

IBM Infrastructure Suite for z/VM and Linux: Introduction

Tivoli Storage Manager Extended Edition

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Contents

Introduction	3
Lab Environment	3
TSM Credentials	3
TSM Client and Operations Manager Functions	4
<i>Install the guest application</i>	4
<i>Backup the application files.</i>	5
<i>Perform an Incremental Backup</i>	7
<i>View the backup activity in the Operations Center</i>	8
<i>Restore data from the TSM server</i>	10
<i>Explore the Operations Center</i>	11
Summary	16

Introduction

IBM Infrastructure Suite for z/VM and Linux consists of five products for monitoring and managing your z/VM and Linux on System z environments. These products include:

- IBM Wave for z/VM
- IBM Operations Manager for z/VM
- IBM Backup and Restore Manager for z/VM
- IBM Tivoli Storage Manager Extended Edition
- IBM Tivoli OMEGAMON XE on z/VM and Linux

In this lab, you will work with IBM Tivoli Storage Manager Extended Edition. Separate labs are available for the remaining products in the suite.

Lab Environment

The labs for IBM Infrastructure Suite for z/VM and Linux are hosted on a z196 machine running z/VM 6.3. The TSM server is running on a Linux on System z guest in this environment. The client is running on another Linux on System z guest, IC15BASE. All TSM user ids are defined to this guest.

TSM Credentials

You will need the following credentials for this lab:

Linux Guest IP address : 192.84.47.117

Linux Guest z/VM user ID : IC15BASE

Linux Guest user id/password: tsmuserxx/t0userxx where xx is 01-20, for example, user id tsmuser10 has password t0user10

TSM Node name: IC15BASE

TSM Client id/password: IC15BASE/tsmclient

TSM Operations Manager administrator ID/Password: labadmin01/c0nn3ct01

TSM Operations Manager URL: <https://192.84.47.54:11090/oc/>

TSM Client and Operations Manager Functions

Tivoli Storage Manager allows Linux users to perform their own software and application backups, under the control of policies defined by the TSM administrator.

In this lab, you will perform simple backup/restore scenarios and walk through the TSM Operations Center, to give you an Administrator's view of the backup/restore activity.

You will perform the following tasks:

- Create files for your user ID.
- Perform a backup of those files.
- Modify a file used by the application.
- Perform an incremental backup.
- View the backup activity in the Operations Center.
- Restore data from the TSM server

Install the guest application

1. Sign onto the Linux Guest and setup a simple application.

a. Using an SSH client, logon to the Linux guest using the provided userid/password. You will be in the home directory of the ID (referred to as /home/<user id> in this document).

b. Issue the command **/opt/makemyfiles.sh** This will create the directory /home/<user id>/myappfiles and unpack a set of files into that directory (which will be a subdirectory of where you currently are).

c. Issue the command **ls -l myappfiles** to verify that files that were created.

Backup the application files.

2. Use the TSM client to backup all files in myappfiles.

Issue the command

```
dsmc selective '/home/<user id>/myappfiles/*' -sub=yes
```

When prompted, enter the TSM client ID and password listed in the [TSM Credentials](#) section of this lab guide.

The response from the dsmc command should be similar to the following:

```
# dsmc selective '/home/<user id>/myappfiles/*' -sub=yes
```

```
IBM Tivoli Storage Manager
Command Line Backup-Archive Client Interface
  Client Version 7, Release 1, Level 1.0
  Client date/time: 04/29/2015 15:28:59
(c) Copyright by IBM Corporation and other(s) 1990, 2014. All Rights Reserved.

Node Name: <MYNODE>
Please enter your user id <MYNODE>: <Node name>

Please enter password for user id "IC15BASE": <Node password>

Session established with server TIVLP3RHEL2: Linux/s390x
  Server Version 7, Release 1, Level 1.0
  Server date/time: 04/29/2015 14:29:33  Last access: 04/29/2015 14:29:33

Selective Backup function invoked.

Directory-->                4,096 /home/tsmuser/myappfiles [Sent]
Normal File-->                80 /home/tsmuser/myappfiles/myfile01.txt [Sent]
Normal File-->                80 /home/tsmuser/myappfiles/myfile02.txt [Sent]
Normal File-->                80 /home/tsmuser/myappfiles/myfile03.txt [Sent]
Normal File-->                80 /home/tsmuser/myappfiles/myfile04.txt [Sent]
Selective Backup processing of '/home/tsmuser/myappfiles/*' finished without
failure.

Total number of objects inspected:           5
Total number of objects backed up:           5
Total number of objects updated:             0
Total number of objects rebound:            0
Total number of objects deleted:             0
Total number of objects expired:             0
Total number of objects failed:              0
Total number of objects encrypted:           0
Total number of objects grew:                0
Total number of retries:                     0
Total number of bytes inspected:             4.31 KB
Total number of bytes transferred:           452 B
Data transfer time:                          0.00 sec
Network data transfer rate:                   147,135.41 KB/sec
Aggregate data transfer rate:                 0.35 KB/sec
Objects compressed by:                       0%
Total data reduction ratio:                  89.77%
Elapsed processing time:                      00:00:01
```

