

IBM TIVOLI STORAGE MANAGER V6.3 ADMINISTRATION COURSE CONTENT

❖ **SECTION 1:IBM TIVOLI STORAGE MANAGER CONCEPTS:**

A. Given knowledge of IBM Tivoli Storage Manager (TSM) V6.3 server components, explain the TSM V6.3 server components so that the TSM V6.3 server components have been explained.

With emphasis on performing the following tasks:

- a. Explain database.
- b. Explain DB2 integration with TSM.
- c. Explain storage pools.
- d. Explain recovery log.
 - 1) Active log
 - 2) Active log mirror
 - 3) Archive log
 - 4) Archive failover log

B. Given knowledge of TSM V6.3 client components, explain the TSM V6.3 client components so that the TSM V6.3 client components are understood.

With emphasis on performing the following tasks:

- a. Explain backup methods.
- b. Explain restore methods.
- c. Explain archive and retrieve.
- d. Explain client interface.
 - 1) GUI
 - 2) Command line
 - 3) Web GUI
- e. Explain client server communication options.

C. Given knowledge of backup and recovery methodologies, explain these methodologies so that the backup and recovery methods are understood.

With emphasis on performing the following tasks:

- a. Explain the differences between backup and archive.
- b. Explain incremental backup.
 - 1) incremental by date
 - 2) full incremental
 - 3) partial incremental
 - 4) forever incremental
- c. Explain selective backup.
- d. Explain differential backup.
- e. Explain image backup.
- f. Explain snapshot backup.
- g. Explain open file backup.
- h. Explain journal based backup.
- i. Explain system state backup.
- j. Explain TSM LAN-free client backup.
- k. Explain Network Data Management Protocol (NDMP) backup.
 - 1) Understand the communication between TSM and NDMP on file server/filer.
 - 2) Use of SnapDiff.
- l. Explain Hierarchical Storage Management (HSM) backup process.
 - 1) Describe how archived items are "recovered" by HSM.
- m. Explain Volume Shadow Copy Services backup.
- n. Explain archives.
- o. Explain classic restore.
- p. Explain no query restore.

- D. Given knowledge of TSM V6.3 server components, features and functions, and a need for enterprise management tool for backup and recovery, explain the TSM V6.3 server processes so that the TSM V6.3 server processes are understood.**

With emphasis on performing the following tasks:

- a. Explain migration.
- b. Explain reclamation.
- c. Explain expiration.
- d. Explain TSM database backup.
- e. Explain storage pool backup.
- f. Explain backup volhistory.
- g. Explain backup devconfig.

- E. Given knowledge of TSM V 6.3 server administration, reporting and monitoring requirements, explain the Administration Center (AC), reporting, and monitoring functions so that these functions are understood.**

With emphasis on performing the following tasks:

- a. Explain the AC.
- b. Explain Tivoli Common Reporting.
- c. Explain Tivoli Monitoring.
- d. Explain Tivoli Data Warehousing (historical report).
- e. Explain the Cognos custom reports.

- F. Given the knowledge of TSM V6.3 server and client side deduplication, explain the benefits and considerations for using TSM V6.3 data deduplication so that TSM V6.3 deduplication is understood.**

With emphasis on performing the following tasks:

- a. Explain the differences between client side and server side deduplication.
- b. Explain the benefits of client side deduplication.
- c. Explain the benefits of server side deduplication.
- d. Explain the pre-requisites for deduplication (e.g. storage device class and pool types).
- e. Explain the impact on functions and options that need to be considered when planning to use deduplication.
- f. Explain the server side deduplication concept and phases.
- g. Explain the client side deduplication concept and phases.

- G. Given knowledge of TSM V6.3 licensed products, provide an understanding of why and when the data protection modules for database and mail are used so that data protection for databases and email is understood.**

With emphasis on performing the following tasks:

- a. Explain the function of a Data Protection module...
- b. Explain the function provided by the Data Protection for Mail.
- c. Explain the function provided by the Data Protection for Database.

- H. Given a working TSM V6.3 and virtual environments, explain the requirements and concepts to back up and restore virtual environment data so that this functionality can be understood.**

With emphasis on performing the following tasks:

- a. Describe vStorage APIs for Data Protection.
- b. Describe Full virtual machine (VM) backup.
- c. Describe Full VM restore.

- I. Given a working TSM V6.3 environment having Windows/UNIX backup/archive clients, configured TIP/AC, explain TSM V6.3 Windows/UNIX backup/archive client auto deployment so that TSM V6.3 Windows/UNIX backup/archive client is understood.**

With emphasis on performing the following tasks:

- a. Explain auto deployment components used.
- b. Explain integration of auto deployment with Admin Center..
- c. Explain client requirements for auto deployment.
- d. Explain AUTODEPLOY client option.
- e. Explain deployment options.
- f. Explain the requirements and limitations of auto deployment.

