Tivoli Professional Certification Program

Study Guide Series

Exam 532 - IBM Tivoli Storage Manager V6.2 Fundamentals

Purpose of Exam Objectives

When an exam is being developed, the Subject Matter Experts work together to define the role the certified individual will fill. They define all of the tasks and knowledge that an individual would need to have in order to successfully implement the product. This creates the foundation for the objectives and measurement criteria, which are the basis for the certification exam.

The Tivoli Certification item writers use these objectives to develop the questions that they write and which will appear on the exam.

It is recommended that you review these objectives. Do you know how to complete the task in the objective? Do you know why that task needs to be done? Do you know what will happen if you do it incorrectly? If you are not familiar with a task, then go through the objective and perform that task in your own environment. Read more information on the task. If there is an objective on a task there is about a 95% chance that you WILL see a question about it on the actual exam.

After you have reviewed the objectives and completed your own research, then take the assessment exam. While the assessment exam will not tell you which question you answered incorrectly, it will tell you how you did by section. This will give you a good indication as to whether you are ready to take the actual exam or if you need to further review the materials.

Note: This is the high-level list of objectives. As you review these objectives, click for a more detailed level of how to perform the task.

High-level Exam Objectives

	Section 1 - IBM Tivoli Storage Manager Family
1.1	Given the online resources available, identify IBM Tivoli Storage Manager (Tivoli Storage Manager) data protection products so that knowledge of when to use the data protection products has been obtained.
1.2	Given online resources available, describe Tivoli Storage Manager de-duplication functionality so that knowledge of were the de duplication action takes place is identified.
	Section 2 – IBM Tivoli Storage Manager Server Architecture Concepts
2.1	Given the use of IBM Redbooks, identify IBM Tivoli Storage Manager (Tivoli Storage Manager) "wheel of life" data protection products so that knowledge how/when Tivoli Storage Manager processing takes place is obtained.
2.2	Given online resources, describe what role Tivoli Storage Manager policies play in the enforcement of data retention so that customer data is retained per business or legal requirement.
2.3	Given online resources, identify the different types of backups available so that the methodology that Tivoli Storage Manager uses for backups are understood.
2.4	Given book/documentation describe the Tivoli Storage Manager backup versioning and data retention, so that the Tivoli Storage Manager data storage rules defined.
2.5	Given knowledge of Tivoli Storage Manager, describe how the Tivoli Storage Manager server and client work together, so that Tivoli Storage Manager can provide backup and restore data.
2.6	Given knowledge of Tivoli Storage Manager, describe the Tivoli Storage Manager Disaster Recovery Manager feature, so that the complete backup of all data and ability to recover it in a timely fashion.
	Section 3 – IBM Tivoli Storage Manager Storage and Device Concepts
3.1	Given knowledge of IBM Tivoli Storage Manager (Tivoli Storage Manager), describe the storage hierarchy in Tivoli Storage Manager, so that the way Tivoli Storage Manager organizes storage pools is understood.
3.2	Given knowledge of Tivoli Storage Manager, describe Tivoli Storage Manager reclamation, so that how Tivoli Storage Manager reclamation process, which minimize the use of sequential volumes is understood.
3.3	Given knowledge of Tivoli Storage Manager, describe the data movement between the Tivoli Storage Manager storage pools, so that how data moves between the Tivoli Storage Manager storage pools is understood.
	Section 4 – IBM Tivoli Storage Manager Client Concepts