The above command performed a *full* backup of the /home/<user id>/myappfiles directory; it backed up all files regardless of if they had changed since the last backup. An *incremental* backup will only backup files that have been changed since the last backup. You will take this action in the next step.

Perform an Incremental Backup

1. Perform an incremental backup. Start by modifying a file in the myappfiles directory.

a. Change to the `/home/<user id>/myappfiles` directory if you are not already there.

b. Edit the file `myfiles01.txt`. Add the line

File has been edited

c. Save the `myfiles01.txt` file.

2. Issue the command for an incremental backup:

```
dsmc incr '/home/<user id>/myappfiles/*' -sub=yes
```

Respond to the ID and password prompts as was done in the preceding step.

Note the **objects inspected** and **objects backed up** lines in the response output:

Total number of objects inspected:	6
Total number of objects backed up:	1

Only the file that was changed was sent to the TSM server this time.

View the backup activity in the Operations Center

Now that a backup is complete, you will explore the Operations Center.

1. Logon to Tivoli Storage Manager Operations Center to view details about your backup.

- a. Open a browser session to the TSM Operations Center URL.
- b. Sign on using the userid and password

Check the [TSM Credentials](#) section for the link to the TSM Operations Center and userid/password information.



- c. Click on **Clients** on the top line to display the Clients page:

Tivoli Storage Manager Overviews **Clients** Services Servers Storage Pools Storage Devices

TSM Clients 3

Alerts 0 Applications 0 Virtual Machines 0 Systems 3

Quick Look Details Back Up Set At Risk More Filter

Type	Name	At Risk	Server	Replication	Peer S
	HASL108		HASLE333		
	HASL111		HASLE333		
	HASL117	—	HASLE333		

d. Double click on the name of the node you are using to view its details. It will look similar to the following:

HASL108

Normal

- Summary
- Properties
- File Spaces
- Client Access
- Diagnosis

Client Files

Platform

SUSE Linux Enterprise Server 11 (s390x)

Current Sessions

There are no active sessions for the client.

Contact

Files Scheduled

Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Today
0	0	0	0	0	0	0	0	0	0	0	0	0	0	11

The two charts in the center show the recent history of backup/restore activity being performed on the node. It will include information on the two backups that were performed earlier in this lab.

- e. Hold the cursor over the points in the **Client Files** chart and the bar in the **Activity** chart to see details.
- f. Click on **Properties** on the left side to see the client's attributes in the TSM server.

Restore data from the TSM server

1. Return to the terminal session and delete the files in the myappfiles directory with the command

```
rm -f /home/<user id>/myappfiles/*
```

Then issue the command `ls -l /home/<user id>/myappfiles` to verify the directory is empty.

2. Restore the files from the TSM server with the command

```
dsmc restore '/home/<user id>/myappfiles/*'
```

When prompted supply the node ID and password.

The response should be similar to the following:

```
Session established with server TIVLP3RHEL2: Linux/s390x
Server Version 7, Release 1, Level 1.0
Server date/time: 04/29/2015 14:58:34 Last access: 04/29/2015 14:44:44
```

Restore function invoked.

