIRM FOR 5697J06B AMD 2A6 3390 AUTOG 1 USER MR
DIRM FOR 5697J06B AMD 491 3390 AUTOG 5 USER MR
DIRM FOR 5697J06B AMD 492 3390 AUTOG 5 USER MR
DIRM FOR 5697J06B AMD 591 3390 AUTOG 5 USER MR
DIRM FOR 5697J06B AMD 592 3390 AUTOG 5 USER MR
DIRM FOR 5697J06B AMD 49D 3390 AUTOG 5 USER MR
```

Format All Minidisks

- **From MAINT, issue**

```
link 5697J06B 191 333 MR
format 333 z
release z (det
```

- **Repeat for each 5697J06B disk**

Create New SFS Server and File Pool

- **Background**
  - Backup catalog is stored in SFS
    - Separate file pool dedicated to Backup is recommended
      - Should not use VMSYS: or VMSYSU:
      - We'll use **BKRSFS:** here, with **BKRSVSFS** as the server
  - Recommend starting with at least 3000 cylinders
    - Large sites will need more
    - Your mileage may vary 
  - Need space for service machine work areas also
    - We'll use BKRSFS: for this also
  - BKRSVSFS is a repository file pool server
    - Does not perform Coordinated Resource Recovery (CRR)
  - Reference: "CMS File Pool Planning, Administration, and Operation" (SC24-6074)

Create New SFS Server: BKRSVSFS

- **From MAINT, create and add directory entry for BKRSVSFS, using most of the sample values**
  - Same procedure used to create user ID 5679J06B
  - Do not format the disks after you've added them

BKRSVSFS DIRECT

```
USER BKRSVSFS password 32M 32M BG
OPTION MAXCONN 2000 NOMDCFS APPLMON QUICKDSP SVMSTAT
SHARE REL 1500
MACHINE XC
IUCV ALLOW
IUCV *IDENT RESANY GLOBAL
IPL CMS
CONSOLE 009 3215 T OPMGRM1
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403
LINK MAINT 190 190 RR
LINK MAINT 193 193 RR
LINK MAINT 19D 19D RR
```

Make Ops Mgr the secondary console

BKRSVSFS Directory Entry (continued)

- **From MAINT, issue**

```
DIRM FOR BKRSVSFS AMD 191 3390 AUTOG 2 USER W
DIRM FOR BKRSVSFS AMD 250 3390 AUTOG 30 USER R PW readpw writepw
DIRM FOR BKRSVSFS MINIOPT 250 NOMDC
DIRM FOR BKRSVSFS AMD 405 3390 AUTOG 10 USER R PW readpw writepw
DIRM FOR BKRSVSFS AMD 406 3390 AUTOG 10 USER R PW readpw writepw
DIRM FOR BKRSVSFS MINIOPT 405 NOMDC
DIRM FOR BKRSVSFS MINIOPT 406 NOMDC
DIRM FOR BKRSVSFS AMD 260 3390 AUTOG 10 USER R PW readpw writepw
DIRM FOR BKRSVSFS AMD 310 3390 AUTOG 750 USER R PW readpw writepw
DIRM FOR BKRSVSFS AMD 311 3390 AUTOG 750 USER R PW readpw writepw
DIRM FOR BKRSVSFS AMD 312 3390 AUTOG 750 USER R PW readpw writepw
DIRM FOR BKRSVSFS AMD 313 3390 AUTOG 750 USER R PW readpw writepw
```

Work disk

Control disk

Repository log disks

Initial catalog disk

User data disks

Initial SFS Server Setup: BKRSVSFS

- **Format 191 disk**
  - From BKRSVSFS, issue

```
format 191 a
```

- **Create a PROFILE EXEC on the 191 disk, containing**

```
/*  */
'ACCESS 193 C'
'CP SET EMSG ON'
Exit 0
```

- **Run the PROFILE**
  - profile

Define Startup Parameters for SFS Server: BKRSVSFS

- **On BKRSVSFS 191 disk, create a file called BKRSVSFS DMSPARMS**