4.1	Given detailed information about data protection strategies described in IBM Tivoli Storage Manager (Tivoli Storage Manager) Documentation, explain backups and archives and how they differ, so that the concepts have been explained.
4.2	Given Tivoli Storage Manager Documentation, explain the difference between restoring and retrieving data, so that the concepts have been explained.
4.3	Given Tivoli Storage Manager documentation, describe journal based backups, so that the concept has been explained.
4.4	Given knowledge of Tivoli Storage Manager and SAN Infrastructure and the basics of LAN-free data movement, explain the principles of LAN-free and LAN based backup so that the configuration and principles of operation is understood.
	Section 5 – IBM Tivoli Storage Manager Client Implementation
5.1	Given a correctly set up system and network which meet the requirements, and access to the IBM Tivoli Storage Manager (Tivoli Storage Manager) code, determine whether the installation is new and follow the documented installation steps for any supported operating system so that the Tivoli Storage Manager client installed on the system.
5.2	Given the need to register a client to Tivoli Storage Manager, log on to Tivoli Storage Manager as admin, determine policy information based on SLA, run commands to register node, schedule the client for automatic backup, so that a user can perform backups and restore the user's data.
5.3	Given the need to perform a client backup manually as opposed to automated scheduling, log on to the Backup-Archive GUI client, select the backup icon, determine files/folders identified requiring backed up so that the files identified as needing a manual back up have been copied to the Tivoli Storage Manager server.
5.4	Given the need to perform a client restore: log on to the B/A GUI client, select the restore icon, select versioning criteria, identify files/folders that are needing restored, so that files saved on the Tivoli Storage Manager server have been copied back to the local system.
5.5	Given the need to perform a client restore manually to a different location on the system: log on to the Backup- Archive GUI client, select the restore icon, select versioning criteria, determine files/folders that are identified as needing restored up, so that files saved on the Tivoli Storage Manager server have been copied back onto the local system to an alternate location.
5.6	Given a working Tivoli Storage Manager environment where there should have one node restore data backed up from another node, create a node access so that one node now has been granted the authority to restore files for another specified node.

5.7	Given the need to check if a client back-up completed: log on to Tivoli Storage Manager, query the events to determine the status of the backup, determine course of action based on results so that the status of the back-up has been identified.
5.8	Given a properly installed and customized Tivoli Storage Manager Client environment and an error has occurred, review the various logs, so that the Tivoli Storage Manager client issue has been identified.
5.9	Given a properly set up scheduling for backup on client and server side, review the schedule and event logs, so that it has been confirmed that the client backups are running as scheduled.

Detailed Exam Objectives

Section 1 - IBM Tivoli Storage Manager Family

1.1. Given the online resources available, identify IBM Tivoli Storage Manager (Tivoli Storage Manager) data protection products so that knowledge of when to use the data protection products has been obtained.

SUBTASK(S):

1.1.1. Tivoli Storage Manager for Databases - Performs online, consistent and centralized backups to avoid downtime, protect vital enterprise data infrastructure and minimize operation costs.
  1.1.1.1. Includes Data Protection for Oracle, which interfaces with Oracle Recovery Manager (RMAN), to support Oracle backup and restore utilities.
  1.1.1.2. Includes Data Protection for Microsoft SQL Server, which enables users to perform on-line backups of SQL databases, to Tivoli Storage Manager storage

1.1.2. Tivoli Storage Manager for Mail - Utilizes the application program interfaces (APIs) provided by e-mail application vendors to perform online "hot" backups and improve restores without shutting down the e-mail server.
  1.1.2.1. Includes Data Protection for Lotus Domino which exploits the "transaction logging" feature of Domino, enabling the capture of just the database changes for logged databases, thus resulting in less-frequent full backups.
  1.1.2.2. Includes Data Protection for Microsoft Exchange which can produce the different types of backups specified by Microsoft backup APIs: Full Backups, Incremental Backups, Differential Backups, Copy Backups and Database Copy Backups.

1.1.3. Tivoli Storage Flashcopy Manager - Provides fast application-aware backups and restores leveraging advanced snapshot technologies in IBM storage systems.

1.1.4. Tivoli Storage Manager for Microsoft Sharepoint - Provides backup and recovery of Microsoft SharePoint Portal 2003 and Microsoft Office SharePoint Server 2007 environments.

1.2. Given online resources available, describe Tivoli Storage Manager de-duplication functionality so that knowledge of were the de duplication action takes place is identified.

