ARM OF THE "restart" LAW

Automatic restart management is a z/OS recovery function inherent with the operating system that can improve the availability of specific batch jobs or started tasks (i.e. WAS, DB2, CICS, MQ, etc.). When a job or task fails, or the system on which it is running fails, automatic restart management can restart the job or task without operator intervention. To be eligible for restart under automatic restart management, a batch job or started task must register with automatic restart management. Many of the subsystems today innately at initialization register automatically.

In a sysplex environment, a program can enhance its recovery potential by registering as an element of automatic restart management. An automatic restart management element represents a program or an application that:

- Is submitted as a job.
- Is submitted as a started task.
- Is an abstract resource. An abstract resource is a program or a set of programs that is only associated with (or has a bind to) the system on which it is running.

IBM provides policy or rules defaults for automatic restart management. The customer can use these defaults or override them for their installation recovery needs. The policy for ARM is kept in the coupling facility, similar to the WLM policy. Having the policy in a central sysplex location allows the administration to restart a batch job or started task on an alternate LPAR within the sysplex in the event the original LPAR is not longer available.

Automatic restarts do not need to be enabled at all times. For example, customers might not want automatic restart management enabled for restarts unless certain jobs are running, or during off-shift hours. However, even while automatic restarts are disabled, elements can register with automatic restart management as long as the system is connected to an ARM couple data set.

Automatic restart management reduces the impact of an unexpected error to an element because zOS can restart it automatically. In general, zOS restarts an element when:

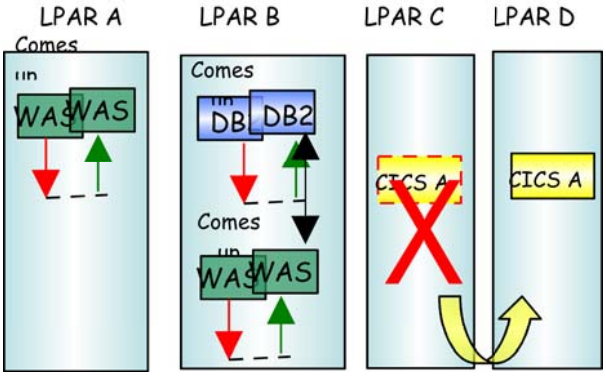
- The element itself fails. In this case, zOS restarts the element on the same system.
- The system on which the element was running unexpectedly fails or leaves the sysplex. In this case, zOS restarts the element on another system in the sysplex; this is called a **cross-system restart**.

In general, customer installation's may use automatic restart management in two ways:

1. To control the restarts of applications (such as WAS) that already use automatic restart management as part of their recovery.
2. To write or modify installation applications to use automatic restart management as part of recovery.

Customers can override one or more of the policy defaults through the administrative data utility (IXCMIAPU). Sample JCL to run the utility to create or update the automatic restart management administrative data is shipped in SYS1.SAMPLIB member IXCARMP0. For example, a customer might want to define a policy to group together elements (such as WAS and DB2) that are related or perform interdependent processing and, therefore, must run on the same system. These groups are referred to as restart groups. Also each element within a restart group can then be serialized at startup such as having DB2 available prior to WAS since WAS may use object persistence.

To determine whether customers need to override any policy defaults, they must decide how they want to manage automatic restarts and whether the defaults satisfy those goals. Use the following table example on left and the considerations. The table provides a list of the automatic restart management parameters of IXCMIAPU, their default values (which you can override in the policy), and, in the column to the far right, the IXCARM macro parameters that can override some of the defaults.

Illustrations

IXCMIAPU Parameter	Optional/ Required	Default	IXCARM Parameter that Overrides Default
RESTART_ORDER	Optional	LEVEL(2),SYSLVL2	None
LEVEL	Optional	(2)	None
ELEMENT_NAME	Optional	None	None
ELEMENT_TYPE	Optional	(SYSLVL2)	ELEMTYPE
RESTART_GROUP	Required	DEFAULT	RESTART_GROUP
TARGET_SYSTEM	Optional	(*)	TARGET_SYSTEM
FREE_CSA	Optional	(0,0)	FREE_CSA
RESTART_PACING	Optional	(0)	RESTART_PACING
ELEMENT	Required	None	None
RESTART_ATTEMPTS	Optional	(3,300)	None
RESTART_TIMEOUT	Optional	(300)	None
READY_TIMEOUT	Optional	(300)	None
TERMTYPE	Optional	(ALLTERM)	TERMTYPE
RESTART_METHOD	Optional	(BOTH,PERSIST)	STARTTXT