J. Given a working TSM V6.3 environment which includes TSM V6.3 server in production data center and TSM V6.3 server in disaster recovery data center, configure node replication so that protection against disasters is achieved.

With emphasis on performing the following tasks:

- a. Explain source and target node replication servers.
- b. Explain policy management for node replication.
- c. Explain replication rules.
- d. Explain replication state.
- e. Explain replication mode.
- f. Explain replication of deduplicated data.

K. Given TSM V6.3 server environment and administrative tasks, explain TSM V6.3 multiple data streams for database backup so that an understanding of multiple data streams for TSM database backup is achieved.

With emphasis on performing the following tasks:

- a. Explain the automatic database backup operation.
- b. Explain the manual database backup operation.
- c. Explain the multi-stream database backup operation.
- d. Explain the multi-stream database restore operation.

L. Given knowledge of TSM V6.3 data storage management components, explain the TSM V6.3 data storage management components so that the TSM V6.3 data storage management components have been explained.

With emphasis on performing the following tasks:

- a. Explain the policy domain.
- b. Explain the policy set.
- c. Explain the management class.
- d. Explain the backup copy group.
- e. Explain the archive copy group.

❖ **SECTION 2:TIVOLI STORAGE MANAGER DAILY OPERATIONS:**

A. Given an IBM Tivoli Storage Manager (TSM) V6.3 server with access to Tivoli Integrated Portal/Admin Center (TIP/AC) and Tivoli Common Reporting, review reports so that administrator can monitor the health of the TSM environment

With emphasis on performing the following tasks:

- a. Access the TSM server through the TIP or command line.
- b. Add TSM server on TIP/AC.
- c. Monitor and report client node information.
- d. Review the health monitor in the Administration Center.

B. Given the Tivoli Integrated Portal/Admin Center (TIP/AC), the appropriate User portal and the need to define, add, delete,and provide privileges of administrative users, manage the appropriate administrative users so that defined and configured administrative users are managed.

With emphasis on performing the following tasks:

- a. Access appropriate user portal.
- b. Manage administrative users.

c. Grant authority.

C. Given an administrator with sufficient authority, manage client nodes so that the client nodes are managed.

With emphasis on performing the following tasks:

- a. Access TSM sever with administrator ID.
- b. Register node with appropriate settings.
- c. Update node properties.
- d. Grant appropriate authority to client/node access/ownership.

D. Given a working TSM V6.3 environment where client data has been successfully backed up on a TSM V6.3 server, and a request for data recovery, restore or retrieve the data from TSM V6.3 so that the client data is recovered.

With emphasis on performing the following tasks:

- a. Determine which recovery function need to be used: restore or retrieve.
- b. Determine if only active or also inactive files need to be displayed based on the user input about when the data was deleted.
- c. Determine location of data to be recovered.
- d. Restore or retrieve data.

❖ **SECTION 3: TIVOLI STORAGE MANAGER SERVER MANAGEMENT:**

A. Given access to a functional IBM Tivoli Storage Manager (TSM) V6.3 server and administrator ID, determine current disk allocation for TSM V6.3 DB and logs so that the server has sufficient disk space to manage TSM V6.3 server DB and log.

With emphasis on performing the following tasks:

- a. Estimate database space requirement.
- b. Estimate log space requirement.
- c. Increase database and/or log space.
- d. Relocate the database and recovery log.
 - 1) Relocate active log.
 - 2) Relocate archive log.
 - 3) Relocate archive failover log.
 - 4) Relocate database.
- e. Perform database backup.
- f. Perform database restore.
- g. Perform multi-stream database backup and restore processing.

B. Given a TSM V6.3 server and client environment, monitor and manage administrative tasks and client schedules so that TSM V6.3 server and client environment are properly maintained.

With emphasis on performing the following tasks:

- a. Review completion status for TSM processes (migration, reclamation, backup DB expiration, backup storage pool).
- b. Address failed or incomplete TSM processes.
- c. Review completion status of client schedules.
- d. Address failed or missed client backup/archive.
- e. Add or change TSM schedules.
- f. Monitor Automatic Backup-Archive client deployment.
- g. Monitor Node Replication progress.

C. Given a functioning TSM V6.3 server and sufficient storage space, define device classes and storage pools so that appropriate storage pools are configured.

With emphasis on performing the following tasks:

- a. Verify hardware is configured correctly and ready for use.

- b. Configure appropriate device classes.
- c. Configure appropriate storage pools.
- d. Configure simultaneous write during storage pool migration.
- e. Configure data shredding.

D. Given a TSM environment, define, update or delete the appropriate policies so that retention requirements are properly managed.