SUBTASK(S):

1.2.1. Client side de-duplication -De-duplication performed at the data source (e.g., by a backup client), before transfer to target location.
  1.2.1.1. Advantages
    1.2.1.1.1. De-duplication before transmission conserves network bandwidth.

1.2.1.1.2. Awareness of data usage and format may allow more effective data reduction.
1.2.1.1.3. Processing at the source may facilitate scale-out
1.2.1.1.4. Immediate data reduction, minimizing disk storage requirement
1.2.1.1.5. No post-processing (identify, reclamation) to regain duplicate data.

1.2.1.2. Disadvantages

1.2.1.2.1. De-duplication consumes CPU cycles on the file/application server.
1.2.1.2.2. Requires TSM 6.2+ software deployment at source and target endpoints.
1.2.1.2.3. Maybe bottleneck for data ingestion (e.g., longer backup times).
1.2.1.2.4. Only one de-duplication process for each I/O stream
1.2.1.2.5. Can't do de-duplication of legacy data on the target server if only method used.

1.2.2. Server side de-duplication – De-duplication performed at the target (e.g. by backup server or storage appliance).

1.2.2.1. Advantages

1.2.2.1.1 No deployment of client software required
1.2.2.1.2 Possible use of direct comparison to confirm duplicates
1.2.2.1.3 No impact to data ingestion
1.2.2.1.4 Potential for de-duplication of legacy data
1.2.2.1.5 Possibility for parallel data de-duplication processing

1.2.2.2. Disadvantages

1.2.2.2.1 De-duplication consumes CPU cycles on the target server.
1.2.2.2.2 Data must be processed twice (during ingestion and subsequent de-duplication).
1.2.2.2.3 Storage needed to retain data until de-duplication occurs

Section 2 – IBM Tivoli Storage Manager Server Architecture Concepts

2.1. Given the use of IBM Redbooks, identify IBM Tivoli Storage Manager (Tivoli Storage Manager) "wheel of life" data protection products so that knowledge how/when Tivoli Storage Manager processing takes place is obtained.

SUBTASK(S):

2.1.1. The daily schedule has a period where clients perform their backups.

2.1.2. Once the clients are finished, the server performs housekeeping.

- 2.1.2.1. The server makes copies of the disk storage pools for off-site storage.
- 2.1.2.2. The server backs up its database, deletes volume history, saves the device configuration, and creates a list of tapes for vault processing.
- 2.1.2.3. The server then migrates the data from disk storage pools to on-site tape pools, reclaims blank space from tape pools.
- 2.1.2.4. Finally the expiration process runs.

2.1.3. A new client backup begins for the next night.

2.2. Given online resources, describe what role Tivoli Storage Manager policies play in the enforcement of data retention so that customer data is retained per business or legal requirement.

SUBTASK(S):

2.2.1. Identify business data retention requirements.

2.2.2. The Tivoli Storage Manager policy structure is built on the server by using either the GUI or CLI.

2.2.3. Tivoli Storage Manager policy hierarchy structure is as follows:

- 2.2.3.1. Policy Domain:
  A policy domain is a way to group Tivoli Storage Manager clients depending on how to treat their data
- 2.2.3.2. Policy Set:
  A policy set is a group of management classes. There can be multiple policy sets within a policy domain, but only one of them is active at a time.
- 2.2.3.3. Management Class:
  The management class is a tier in the policy management that essentially serves as an interface between the client's data and the copy groups whose rules govern the versioning and/or the retention of data. A management class usually contains both a backup and an archive copy group, or it can house either group. A management class can even be empty, that is, without a backup or archive copy group, but in such a case, the management class is useless, as there are no rules that would govern the data.
- 2.2.3.4. Copy Group:

Copy groups consist of rules used to govern the retention of data. There are two types of copy groups: a backup copy group, which holds the rules for backup data, and an archive copy group which holds the rules for archive data.

2.3. Given online resources, identify the different types of backups available so that the methodology that Tivoli Storage Manager uses for backups are understood.