ANS1247I Waiting for files from the server...

```
Restoring          80 /home/tsmuser/myappfiles/myfile02.txt [Done]
Restoring          80 /home/tsmuser/myappfiles/myfile03.txt [Done]
Restoring          80 /home/tsmuser/myappfiles/myfile04.txt [Done]
Restoring         102 /home/tsmuser/myappfiles/myfile01.txt [Done]
```

Restore processing finished.

```
Total number of objects restored:          4
Total number of objects failed:            0
Total number of bytes transferred:        442 B
Data transfer time:                        0.00 sec
Network data transfer rate:                53,955.07 KB/sec
Aggregate data transfer rate:              0.08 KB/sec
Elapsed processing time:                    00:00:0
```

3. Verify the files have been restored

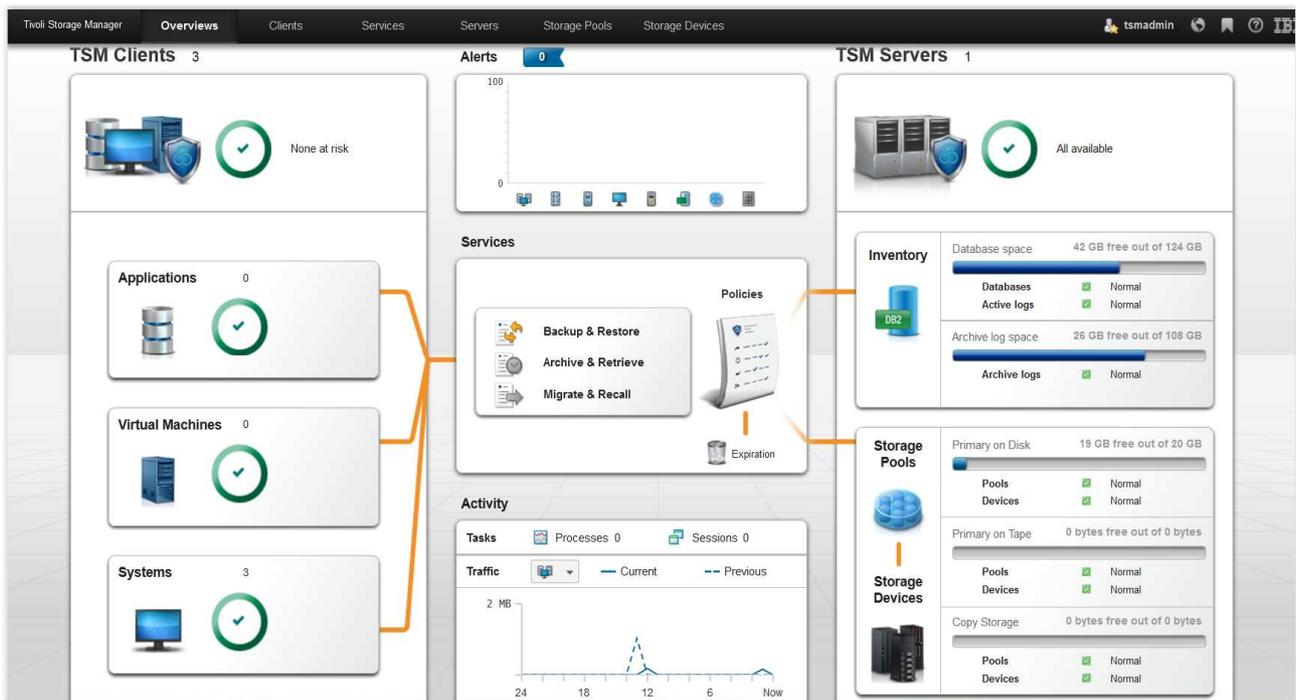
- a. Issue the command **ls -l myappfiles**
- b. Note the files are when they were last changed. By default, the most recent version of each active file is restored. Versioning is possible, to restore a particular backed up version.

4. Work with these files has been completed. Delete them and the myappfiles directory with the command

```
rm -rf /home/<user id>/myappfiles
```

Explore the Operations Center

1. Return to the browser session that was opened for the TSM Operations Center and click **Tivoli Storage Manager** on the top left of the menu. This will display an overview of the environment known to the Operations Center:



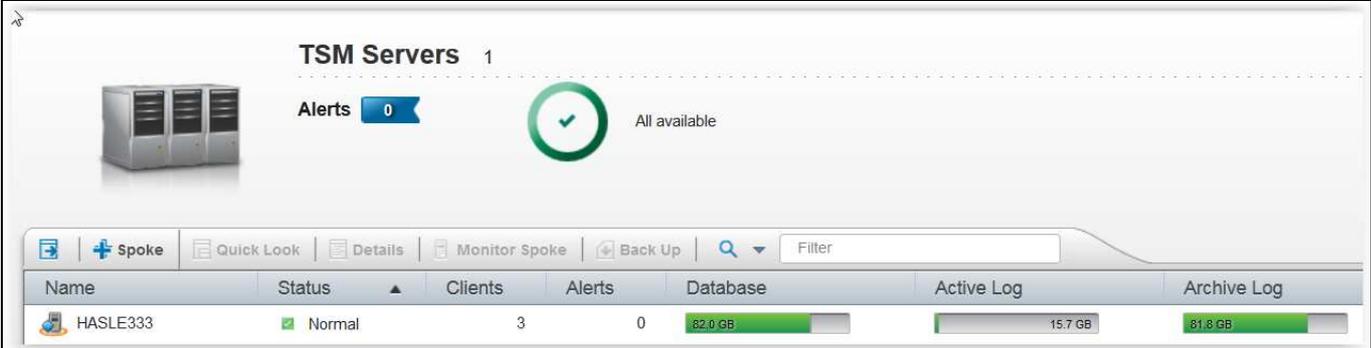
The main menu shows three categories of information:

- **Clients** – the left column provides information related to the TSM clients
- **Alerts and activity** – the center column provides information related to the client activities and any alerts generated from these activities
- **Servers** – the right column provides information on the TSM servers defined to this Operations Center

The globe icon in the upper right of the menu will open a command line interface to the TSM server.

The circles on some of the boxes indicate the overall status of the information for that section. They can be green (normal) yellow (warning) or red (critical).

2. Click the top box under the **TSM Servers** column to drill down into details on the TSM server:



The screenshot displays the 'TSM Servers' section of the Operations Center. At the top, there is a server rack icon, the title 'TSM Servers 1', and an 'Alerts 0' indicator. A green checkmark icon is labeled 'All available'. Below this is a navigation bar with tabs: '+ Spoke', 'Quick Look', 'Details', 'Monitor Spoke', and 'Back Up'. A search filter is also present. The main content is a table with the following data:

Name	Status	Clients	Alerts	Database	Active Log	Archive Log
HASLE333	Normal	3	0	82.0 GB	15.7 GB	81.8 GB

Note the type of information provided for the top (or only) server in the list:

- What is its current status?
- How long has it been active?
- How many clients is it supporting?
- How large is the database?
- When was the last database backup ?

The **+Spoke** tab (which is greyed out) allows additional servers to be added and monitored by this Operations Center. This will not be used in this lab, but is mentioned for awareness.

3. Double click the server name to view more details:



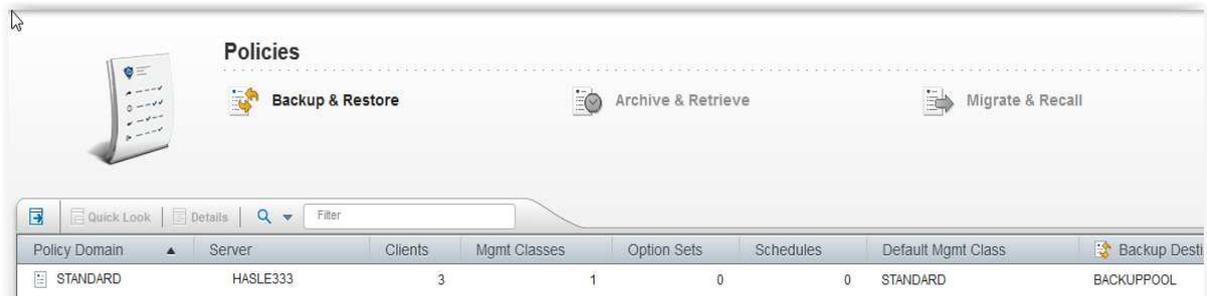
Note the information provided at this level (for the graphs, hover the cursor over the contents to see specific values):

- How many server activities (tasks) are active, and how many are completed?
- What has been the storage capacity usage over the last 2 weeks?
- What has been the peak number of client sessions in the last 24 hours?

4. Click **Properties** on the left to view the detail server properties. With the proper administration authority many of these can be updated. Note the type of information shown:

- When was the server installed?
- What is the server version and operating system platform?
- What is the authentication method?
- What type of password rules are in place?
- What is the maximum number of concurrent sessions allowed?
- What is the retention period for the server logs?