```
ADMIN 5697J06B
ADMIN BKRADMIN
ADMIN BKRBKUP
ADMIN BKRWRK01
ADMIN BKRWRK02
ADMIN BKRWRK03
ADMIN BKRWRK04
NOBACKUP
FILEPOOLID BKRSFS
NOCRR
NOLUNAME
SAVESEGID CMSFILES
USERS 700
```

Generate the File Pool BKRSFS

- **From BKRSVSFS, issue**

  `fileserv generate`

- **When prompted in $$TEMP $POOLDEF, enter**

```
MAXUSERS=1000
MAXDISKS=500
DDNAME=CONTROL          VDEV=250
DDNAME=LOG1             VDEV=405
DDNAME=LOG2             VDEV=406
DDNAME=MDK00001         VDEV=260 GROUP=1 BLOCKS=0
DDNAME=MDK00002         VDEV=310 GROUP=2 BLOCKS=0
DDNAME=MDK00003         VDEV=311 GROUP=2 BLOCKS=0
DDNAME=MDK00004         VDEV=312 GROUP=2 BLOCKS=0
DDNAME=MDK00005         VDEV=313 GROUP=2 BLOCKS=0
```

- **Then** `FILE`

Final SFS Server Tasks for BKRSVSFS

- **Start the server**
  - From BKRSVSFS, issue

```
fileserv start
#cp disc
```

Authorize Users and Create Directories in SFS

- **Authorize administrators and service machines**
  - From 5697J06B, issue

```
enroll user bkradmin bkrsfs (blocks 4000 storgroup 2
enroll user bkrbkup bkrsfs (blocks 4000 storgroup 2
enroll user bkrcatlg bkrsfs (blocks 500000 storgroup 2
enroll user bkrwrk01 bkrsfs (blocks 20000 storgroup 2
enroll user bkrwrk02 bkrsfs (blocks 20000 storgroup 2
enroll user bkrwrk03 bkrsfs (blocks 20000 storgroup 2
enroll user bkrwrk04 bkrsfs (blocks 20000 storgroup 2
```

- **Create required directory entries**
  - From 5697J06B, issue

```
create directory bkrsfs:bkradmin.workarea
create directory bkrsfs:bkrcatlg.workarea
create directory bkrsfs:bkrbkup.workarea
create directory bkrsfs:bkrwrk01.workarea
create directory bkrsfs:bkrwrk02.workarea
create directory bkrsfs:bkrwrk03.workarea
create directory bkrsfs:bkrwrk04.workarea
```

Authorize Users and Create Directories in SFS

- **Create required directory entries for service machines**
  - From 5697J06B, issue

```
enroll user bkradmin bkrsfs (blocks 4000 storgroup 2
enroll user bkrbkup  bkrsfs (blocks 4000 storgroup 2
enroll user bkrcatlg bkrsfs (blocks 4000 storgroup 2
enroll user bkrwrk01 bkrsfs (blocks 4000 storgroup 2
enroll user bkrwrk02 bkrsfs (blocks 4000 storgroup 2
enroll user bkrwrk03 bkrsfs (blocks 4000 storgroup 2
enroll user bkrwrk04 bkrsfs (blocks 20000 storgroup 2
create directory bkrsfs:bkradmin.workarea
create directory bkrsfs:bkrcatlg.workarea
create directory bkrsfs:bkrbkup.workarea
create directory bkrsfs:bkrwrk01.workarea
create directory bkrsfs:bkrwrk02.workarea
create directory bkrsfs:bkrwrk03.workarea
create directory bkrsfs:bkrwrk04.workarea
```

It's okay if these user IDs don't actually exist yet

Take a Breath – New SFS Server is Set Up

If you've never set up SFS before,

this is the hardest part of the product install

Prepare for VMSES/E Installation

- **From 5697J06B**
  - Mount installation tape at virtual address 181
  - Link and access MAINT disks

```
link MAINT 5e5 5e5 rr
access 5e5 b
link MAINT 51d 51d mr
access 51d d
```

  - Load product control files

```
vmfins install info (nomemo
```

  - Obtain planning info

```
vmfins install ppf 5697J06B BKUPMGR (plan nomemo
```

  - Review for errors

```
vmfview install
```


Create Directory Entries for All Required Users

- **Use directory entry samples in 5697J06B PLANINFO**
  - Located on 5697J06B 191 disk
- **Follow steps outlined earlier for creating 5697J06B user ID to create directory entries for**
  - BKRADMIN
  - BKRCATLG
  - BKRBKUP
  - BKRWRK01
  - BKRWRK02
  - BKRWRK03
  - BKRWRK04

Format All Minidisks

- **From 5697J06B, issue**