SUBTASK(S):

2.3.1. Identify backup methodology types.
- 2.3.1.1. Full – All files are backed up.
- 2.3.1.2. Incremental – Only files that have changed since last backup occurred are backed up.
- 2.3.1.3. Selective - Overrides Incremental backup and saves selected files regardless if they have changed or not since the last backup.
- 2.3.1.4. Image or Logical volume backup – Backing up a file system, or raw logical volume as a single object from the client machine.
- 2.3.1.5. Adaptive subfile backup – This is when only changed portions of files are backed up.
- 2.3.1.6. Journal-based backup – This is when the client keeps a running list of files as they change. This list is what is used to determine what files get saved when the backup occurs.

2.3.2. Determine which is appropriate methodology should be use in any given customer situation.

2.4. Given book/documentation describe the Tivoli Storage Manager backup versioning and data retention, so that the Tivoli Storage Manager data storage rules defined.

SUBTASK(S):

2.4.1. Tivoli Storage Manager Backup versioning – is where you save multiple versions of the same object - There are multiple parameters to set Tivoli Storage Manager Backup versioning.
VEREXISTS: Number of object copies or versions to keep.
VERDELETE: Number of versions to keep when object has been deleted on the client.

2.4.2. Tivoli Storage Manager data retention – is where you save multiple versions of the same object - There are multiple parameters to set Tivoli Storage Manager backup data retention.
RETEXTRA: Number of days to keep inactive versions.
RETONLY: How many days to keep the last object copy in Tivoli Storage Manager when the object deleted on the client.

2.5. Given knowledge of Tivoli Storage Manager, describe how the Tivoli Storage Manager server and client work together, so that Tivoli Storage Manager can provide backup and restore data.

SUBTASK(S):

2.5.1. Progressive Backup Methodology:
Progressive Backup can be thought of as combining the backup benefits of the incremental approach with the restore benefits of the differential approach. Files are backed up incrementally to reduce network traffic, while recovery media is consolidated to provide better restore performance.

2.5.2. Data Management Policy:

2.5.2.1. Policy Domain:
A policy domain is a way to group Tivoli Storage Manager clients depending on how to treat their data.

2.5.2.2. Policy Set:
A policy set is a group of management classes. There can be multiple policy sets within a policy domain, but only one of them is active at a time.

2.5.2.3. Management Class:
The management class is a tier in the policy management that essentially serves as an interface between the client's data and the copy groups whose rules govern the versioning and/or the retention of data. A management class usually contains both a backup and an archive copy group, or it can house either group. A management class can even be empty, that is, without a backup or archive copy group, but in such a case, the management class is useless, as there are no rules that would govern the data.

2.5.2.4. Copy Group:
Copy groups consist of rules used to govern the retention of data. There are two types of copy groups: a backup copy group, which holds the rules for backup data, and an archive copy group which holds the rules for archive data.

2.5.3. Storage pool:
A storage pool is a collection of storage pool volumes; each storage pool represents one type of media.
Tivoli Storage Manager has two types of storage pools: Primary storage pools and copy storage pools.

2.5.3.1. Primary storage pools:
When a client node backs up, archives, or migrates data, the data is stored in a primary storage pool.

2.5.3.2. Copy storage pools:
A copy storage pool provides an additional level of protection for client data and is created for the express purpose of backing up a primary storage pool.

2.5.4. Register Tivoli Storage Manager client, associated with policy domain.

2.5.5. Tivoli Storage Manager client backup/archive objects store in Tivoli Storage Manager data storage rules.

2.5.6. Tivoli Storage Manager client backup/store data by using Tivoli Storage Manager scheduler or on demand (manual).

2.5.7. Tivoli Storage Manager client backup/restore protocol (TCP/IP, LAN-Free or share memory).

2.6. Given knowledge of Tivoli Storage Manager, describe the Tivoli Storage Manager Disaster Reovery Manager feature, so that the complete backup of all data and ability to recover it in a timely fashion.

