Unit 8. Recovery and Restart

Objectives

- **Recovery Concept**
- **Logical Unit of Work(LUW)**
- **Syncpoint**
- **Dynamic transaction backout**
- **Automatic Transaction restart**

Figure: 8-1. Objectives

Notes :

Recovery Concepts

The recovery facilities provided by CICS are designed to restore specified resources to their state before the failure occurred.

The resources that can be designated as recoverable are:

- **Data file and database used by CICS application programs.**
- **Intrapartition TDQ's.**
- **Auxillary TSQ's.**
- **Terminal Messages associated with VTAM terminals.**
- **BMS paging and routing data stored in TSQ's.**

Figure: 8-2. Recovery Concept.

Notes :

The goal of recovery processing is to :

Maintain the integrity of the data processed by the system.

Minimize the impact of a task or system failure on the system users.

When developing an application system, it is necessary to examine the processing performed by the each program to determine what type of recovery processing is needed for that program.

When a task fails, CICS performs recovery processing as part of its task termination duties. If the system crashes, recovery processing performed when CICS is restarted.

Conditions for Recovery processing

- **The resources must be defined as recoverable in the system table defining the resource.**

- **The transaction that was used to initiate the task must be defined as recoverable in the PCT.**

Figure: 8-3. Conditions for recovery processing.

Notes :

The PCT entry for a recoverable transaction indicates that Dynamic Transaction Backout(DTB) should be performed if a task initiated by that transaction abends.

Tasks accessing DL/I data bases can be designated for automatic restart.

It is the combination of a recoverable transaction modifying a recoverable resource that causes CICS to save the data necessary for recovery from a task or system failure.

Logical Unit of Work(LUW)

- **Recovery that is performed for a sequence of operations.**
- **It represents processing that is logically tied together.**
- **If LUW fails to complete, any modifications made during the LUW are backed out .**

Figure: 8-4. Logical Unit of Work(LUW).

Notes :

All the operations in the group must finish before the whole set of operations can be considered complete from a data integrity point of view.

All recoverable resources are restored to their state before the LUW started.

The beginning and end of a LUW are identified by Sync points.

Syncpoint

- **The beginning and end of a LUW are identified by Syncpoint.**

- **A Syncpoint is automatically generated by CICS at task initialization and again at task completion.**

Figure: 8-5. Syncpoint

Notes :

Sync points can be requested by an Application program.

Dynamic Transaction backout(DTB)

The process of backing out changes made to recoverable resources is known as Dynamic Transaction Backout(DTB).

When a task failure occurs, the CICS dynamic transaction backout program (DBP) backs out the changes that are recorded in the dynamic log of the abending task.

Figure: 8-6. Dynamic transaction Backout.

Notes :

DBP performs the following functions :

CICS files and DL/I data bases are restored to their pre-LUW state. Records that were updated will be replaced with their before-images found in the dynamic log. Deleted records will be added back.Added records will be deleted.

Intrapartition TDQs and TSQs will be restored to their pre-LUW state.

Interval control START requests for which PROTECT has been specified will be cancelled. The data passed by the start request will be removed from the TSQ if the TSQ is defined as recoverable.

DTB will perform a significant amount of processing, depending on the number of recoverable resources used by an Application program.

Automatic Transaction Restart(ATR)

It is another recovery option that can be specified for a transaction to restart the task automatically after abnormal termination.

Automatic transaction restart can be provided for transactions that accesses DL/I databases and may be subject to program isolation deadlock.

When a task is restarted it resumes execution as if the transaction were being executed for the first time, not at the beginning of the LUW that was backed out.

Figure: 8-7. Automatic Transaction Backout.

Notes :

To require automatic restart, modifications must be made to the Transaction Restart Program(RTY), which determines whether a transaction should be restarted. This program is defined as a user exit program of DTB. RTY returns a restart indicator to DTB,which will restart the transaction or continue with the abnormal termination.

