

Disaster Recovery (D/R) is a discipline that has existed in the mainframe arena for many years. In fact, in the early 1990s, the Automatic Remote Site Recovery project at **SHARE** defined a set of tiers of Disaster Recovery readiness, as described here.

The tiers, ranging from the least expensive to the most expensive are as follows: Summary - displayed in lower right.

- Tier 0** No Disaster Recovery plan. All data is lost and recovery is not possible.
- Tier 1** Pickup Truck Access Method (PTAM) - the system, the subsystem, and the application infrastructure, along with application data, is dumped to tape and transported to a secure facility. All backup data, such as image copies and archived logs that are still onsite will be lost in the event of a disaster (typically up to 24-48 hours of data). Recovery from a disaster involves securing a DR site, installing IT equipment, transporting backup tapes from the secure facility to the DR site, restoring the system, the subsystem, and application infrastructure along with related data, and restarting the workload (*typically taking a number of days*). Cost factors include securing a site to perform the recovery, creating the backup copy of data, backup tape transportation, and backup tape storage.
- Tier 2** PTAM and Hot Site - same as Tier 1 except the enterprise has secured a DR facility in advance. Data loss will be up to 24-48 hours, and recovery will take 24-48 hours. Cost factors include owning a second IT facility or a DR facility subscription fee, in addition to the Tier 1 cost factors.
- Tier 3** Electronic vaulting - same as Tier 2 except that the enterprise dumps the backup data to a remotely-attached tape library subsystem. Data loss will be up to 24 hours or less (depending upon when the last backup was created) and the recovery duration will typically be 24 hours or less. Cost factors include telecommunication lines to transmit the backup data and a dedicated tape library subsystem at the remote site, in addition to the Tier 2 cost factors.
- Tier 4** Active Secondary Site (electronic remote journaling) - same as Tier 3 except that transaction managers (TM) and Data Base Management System (DBMS) updates are remotely journaled to the DR site. The amount of data loss will be minutes to hours, and the recovery time will be 24 hours or less (the recovery time could be reduced to 2 hours or less if updates are continuously applied to a shadow secondary DBMS image). Cost factors include a staffed, running system in the DR site to receive the updates and disk to store the updates, in addition to the Tier 3 cost factors.
- Tier 5** Two-Site Two-Phase Commit - same as Tier 4, with applications performing two-phase commit processing between two sites. Data loss will be seconds and the recovery time will be 2 hours or less. Cost factors include modifying and maintaining the application to add the two-phase commit logic, in addition to the Tier 4 cost factors.
- Tier 6** Zero Data Loss (remote copy) - the system, the subsystem, and application infrastructure along with application data is mirrored (copied) from the production site to a DR site. There will be small to zero data loss if using synchronous remote copy, and seconds to minutes if using asynchronous remote copy. The recovery window will be the time required to restart the environment using the secondary disks if they are data consistent (typically less than 2 hours); however, experience has shown that DBMS data at the remote site is unusable in the case of a disaster when using any form of synchronous remote copy. Cost factors include the cost of the telecommunications lines to shadow all of the data updates in real time, in addition to the Tier 4 cost factors.
- Tier 7** Geographically Dispersed Parallel Sysplex (GDPS) - GDPS is beyond the SHARE-defined DR tiers because it provides total IT business recovery through the management of processors, systems, and storage resources across multiple sites. GDPS manages not just the physical resources, but also the application environment and the consistency of the data, providing full data integrity (across volumes, subsystems, operating system platforms, and sites), while providing the ability to perform a normal restart in the event of a site switch. thus keeping to a minimum the duration of the recovery window.

NOTE: GDPS Services. This is the most important aspect of each of the offerings displayed on the right column. There is perhaps only one thing in common across all the GDPS implementations – every customer has some unique requirement or attribute that makes it different from every other implementation. IBM's SMEs will design a solution for your customers.

CheatSheet #40 zTidBits Disaster Recovery



When customers are investigating IT resilience options, two things that must be at the forefront of their thinking :

- 1. Recovery Time Objective (RTO).** This is how long a customer's business can afford to wait for IT services to be resumed following a disaster.
 - If this number is not clearly defined, have them think back to the last time they had a significant service outage, how long was that outage, and how much financial pain did they suffer as a result?
 - > This will help them get a feel for whether RTO should be measured in days, hours, or minutes.
- 2. Recovery Point Objective (RPO).** This is how much data your customer is willing to have to recreate following a disaster.
 - Ask what is the acceptable time difference between the data in their production system and the data at their recovery site?
 - As an example, if their disaster recovery depends on daily full volume dumps, their RPO is 24 to 48 hours, depending on 'when' the tapes are taken off site.
 - If their RPO is less than 24 hours, they will almost certainly be forced to do some form of offsite real time disk mirroring.

*** GDPS Offerings ***

- GDPS/PPRC:** Near Continuous Availability (CA) or Disaster Recovery (DR) solution across two sites separated by metropolitan distances (100-200 km fiber distance between sites). The solution is based on the IBM System Storage™ Metro Mirror technology (a.k.a. Peer-to-Peer Remote Copy, or PPRC), which is a synchronous form of remote copy.
- GDPS/PPRC HyperSwap Manager:** Near CA solution for a single site or entry level DR solution across two sites separated by metropolitan distances (100-200 km fiber distance between sites). This solution is based on the IBM System Storage Metro Mirror technology (aka. Peer-to-Peer Remote Copy, or PPRC), which is a synchronous form of remote copy.
- GDPS/XRC:** Disaster Recovery (DR) solution across two sites separated by virtually unlimited distance between sites. The solution is based on the IBM System Storage z/OS Global Mirror technology (formerly called Extended Remote Copy, or XRC), which is an asynchronous form of remote copy.
- GDPS/Global Mirror:** Disaster Recovery (DR) solution across two sites separated by virtually unlimited distance between sites. The solution is based on the IBM System Storage Global Mirror technology, which is an asynchronous form of remote copy.
- GDPS Metro/Global Mirror:** A three-site solution that provides CA across two sites within metropolitan distances and DR to a third site at virtually unlimited distances. It is based on a cascading mirroring technology that combines Metro Mirror and Global Mirror.
- GDPS Metro/z/OS Global Mirror:** A three-site solution that provides CA across two sites within metropolitan distances and DR to a third site at virtually unlimited distances. It is based on a multi-target mirroring technology that combines Metro Mirror and z/OS Global Mirror.
- RCMF/PPRC:** A solution that provides the ability to manage customers Metro Mirror remote copy configuration, a subset of the functions provided by GDPS/PPRC and GDPS/PPRC HyperSwap Manager. ALSO - **RCMF/XRC:** This solution provides the ability to manage a z/OS Global Mirror remote copy configuration, a subset of the functions provided by GDPS/XRC.

Tier	Description	Data Lost (hours)	Recovery Time (hours)
0	No D/R Plan	All	N/A
1	PTAM	24-48	>48
2	PTAM and "hot" site	24-48	24-48
3	Electronic Vaulting	<24	<24
4	"Active" second site	Minutes to hours	<24 (<2)
5	Second site two-phase commit	seconds	<2
6	Zero Data Lost	None/seconds	<2
7	GDPS	None/Seconds	<1-2