SUBTASK(S):

2.6.1. Tivoli Storage Manager server database backup:
The heart of every Tivoli Storage Manager is the database, and the database backup is vital for server recovery.

2.6.2. Copy storage pool data:
When Tivoli Storage Manager backs up clients, the new client data is stored in primary pools. Copy storage pools contain backups of the primary storage pools, and are intended for shipment off-site. Copy all new primary storage pool files to a copy storage pool, ensuring that the copy storage pool is up-to-date with the most recent backup. Each time the primary pool is backed up to the copy storage pool, the newly generated tapes should be sent off-site.

2.6.3. Send copy storage data and Tivoli Storage Manager database backup to off-site location.

2.6.4. Volumes tracking:
Tivoli Storage Manager disaster recover manager (DRM) provides several levels of volume tracking. DRM volume tracking includes:

- 2.6.4.1. Identify which off-site volumes are needed for a given recovery.
- 2.6.4.2. Integrate with tape management systems: Tivoli Storage Manager DRM is fully integrated with tape management. Every time a new tape is created in the corresponding copy storage pools or Tivoli Storage Manager database backup, it is automatically eligible for off-site movement.
- 2.6.4.3. Recycle partial filled volumes: Off-site volumes are reclaimed in the same way as on-site volumes. By using DRM, you can query which volumes have reached an empty state because of reclamation, and request them to be returned on-site.
- 2.6.4.4. Tracking off-site volumes: DRM manages media (volumes) by assigning a special state to each volume. The state is one of a number of predefined states used by DRM. There are two possible directions for a volume; move from on-site to off-site and move from off-site to on-site.

2.6.5. Server recovery plan
The special DRM “prepare” command generates a recovery plan that contains critical information needed for recovery.

2.6.6. Disaster recovery methods – There are several methods for disaster recovery.

- 2.6.6.1. Mirror site:

A mirror site has an up-to-date replica of all required data, on line and ready to go. Updates from the primary site are transmitted and applied in real time to the mirror site.

2.6.6.2. Hot site:
Generally, a hot site has all of the infrastructure hardware and software in place, A hot site can also contain copies of the data, but possibly not up-to-date.

2.6.6.3. Cold site:
With a cold site, it may have all the required hardware and software available, but not running (thus the term “cold”). It may not even be properly configured or ready for usage. The installation of Tivoli Storage Manager and all required software are needed in order to restore Tivoli Storage Manager server database and Tivoli Storage Manager clients’ data. DRM will help to rebuild the Tivoli Storage Manager server, so that that Tivoli Storage Manager clients’ data can be restored.

2.6.6.4. Reconstruction:
Reconstruction is rebuilding the previous working environment at the same place and to the same state as it was before. DRM will help to rebuild the Tivoli Storage Manager server, so that that Tivoli Storage Manager clients’ data can be restored.

Section 3 – IBM Tivoli Storage Manager Storage and Device Concepts

3.1. Given knowledge of IBM Tivoli Storage Manager (Tivoli Storage Manager), describe the storage hierarchy in Tivoli Storage Manager, so that the way Tivoli Storage Manager organizes storage pools is understood.

SUBTASK(S):

3.1.1. Disk storage pool
Disk storage pool is a random access device (refer as hard disk). The disk storage pool can be configured as primary storage pool.

3.1.2. Sequential storage pool
This can be hard disk device but configure as FILE device class, or a tape or optical devices. The sequential storage pool can be configured as primary or copy storage pool.

3.1.3. Primary storage pools
When a client node backs up, archives, or migrate data, the data is stored in a primary storage pool.

3.1.4. Copy Storage pool
A copy storage pool provides an additional level of protection for client data and is created for the express purpose of backing up a primary storage pool. Copy storage pool volumes are intended for shipment off-site, to provide recoverability of the Tivoli Storage Manager server environment. The copy storage pool contains all current versions of all files, active and exactly as they appear in the primary storage pool.

