

Component 8 Installation and Maintenance of Health IT Systems

Unit 9b Creating Fault-Tolerant Systems, Backups, and Decommissioning

This material was developed by Duke University, funded by the Department of Health and Human Services,
Office of the National Coordinator for Health Information Technology under Award Number U24OC000024.

Importance of Backup

- Volume of data: hospital can generate 12 terabytes/yr in radiology alone.
- HIPAA (Health Information Portability & Accountability Act) Security Rule requires exact backup copies of all healthcare data, easily retrievable, generally for the patient's lifetime plus one year.

Backup Strategies: Requirements

- Healthcare data generally must be retained for patient's lifetime + 1 year.
- Copies protected at off-site location in case of natural disaster, fires, flooding, etc.
- Easily retrievable for timely restoration
- Security via encryption and storage in secure location

Backup Strategies: Backup Window

- Time required to complete a given backup.
 - Determined by amount of data to be backed up + speed of network infrastructure
- Problems when backup window reaches peak operation cycles, potentially straining resources and slowing down the system.

Backup Strategies: Which Files?

- Full backups
 - All files
 - Pro: Ultimate protection, simple restoration
 - Con: Requires more time & lots of storage to keep multiple file versions
- Incremental backups
 - Only files that have changed since last backup (full or incremental)
 - Pro: Much faster
 - Con: Restoration from multiple files

Backup Strategies: Which Files? (cont'd)

- Differential backup
 - Middle ground: all the files that have changed since the last full backup
 - Pro: easier restoration
- Synthetic full backup
 - Compensates for small/nonexistent backup window
 - Data from last full backup + differential / incremental backup combined to create new full backup tape

Backup Strategies: Which Files? (cont'd)

- File system snapshots
 - Available through VM environments and later UNIX versions
 - Backups at several times through the day without needing large amounts of additional storage media
 - Reliable backups without shutting down applications

Backup Strategies: Methods

- Direct backup
 - Tape drive / autoloader / library directly connected to every server to directly backup and restore data
- Network backup
 - Much larger device connected to just one server backs up data of all servers
- SAN (Storage Area Network) backup
 - Storage network to which all servers & backup device connect
 - With appropriate arbitration, all servers backup to shared devices.
- Most use a combination.

Backup Strategies: Databases

- Databases require extra considerations.
- Consult with EHR vendor to ensure backup strategy is compatible with database infrastructure.

Decommissioning

- Goals in retiring old systems / applications / datasets
 - Active data properly retained
 - Inactive data archived or disposed of securely
- Tips
 - Complete full data audit; note redundancies.
 - Determine data owners and stakeholders.
 - Identify active vs. inactive data.
 - Consider reporting / retrieval requirements for compliance.

Decommissioning (cont'd)

- Tips (cont'd)
 - Document retention policies well & ensure consistency with government guidelines.
 - Standardize on single, well-navigable archival system.
 - Develop decommissioning plan & schedule.
 - Ensure integrity of archived data and destruction of decommissioned data.

Summary

- HIPAA requires exact backup copies of all healthcare data, to remain protected and easily retrievable for the patient's lifetime plus one year after death.
- A Backup Window is the time required to complete a given backup task.
- An effective backup strategy minimizes the backup window while ensuring data integrity.

Summary

- Types of backups include:
 - Full Backups
 - Incremental backups
 - Differential Backups
 - Synthetic Full Backups
 - Snapshots
- Typical backup strategies use a combination of different methods:
 - Direct
 - Network
 - SAN

Summary

- Decommissioning Storage Systems require special considerations including:
 - Active data properly retained
 - Inactive data archived or disposed of securely

References

- Mike Harwood. "Storage Basics: Backup Strategies," Enterprise Storage Forum.
 - <http://www.enterprisestorageforum.com/management/features/article.php/3082691>
- Simon Gordon. "Comparing different backup strategies." SearchStorage.com.
 - <http://searchstorage.techtarget.com/tip/Comparing-different-backup-strategies>