5. Click **Tivoli Storage Manager** on the upper left to return to the main dashboard then click **Backup & Restore** in the middle box of the center column:

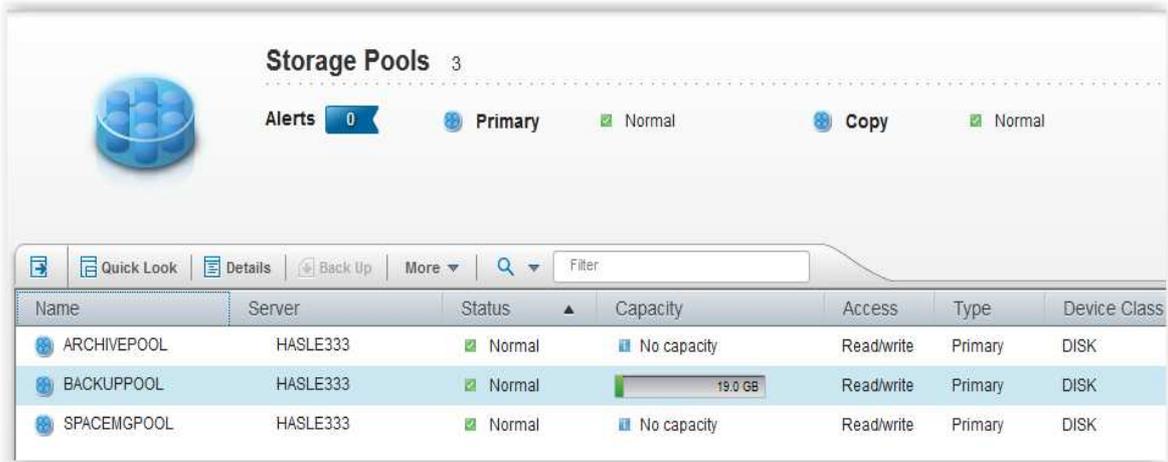


From this view server policies for backup and restore, archive and restore, and migrate and recall can be viewed. Note the type of information provided for the **STANDARD** policy:

- How many clients are associated with this policy?
- How many management classes are defined for this policy?

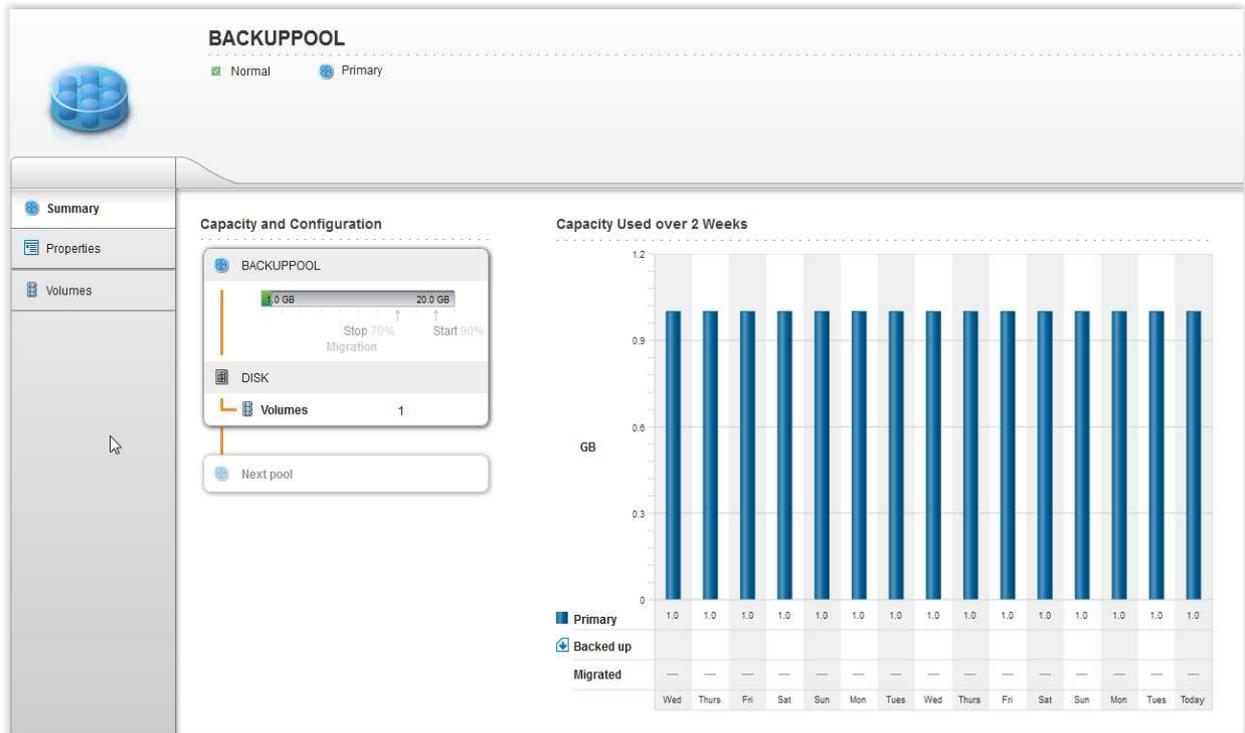
6. Double click on the **STANDARD** policy name to see the policy details. Then click the browser back button to return to the *Policies* view.