3.1.5. Migration thresholds
Specify that Tivoli Storage Manager server start or stop migration data from a storage pool to the next storage pool in the Tivoli Storage Manager storage pool hierarchy.

3.2. Given knowledge of Tivoli Storage Manager, describe Tivoli Storage Manager reclamation, so that how Tivoli Storage Manager reclamation process, which minimize the use of sequential volumes is understood.

SUBTASK(S):

3.2.1. Reclamation threshold
Reclamation threshold is a parameter when defining or modifying a sequential storage pool. Reclamation makes the fragmented space on a sequential volume usable again by moving any remaining unexpired objects from one volume to another volume within the same storage spool, thus making the original volume available for reuse.

3.2.2. Data expiration
When the backup/archive data is no longer needed (exceed versioning or data retention expired), Tivoli Storage Manager server will delete (expire) that object, thus freeing up the storage media.

3.2.3. Off-site volumes reclamation

Tivoli Storage Manager cannot physically move the data from one of these volumes to another because they are in an off-site vault, not available in the library. Tivoli Storage Manager manages reclamation for an off-site copy pool by obtaining the active files from a primary storage pool or from an on-site volume of a copy pool. These files are then written to a new volume in the copy pool, and the database is updated. The new volume will be moved to the off-site location, and the off-site volume, will be moved back to the on-site scratch pool for reuse.

3.3. Given knowledge of Tivoli Storage Manager, describe the data movement between the Tivoli Storage Manager storage pools, so that how data moves between the Tivoli Storage Manager storage pools is understood.

SUBTASK(S):

3.3.1. Disk storage pool
Disk storage pool is a random access device (refer as hard disk). The disk storage pool can be configured as primary storage pool.

3.3.2. Sequential storage pool
This can be hard disk device but configure as FILE device class, or a tape or optical devices. The sequential storage pool can be configured as primary or copy storage pool.

3.3.3. Automatic Migration
By setting up storage pool migration thresholds, a storage pool data will automatically migrate data from one storage to next storage pool in the Tivoli Storage Manager storage pool hierarchy.

3.3.4. Migration processes
A process of migrate data from one storage pool to the next storage pool in the Tivoli Storage Manager storage pool hierarchy automatically or manually.

3.3.5. Restore storage pool
In the event of lost or damaged volume(s) in the primary storage pool, restore storage pool will copy data from copy storage pool back to primary storage pool.

3.3.6. Reclamation processes
Reclamation is a server process that consolidates data and free space on tape (or optical) volumes in sequential storage pools.

Section 4 – IBM Tivoli Storage Manager Client Concepts

4.1. Given detailed information about data protection strategies described in IBM Tivoli Storage Manager (Tivoli Storage Manager) Documentation, explain backups and archives and how they differ, so that the concepts have been explained.

SUBTASK(S):

4.1.1. Explain how backup uses versioning.
- 4.1.1.1. Backup is, when data will be stored in versions on the Tivoli Storage Manager-Server, controlled and managed by policies in versions and retention time.
- 4.1.1.2. The backup versions and retention time will be managed in the Tivoli Storage Manager Server policies by the appropriate management class.

4.1.2. Explain how Archive is a powerful and extremely flexible mechanism for storing long term Data.
- 4.1.2.1. Archive is the function, to store long term data on a basis of retention time bound to a description.
- 4.1.2.2. Archived Objects will be stored with no version limit and they will be retained for the defined time period regardless of whether they are deleted on the client.

4.2. Given Tivoli Storage Manager Documentation, explain the difference between restoring and retrieving data, so that the concepts have been explained.

SUBTASK(S):

4.2.1. Restore is used for the recover of active or inactive files that have been saved by using the "backup" function of Tivoli Storage Manager.