With emphasis on performing the following tasks:

- a. Define, update, or delete policy domain(s).
- b. Define, update, or delete policy set(s).
- c. Define, update, or delete management class (es).
- d. Define, update, or delete backup copy group(s).
- e. Define, update, or delete archive copy group(s).

E. Given a working TSM V6.3 environment with library and drives, monitor and manage library drives and paths so that a properly working tape environment is achieved.

With emphasis on performing the following tasks:

- a. Define, update, or delete library(ies).
- b. Define, update, or delete drive(s).
- c. Define, update, or delete path(s).
- d. Define a library as a virtual tape library (VTL) to TSM.

F. Given a working TSM V6.3 environment, requirement to manage multiple TSM V6.3 servers, configure server-to-server library sharing, storage agents, export/import so that the TSM V6.3 servers are communicating and library sharing environment is configured.

With emphasis on performing the following tasks:

- a. Configure server-to-server communication.
- b. Configure library sharing.
- c. Configure drive and path to storage agent(s).
- d. Export/import across TSM servers.
- e. Configure enterprise configuration manager.

G. Given a working TSM V6.3 environment with disaster recovery module, configure recovery plan and off-site media movement so that protection against disasters is achieved.

With emphasis on performing the following tasks:

- a. Define database retention.
- b. Define recovery plan.
- c. Define policy for offsite tape retention.
- d. Ensure administrative tasks to create disaster recovery plan are completed.
- e. Create storage pool backups and move tapes offsite.
- f. Create database backups and move tapes offsite.

H. Given a functioning TSM V6.3 server with configured Tivoli Integrated Portal/Admin Center (TIP/ AC), make changes to server maintenance, and storage devices, through the TIP/AC so that properly managed TSM V6.3 server using TIP/AC is achieved.

With emphasis on performing the following tasks:

- a. Start and stop TSM Administration Center server by command.
- b. Manage client operations.
 - 1) Add client node.
 - 2) Implement policies of client nodes.
 - 3) Manage data of client nodes.
 - 4) Schedule operation of client nodes.
- c. Manager storage devices

- 1) Add/remove library definitions.
- 2) Add/remove drives definitions.

❖ **SECTION 4: TIVOLI STORAGE MANAGER CLIENT MANAGEMENT:**

A. Given a working IBM Tivoli Storage Manager (TSM) V6.3 environment, install TSM V6.3 Backup-Archive clients and configure the options file so that data can be backed up or archived.

With emphasis on performing the following tasks:

- a. Verify TSM client code and Operating System code levels are interoperable.
- b. Perform the installation of the Backup-Archive client.
- c. Select which backup methodology and type to use.
- d. Configure the client options for connectivity, performance, and security.
- e. Configure include/exclude list as needed.
- f. Register the client with the TSM server.

B. Given a functioning TSM V6.3 Server and a correctly installed Backup-Archive client, implement and configure client components and services so that additional client features are available.

With emphasis on performing the following tasks:

- a. Perform custom installation of the TSM Backup-Archive client from the appropriate components.
 - 1) Install and configure Logical Volume Snapshot Agent (LVSA).
 - 2) Install and configure the Administrative client.
 - 3) Install and configure the Web client service.
 - 4) Install and configure the TSM Scheduler service.
- b. Initialize and start services on the appropriate platform.

C. Given a working TSM V6.3 environment and customer requirements for additional data security, configure appropriate TSM V6.3 client options so that secure data encryption is configured.

With emphasis on performing the following tasks:

- a. Configure TSM communication in a firewall environment or DMZ.
- b. Configure appropriate TSM client options
 - 1) Configure the include/exclude statements for encryption.
 - 2) Configure password encryption.
 - 3) Configure SSL communication.
 - 4) Configure encryption key handling.

D. Given a functioning TSM V6.3 environment with the necessity for alternative backup methodologies, select and configure journal-based backup, volume/image backup, or client data deduplication as needed so that these features are configured.

With emphasis on performing the following tasks:

- a. Install and start the Journal engine service/daemon.
- b. Select backup methodologies and configure the client option file.
- c. Select and configure the data deduplication options in client DSM option file.
- d. Configure TSM server to enable client data deduplication.

E. Given a working TSM V6.3 environment that is LAN-free enabled, configure storage agent, server and client so that LAN-free backups can be achieved.

With emphasis on performing the following tasks:

- a. Install storage agent.
- b. Define server-to-server communications.
- c. Define paths to storage agents.
- d. Configure the appropriate LAN-free options (e.g., server, client, and storage agent).

F. Given a working TSM V6.3 environment with a requirement for network attached storage (NAS) backup through Network Data Management Protocol (NDMP), configure TSM V6.3 server and client components to support NDMP communication for NAS device so that a NAS backup using NDMP

communication can be established.