Committing a LUW

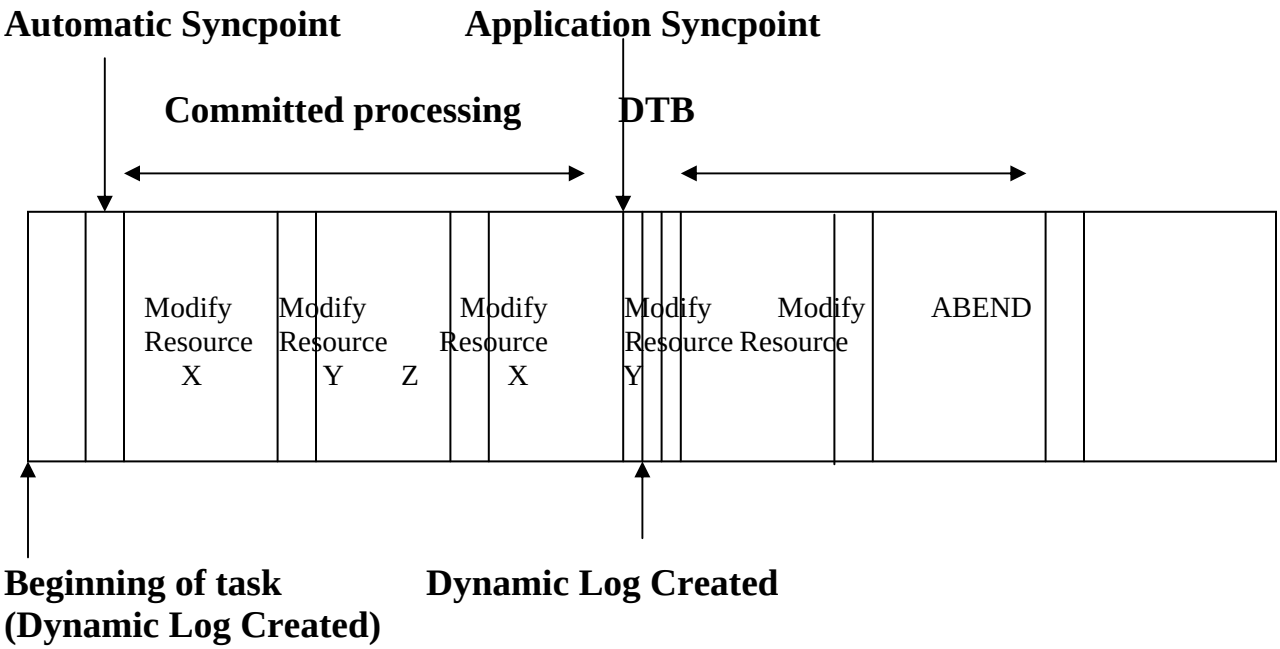

Figure: 8-8. Committing a LUW.

Notes :

Tasks can commit a portion of work completed without terminating the task by issuing Syncpoint command.

Any resources modification made after the Syncpoint command is issued, will be backed out.

SERVICES REQUESTED BY APPLICATION PROGRAMS

Installation supplied Program Error Program(PEP)

Program Level Abend Exit

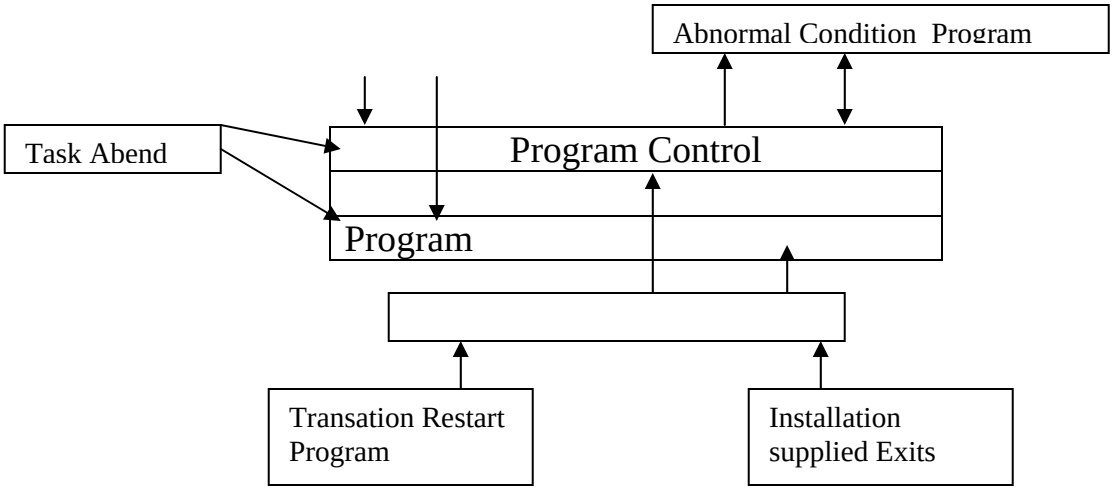

Figure: 8-9. CICS recovery facilities that are invoked by the abnormal termination of a task

Notes :

CICS Commands can be used within an Application program to

Handle processing errors

- HANDLE CONDITION
- IGNORE CONDITION
- RESP
- NOHANDLE

Provide a programmer supplied abend processing routine

- HANDLE ABEND

Indicate the completion of a LUW

- SYNCPOINT ROLLBACK
- SYNCPOINT COMMIT

Record data not recorded by CICS journaling services, etc.