4.2.2. Retrieve is used for the recovery of data that has been archived for long term storage.

4.2.3. Explain how active and inactive Versions from backup can be restored.
- 4.2.3.1. Active version can be restored by BA-Client Command Line or GUI. By default the active version will be used.
- 4.2.3.2. Inactive versions can be restored from back up by BA-Client Command Line or GUI. The inactive version has explicitly be selected.

4.2.4. Use the package description to search for archives and to determine which files to retrieve.

4.3. Given Tivoli Storage Manager documentation, describe journal based back-ups, so that the concept has been explained.

SUBTASK(S):

4.3.1. Describe the advantages of journal based backup.
- 4.3.1.1. Journal based backups can help to significantly reduce the time to compare the changes in the file system.

4.3.2. Set up the Journal Engine.
    4.3.2.1. The journal engine has to be set up by a wizard on windows or by configuring and starting of the journal daemon in AIX.
4.3.3. Dependencies for Journal based backup
    4.3.3.1. If there is heavy load in the file system, the journal service needs to be supported by a frequently full incremental backup without no journal to recreate the Journal database.
    4.3.3.2. During his life cycle the journal service needs additional CPU power and storage space for the journal database.
4.3.4. Describe how the journal backup works and what restrictions exist.
    4.3.4.1. During the incremental backup the journal database was queried about the changes in the file system and the comparison process will be eliminated.
    4.3.4.2. The idle time of the BA-client will be significant reduced.
    4.3.4.3. Journal based backup only works on AIX and Windows and is limited on local file systems.

4.4. Given knowledge of Tivoli Storage Manager and SAN Infrastructure and the basics of LAN-free data movement, explain the principles of LAN-free and LAN based backup so that the configuration and principles of operation is understood.

SUBTASK(S):
4.4.1 Explain the principles of Operation for LAN-free Data movement.
4.4.2 Explain how to install and customize the Storage Agent.
4.4.3 Understand the inter-communication between Tivoli Storage Manager-Server, Storage Agent and Tivoli Storage Manager-Client.

Section 5 – IBM Tivoli Storage Manager Client Implementation

5.1. Given a correctly set up system and network which meet the requirements, and access to the IBM Tivoli Storage Manager (Tivoli Storage Manager) code, determine whether the installation is new and follow the documented installation steps for any supported operating system so that the Tivoli Storage Manager client installed on the system.

SUBTASK(S):
5.1.1 Determine the OS platform.
5.1.2 Determine it this is a new installation or an upgrade.
5.1.3 Read appropriate documentation and Support Flashes on the IBM Tivoli support Web site.
5.1.4 Identify location of most current Tivoli Storage Manager code, patches and fixes.
5.1.5 Select the necessary product parts and features.
5.1.6 Install the Tivoli Storage Manager client code to any supported operating system from the appropriate media /CD or electronic image).
5.1.7 Install the language packs from the appropriate media (CD or electronic image).
5.1.8 Verify the code installed correctly.

5.2. Given the need to register a client to Tivoli Storage Manager, log on to Tivoli Storage Manager as admin, determine policy information based on SLA, run commands to register node, schedule the client for automatic backup, so that a user can perform backups and restore the user's data.

SUBTASK(S):
5.2.1. Open admin CLI.
5.2.2. At the CLI prompt; log in to Tivoli Storage Manager with admin account.
5.2.3. Perform commands to register node.
5.2.4. Authenticate node with Tivoli Storage Manager server.
5.2.5. Associate the node with a client schedule.
5.2.6. Verify the scheduler service is started.
5.2.7. Start the Tivoli Storage Manager Backup-Archive GUI to perform backup (if necessary).

5.3. Given the need to perform a client backup manually as opposed to automated scheduling, log on to the Backup-Archive GUI client, select the backup icon, determine files/folders identified requiring backed up so that the files identified as needing a manual back up have been copied to the Tivoli Storage Manager server.

SUBTASK(S):
5.3.1 Open the Backup-Archive GUI client.
5.3.2 Prepare for backup by selecting the backup icon.

