**Azure Storage Account Redundancy**

**Redundancy -** means duplicates/Copies/backups

**Redundancy in Azure Storage** means your data is copied to multiple locations, either within a region or across regions, to keep it **safe and available** even if something goes wrong — like a hardware failure or a regional outage.  
  
**Why is Redundancy Important?**

Imagine your storage server crashes — without redundancy, your data is lost. With redundancy, Azure keeps **multiple copies** of your data so it can recover quickly.

**Datacentre -** means group of racks

**Availability zones -** multiple datacentres

### **Types of Redundancy in Azure**

| **Redundancy Type** | **Where Data is Stored** | **Protection Level** | **Use Case** |
| --- | --- | --- | --- |
| **LRS** (Locally Redundant Storage) | 3 copies **within one data center** | Protects against drive/server failure | Cheapest option |
| **ZRS** (Zone-Redundant Storage) | 3 copies across **3 availability zones** in a region | Protects against zone failure | Better uptime within a region |
| **GRS** (Geo-Redundant Storage) | 3 copies in **primary region + 3 in secondary (far away)** | Protects against region-wide disasters | For disaster recovery |
| **GZRS** (Geo-Zone-Redundant Storage) | Combines **ZRS + GRS** | Highest protection: zone + regional | Mission-critical apps |
| **RA-GRS** / **RA-GZRS** (Read-Access) | Same as GRS/GZRS but also allows **read access to secondary region** | Adds high availability for reading | Read from secondary even during outage |

**Ex:**Let’s say you store a file in a storage account with:

* **LRS**: 3 copies stored in *West India* data center
* **GRS**: 3 copies in *West India* and another 3 in *South India* (secondary)

If West India fails:

* **LRS**: ❌ Data lost
* **GRS**: ✅ Data available from South India

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