```
link BKRADMIN 191 333 MR
format 333 z
release z (det
```

- **Repeat for each disk**

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Installing using VMSES/E

Initial VMSES/E Install

- **From 5697J06B**
  - Create and run a PROFILE EXEC

```
xedit profile exec a
===> input /**/
===> input 'access 5e5 b'
===> input 'access 51d d‘
===> input ‘CP SET PF12 RETRIEVE‘
===> file
profile
```

  - Mount product tape at virtual address 181
    - If not already done
  - Load the product code to disk and install

```
vmfins install ppf 5697J06B BKUPMGR (nomemo nolink
```


Initial VMSES/E Install (continued)

- Review for errors

```
vmfview install
```

- Update Build Status Table

```
vmfins build ppf 5697J06B BKUPMGR (serviced nolink
```

- Review for errors

```
vmfview install
```

Where Code is Installed for Configuration and Testing

Disk on 5697J06B	Description
2C2	**Sample files**
491	**Service machine executables for** –BKRBKUP –BKRCATLG –BKRWRKxx
492	**End user and administrator executables**
198	**Configuration files**
199	**Backup job templates**
49D	**Help files for test system**

VMSES/E Installation is Complete

- **All code is installed from tape**
- **Standard install commands used by most z/VM products**
- **This was the easy part**

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Configuring

Verify System Access Privileges for Backup Servers

User ID	Privileges Required and *Recommended*
BKRADMIN	➢ **OPTION LNKNOPAS** (or equivalent, such as **RACF OPERATIONS**) ➢ **Privilege Class G** ➢ ***Privilege Class B*** *(for CP MSGNOH)*
BKRBKUP	➢ **OPTION LNKNOPAS** (or equivalent, such as **RACF OPERATIONS**) ➢ **Privilege Class G** ➢ **Privilege Class A** (for CP FORCE) ➢ **Privilege Class B** (CP MSGNOH) ➢ **Privilege Class D** (CP PURGE)
BKRCATLG	➢ **Privilege Class G** ➢ **Privilege Class B** (CP MSGNOH) ➢ ***OPTION LNKNOPAS*** *(or equivalent, such as **RACF OPERATIONS**) if backing up to disk*
BKRWRKxx	➢ **OPTION LNKNOPAS** (or equivalent, such as **RACF OPERATIONS**) ➢ **Privilege Class G** ➢ **Privilege Class B** (for CP MSGNOH) ➢ ***OPTION DEVINFO*** *(if you have minidisks defined with DEVNO or &SYSRES options)* ➢ ***OPTION LNKSTABL*** *(if you want to link disks in STABLE mode during a backup)*

Create PROFILE EXECs for Test Service Machines

- **PROFILE EXEC for BKRADMIN**
  - From 5697J06B

```
link bkradmin 191 291 mr
acc 291 z
acc 2c2 e
copy admprof sampexec e profile exec z
xedit profile exec z
```

    - **Change**

```
'ACCESS' SFS_Pool':BKRADMIN.CONFIGURATION B/B'
'ACCESS' SFS_Pool':BKRADMIN.RUNTIME C/C'
'ACCESS' SFS_Pool':BKRADMIN.JOBDEFS E'
```

    - **To**

```
'ACCESS 198 B/B'
'LINK 5697J06B 491 491 RR'
'ACCESS 491 C/C'
'ACCESS 199 E'
```

    - **Change**

```
SFS_Pool = 'ROCKSFS1'
```

    - **To**

```
SFS_Pool = 'BKRSFS'
```

    - **Add**

```
'ACCESS 592 F'  /* Access end user and admin routines */
file
```

Create PROFILE EXECs for Test Service Machines

- **PROFILE EXEC for BKRCATLG**
  - From 5697J06B

```
link bkrcatlg 191 292 mr
acc 292 z
acc 2c2 e
copy catprof sampexec e profile exec z
xedit profile exec z
```

  - **Change**

