## Chapter 6.5 Protection on Medium Failure

*Definition:*

*Logging can provide Data Protection which aimed with System Malfunction, when System Malfunction happens, then there will lose nothing in the Disk while temporary memory would lost its data. The much more serious malfunction would have lost one or several Disks.*

Below, we would discuss the Backup System that although the data lost in the Disk and it would not influence the Recovery of Database.

Chapter 6.5.1 Backup

*Definition:*

In order to provide Data Protection for Medium Failure, we need to use the technique which is called *Archiving Solution which is used to maintain and separate the Database Copy from Database itself.*

However, if there is any possibility to shut down the Database temporarily, then we can use *Storage Medium to create the Backup File, and copy Database to a safety place far away. With Backup File, if there happens Medium Failure, then Database System would be recovered to it’s previous status.*

If we want to proceed to a much closer procedure, then we can use Logging File, and precondition is that the Backup Logging can be saved and after any Failure, the Logging File itself still exists. *In order to prevent the lost of Logging, we need to send the copy of Logging to a far away site.* If Logging and Data are all lost, then we can use the Backup Logging to recover, at least to recover to the time when the Logging was last sent.

*Building Backup is a long period, so we try to avoid copying the whole Database System during each step when building backup. Here, Two types of Backup:*

1. *Completely Unloading - Copy the whole Database.*
2. *Increment Unloading - Copy those changed Database Elements after the Completely Unloading or Increment Unloading. There have several levels Unloading, and Completely Unloading is considered as the ‘0 Level’ Unloading, ‘i Level’ Unloading is all changes that are less than or equal to ‘i Level’ Unloading.*

Here, we can use one Completely Unloading and its sequential Increment Unloading to recover the Database, and the process is totally the same as using Redo Logging File or Undo/Redo Logging File to repair System Failure.

* *Use Completely Unloading to recover the Database at first.*
* *According to time - line in the Increment Unloading, make changes on the current new Database by using Increment Unloading.*

Chapter 6.5.2 Non - Static Storage

Chapter 6.5.3 Recovery by using Backup and Logging