7. Click **Tivoli Storage Manager** on the top left to return to the main dashboard view. Then click **Storage Pools** in the bottom box in the right column of the dashboard to view the storage details:



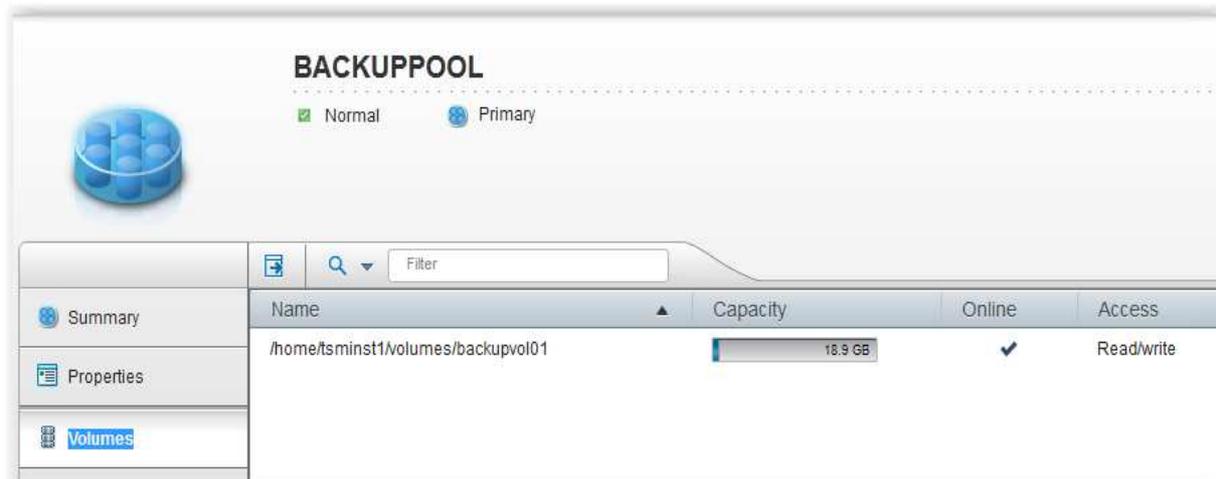
The **Storage Pool** view shows a summary of the storage defined to hold backup and archived data. Three pools are automatically defined (ARCHIVEPOOL, BACKUPPOOL, SPACEMGPOOL), and additional ones can be associated. Associated with each pool are the physical entities in the device class (for example, volumes in the DISK device class) that hold the data.

8. Double click on **BACKUPPOOL** to see more detailed information:



- How much storage is being used in this pool?
- How many volumes are associated with this pool?

9. Volumes are “containers” (files on the Linux file system) that contain backup and archive data. Double click **Volumes** on the left to view more details on the volume(s) associated with BACKUPPOOL:



This shows the volumes names and their respective capacity.

Logoff TSM Operations Center.

Summary

Tivoli Storage Manager Extended Edition allows you to backup and restore individual files on a Linux on System z guest. In this lab you performed a full and an incremental backup of an application directory and then restored the data to the Linux guest. An introduction to the Operations Center provided some visibility into the key aspects of the Tivoli Storage Manager environment, including clients, storage pools, and storage devices.