```
'ACCESS' SFS_Pool':BKRADMIN.CONFIGURATION B/B'
'ACCESS' SFS_Pool':BKRADMIN.RUNTIME C/C‘
```

  - **To**

```
‘ACCESS 198 B/B’
‘LINK 5697J06B 491 491 RR’
‘ACCESS 491 C/C’
```

  - **Change**

```
SFS_Pool = ‘ROCKSFS1’
```

  - **To**

```
SFS_Pool = ‘BKRSFS’
file
```

Create PROFILE EXECs for Test Service Machines

- **PROFILE EXEC for BKRBKUP**
  - From 5697J06B

```
link bkrbkup 191 293 mr
acc 293 z
acc 2c2 e
copy mastprof sampexec e profile exec z
xedit profile exec z
```

    - **Change**

```
'ACCESS' SFS_Pool':BKRADMIN.CONFIGURATION B/B'
'ACCESS' SFS_Pool':BKRADMIN.RUNTIME C/C‘
'ACCESS' SFS_Pool':BKRADMIN.JOBDEFS E/E'
```

    - **To**

```
‘ACCESS 198 B/B’
‘LINK 5697J06B 491 491 RR’
‘ACCESS 491 C/C’
‘ACCESS 199 E/E’
```

    - **Change**

```
SFS_Pool = ‘ROCKSFS1’
```

    - **To**

```
SFS_Pool = ‘BKRSFS’
file
```

Create PROFILE EXECs for Test Service Machines

- **PROFILE EXEC for BKRWRK01**
  - From 5697J06B

```
link bkrwrk01 191 294 mr
acc 294 z
acc 2c2 e
copy wrkprof sampexec e profile exec z
xedit profile exec z
```

    - **Change**

```
'ACCESS' SFS_Pool':BKRADMIN.CONFIGURATION B/B'
'ACCESS' SFS_Pool':BKRADMIN.RUNTIME C/C‘
```

    - **To**

```
‘ACCESS 198 B/B’
‘LINK 5697J06B 491 491 RR’
‘ACCESS 491 C/C’
```

    - **Change**

```
SFS_Pool = ‘ROCKSFS1’
```

    - **To**

```
SFS_Pool = ‘BKRSFS’
```

```
File
```

- **Repeat for BKRWRK02, BKRWRK03, and BKRWRK04**

Define Special Users to Backup Manager

- **From 5697J06B**

```
access 198 z
access 2c2 e
copy bkrusers namesamp e = names z
xedit bkrusers names z
```

  - Add additional administrators:
    - BKRBKUP
    - Others as required by your site
  - Use defaults for other fields
  - Copy BKRUSER NAMES to a shared disk for user and server access
    - E.g. MAINT 19E (Y disk) or 5697J06B 492

Update the Configuration File: BKRSYSTM CONFIG

- **From 5697J06B**

```
access 198 z
access 2c2 e
copy bkrsystm confsamp e = config z
xedit bkrsystm config z
```

Update the Configuration File: BKRSYSTM CONFIG

- **Choose local options for**

```
Local_SVM_Contact = System Administrator - sysadmin@some.corp.com
```

  - Contact name displayed on service machines
  - Not used for automated e-mails or messages

```
Template_MDISK_Buffer_Pages = 512
```

  - Increase this value if you have more than 30,000 minidisks on the system

```
BKR_Allow_EDF_Target_Format = 0
```

  - Change to 1 if you want Backup Manager to format unformatted minidisks on restore

```
CatalogPool = RS54QA02
```

  - Change to BKRSFS
- **Copy BKRSYSTM CONFIG to a shared disk**
  - E.g. MAINT 19E (Y disk) or 5697J06B 492

Complete SFS Configuration and Authorization

- **Create backup catalog structure in SFS**
  - From 5697J06B, issue

    ```
    setupcat
    ```

  - Issue all SFS CREATE DIRECTORY commands displayed by SETUPCAT
- **Give all users access to the catalog for restore requests**
  - User access is limited to catalog directories for their own data
  - From 5697J06B, issue

    ```
    enroll public bkrsfs:
    ```

Create Backup Job to Test

- **Use a shipped sample template as a model**
  - From 5697J06B, issue

```
access 2c2 e
access 199 z
copy sampfull tempsamp e testfull template z
xedit testfull template z
```

Customize the Backup Job: TESTFULL

- **Choose local options for**