5.3.3 Identify and select files identified requiring backup.
5.3.4 Perform backup of selected files.
5.3.5 Verify files have been successfully backed up.

5.4. Given the need to perform a client restore: log on to the B/A GUI client, select the restore icon, select versioning criteria, identify files/folders that are needing restored, so that files saved on the Tivoli Storage Manager server have been copied back to the local system.

SUBTASK(S):
5.4.1. Open the Backup-Archive GUI client.
5.4.2. Prepare for restore by selecting the restore icon.
5.4.3. Select versioning options.
5.4.4. Identify and select files identified requiring restore.
5.4.5. Perform restore of selected files.
5.4.6. Verify files have been successfully restored on the system.

5.5. Given the need to perform a client restore manually to a different location on the system: log on to the Backup- Archive GUI client, select the restore icon, select versioning criteria, determine files/folders that are identified as needing restored up, so that files saved on the Tivoli Storage Manager server have been copied back onto the local system to an alternate location.

SUBTASK(S):
5.5.1. Open the Backup-Archive GUI client.
5.5.2. Prepare for restore by selecting the restore icon.
5.5.3. Select versioning criteria.
5.5.4. Identify and select files identified requiring restore.
5.5.5. Select the new location.
5.5.6. Perform restore of selected files.
5.5.7. Verify files have been successfully restored to desired location.

5.6. Given a working Tivoli Storage Manager environment where there should have one node restore data backed up from another node, create a node access so that one node now has been granted the authority to restore files for another specified node.

SUBTASK(S):
5.6.1. Create a node access list to grant a given node the ability to restore ALL data backed up from another node.
- 5.6.1.1. Initiate a client through:
  - 5.6.1.1.1. CLI
  - 5.6.1.1.2. GUI
  - 5.6.1.1.3. Web client
- 5.6.1.2. Determine objects to be restored.
- 5.6.1.3. Perform restore.
- 5.6.1.4. Monitor progress and confirm completion.

5.7. Given the need to check if a client back-up completed: log on to Tivoli Storage Manager, query the events to determine the status of the backup, determine course of action based on results so that the status of the backup has been identified.

SUBTASK(S):
5.7.1. Open admin CLI.
5.7.2. At the CLI prompt; log in to Tivoli Storage Manager with admin account.
5.7.3. Perform query to determine the status of the backup.
5.7.4. Determine next steps based on the output. ie failure, success, missed.
5.7.5. Query the Tivoli Storage Manager activity log to gather further information if necessary.
5.7.6. Recommend course of action based on findings.

5.8. Given a properly installed and customized Tivoli Storage Manager Client environment and an error has occurred, review the various logs, so that the Tivoli Storage Manager client issue has been identified.

SUBTASK(S):
5.8.1. Check the client error log for error messages.
5.8.2. Check the schedule log and webcl log for additional messages.
5.8.3. Check the Tivoli Storage Manager server activity log for further trouble-shooting.
5.8.4. Search for Error conditions on the operating system level.
5.8.5. Check the error description in the Tivoli Storage Manager documentation for clarification.
5.8.6. Search for assistance at IBM support sites.

5.9. Given a properly set up scheduling for backup on client and server side, review the schedule and event logs, so that it has been confirmed that the client backups are running as scheduled.

SUBTASK(S):
5.9.1. Verify the schedule log on client side for successful operation.
5.9.2. Check the event log on server side for schedule event conditions and statistics.
5.9.3. Check the date and time when the schedule was planned for execution and compare it with the actual values.

Next Steps

1. Take the IBM Tivoli Storage Manager V6.2 Fundamentals using the promotion code *study532* for $5 ($25 USD savings).

2. If you pass the assessment exam, visit www.prometric.com/IBM to schedule your testing sessions. Use the promotion code *tivoliguide* to receive 20% off.

3. If you failed the assessment exam, review how you did by section. Focus attention on the sections where you need improvement. Keep in mind that you can take the assessment exam as many times as you would like ($5 per exam), however, you will still receive the same questions only in a different order.