With emphasis on performing the following tasks:

- a. Configure device class, drive and paths for NAS device.
- b. Configure storage pools.
- c. Set Table of Contents retention.
- d. Define NAS node.
- e. Configure data mover.
- f. Configure client dsm.opt/dsm.sys with the appropriate options.
 - 1) domain
 - 2) include/exclude
- g. Schedule NAS backups.
- h. Monitor NAS backups.

G. Given two connected, properly configured and working TSM V6.3 environments with a requirement to perform offsite data replication for a specific TSM V6.3 client, configure the TSM V6.3 servers and TSM V6.3 clients components to support node replication.

With emphasis on performing the following tasks:

- a. Identify the source and target servers and nodes needing replication.
- b. Sync domains and management classes between source and target servers.
- c. Verify replication rules on source server are correct.
- d. Verify source client nodes are registered to send data.
- e. Create similar storage pools on the target server.

❖ **SECTION 5: TIVOLI STORAGE MANAGER PERFORMANCE AND PROBLEM DETERMINATION:**

A. Given knowledge of IBM Tivoli Storage Manager (TSM) V6.3 server hardware, server maintenance and operating systems, review the appropriate log files so that reported errors can be addressed.

With emphasis on performing the following tasks:

- a. Review, research, and address TSM server activity log for error and warning messages.
- b. Review, research, and address server operating system logs for error and warning messages.
- c. Review, research, and address scheduled and error logs for error and warning messages.
- d. Review, research, and address the various logs for TSM server instance.
- e. Review, research, and address the various logs for DB2 database.

B. Given a functional TSM server, access to client log files, access to OS log files, review client success or failures of client sessions so that failures of client processes/sessions can be addressed.

With emphasis on performing the following tasks:

- a. Review, research, and address TSM client error log for error and warning messages.
- b. Review, research, and address TSM client schedule log for error and warning messages.
- c. Review, research, and address operating system logs.

C. Given a working TSM V6.3 server environment and access to TSM V6.3 Performing and Tuning Guide, monitor and tune TSM V6.3 options and components, operating system, and network resources so that a properly tuned TSM V6.3 server environment is achieved.

With emphasis on performing the following tasks:

- a. Monitor and identify poorly performing processes.
- b. Monitor and tune TSM options and components for better migration processing.
- c. Monitor and tune TSM options and components for better reclamation processing.
- d. Monitor and tune TSM options and components for better expiration processing.
- e. Monitor and tune TSM options and components for better de-duplication processing.
- f. Monitor and recommend operating system changes that can improve TSM performance (e.g. memory resources.)
- g. Monitor and recommend network changes that can improve TSM performance (e.g. NIC settings, network bandwidth and throughput, etc.).

- D. Given a working TSM V6.3 environment and access to TSM V6.3 Performance and Tuning Guide, monitor and tune TSM V6.3 client options and components, operating system and network resources so that a properly tuned TSM V6.3 client backup/archive/restore/retrieve/de-duplication is achieved.**

With emphasis on performing the following tasks:

- a. Monitor and identify poorly performing TSM client sessions.
- b. Monitor and tune TSM client options and components for better backup/archive/restore/retrieve/ deduplication performance.
- c. Monitor and recommend operating system changes that can improve TSM client backup/archive/restore/retrieve/ de-duplication performance.
- d. Monitor and recommend network changes that can improve TSM client backup/archive/restore/retrieve/ de-duplication performance.

- E. Given a TSM V6.3 environment where TSM V6.3 LAN-free data movement is enabled and used, administrative rights; and access to TSM Performance and Tuning Guide, validate the setup so that a tuned and functional TSM V6.3 LAN-free client is achieved.**

With emphasis on performing the following tasks:

- a. Verify the LAN-free data transfer re-requisites are met and tune appropriately.
- b. Verify or change data transfer related settings for the storage agent.
- c. Verify or change server setting.
- d. Verify TSM client is installed properly.
- e. Verify TSM storage agent is installed and configured properly.
- f. Review the server configuration that supports LAN-free is configured properly.
- g. Review, research and address TSM client error log for error and warning messages.
- h. Review, research and address TSM storage agent log for error and warning messages.
- i. Review, research and address TSM server activity log for error and warning messages.

- F. Given a working TSM V6.3 environment with tape library support and a NAS server that supports NDMP operations, review, research and address TSM V6.3, network attached storage (NAS) and Network Data Management Protocol (NDMP) communication issues so that a NAS backup through NDMP is functional.**

With emphasis on performing the following tasks:

- a. Access the NAS file server.
- b. Verify communication among TSM, NAS and Tape library.
- c. Verify the configuration of the device class, drive and paths for NAS device.
- d. Verify Table of Contents retention settings.
- e. Verify NAS node definitions.
- f. Verify, research and address TSM client error log for error and warning messages.
- g. Verify, research and address TSM server activity log for error and warning messages.
- h. Perform tracing instructions as needed upon TSM support request.