```
CONFIG BKR_JOB_WORKERS = 1
```

  - Increase the number of workers based on the number of items to backup

```
CONFIG BKR_JOB_NAME = SAMPFULL
```

  - Change to TESTFULL

```
CONSOLE * Sample full backup generated
```

  - Change “Sample full” to indicate name of backup job TESTFULL

```
CP_QUIET SPOOL CONSOLE CLOSE NAME SAMPFULL $$SDATE$$
```

  - Change SAMPFULL to TESTFULL

- **Many other options available**
  - See job statements and comments in SAMPFULL TEMPSAMP

Customize the Backup Job: TESTFULL

- **Update INCLUDE and EXCLUDE statements**
  - Delete or replace the following entries for Linux guests

```
EXCLUDE MINIDISK MACK0* = *
INCLUDE MINIDISK MACK0* = 019*
EXCLUDE MINIDISK R54TUX* = *
INCLUDE MINIDISK R54TUX* = 019*
```

  - Delete the following entries

```
EXCLUDE MINIDISK MAINT = 0123
EXCLUDE MINIDISK MAINT = 0124
INCLUDE MINIDISK MAINT = 012*
INCLUDE SFS VMDEVU: * *
```

  - Change the following to reflect BKRSVSFS instead of SAMPSFS

```
EXCLUDE MINIDISK SAMPSFS* = *
INCLUDE MINIDISK SAMPSFS* = 019*
```

  - Modify the following to exclude large minidisks

```
EXCLUDE MINIDISK * = * * * = * = * > 3300
```

- **FILE to save changes**

Configuration is Complete

- **Now let's see if it actually works!**

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Verifying

Start Backup Manager Service Machines

- **Start required Backup Manager servers**
  - From MAINT, issue

```
cp xautolog bkrcatlg
cp xautolog bkrbkup
```

- **Starting workers is recommended when product is first installed to verify configuration**
  - From MAINT, issue

```
cp xautolog bkrwrk01
```

  - Repeat for other workers
- **Starting workers (BKRWRKxx) is not required in general**
  - BKRBKUP will start them when needed
- **Verify servers are up and running**
  - From MAINT, issue

```
cp smsg bkrbkup status
cp smsg bkrwrk01 status
```

  - Repeat for other workers
- **Workers automatically logged off when idle timeout expires**

Submit a Backup Job

- **Submit a job for review**
  - From BKRADMIN, issue

    ```
    smsg bkrbkup review testfull
    ```

  - Review files returned to BKRADMIN's reader
    - `TESTFULL LINKFAIL`
      - All errors linking to disks included in backup job
    - `TESTFULn JOB`
      - One file for each backup worker assigned
      - All configuration statements with (most) variables resolved
      - All DUMPxxx statements for data that would be backed up
        - xxx = CKD, EDF, SFS, FBA

Submit a Backup Job

- **Submit a job and perform real backup**
  - From BKRADMIN, issue

    ```
    smsg bkrbkup submit testfull
    ```

  - Review files returned to BKRADMIN's reader
  - Review consoles of BKRWRKxx servers
    - From BKRADMIN, issue

      ```
      GOMCMD OPMGRM1 VIEWCON USER(BKRWRKxx)
      ```

Backup and Restore Manager is Up and Running

- **Major task is SFS setup**
  - Especially if you aren't familiar with SFS
- **VMSES/E install is straightforward**
- **Configuration is quick for initial testing**
  - Use the defaults for most things
  - Give all options some thought before production use
- **Use your in-house procedures to move it to production**

References and More Information

- **Backup and Restore Manager for z/VM Web site**
  - http://www.ibm.com/software/stormgmt/zvm/backup
    - Publications
    - Pre-requisites
    - Announcements
    - Support
- **e-mail: Tracy Dean, tld1@us.ibm.com**
- **Publications**
  - CMS File Pool Planning, Administration, and Operation (SC24-6074)
  - Directory Maintenance Facility Commands Reference (SC24-6133)
  - Backup and Restore Manager for z/VM Program Directory (GI10-8662)
  - Backup and Restore Manager for z/VM Administration Guide (SC18-9346)
  - Backup and Restore Manager for z/VM User Guide (SC18-9523)