**Redundant Array of Independent Disks (RAID)**

By now, everyone knows that the CIA triad is one of the most important pillars in the cybersecurity framework, standing for 'Confidentiality', 'Integrity', and 'Availability'. I believe the Redundant Array of Independent Disks (RAID) function plays a direct role in making data available to legitimate users during system failures or cyber-attacks. This technique helps prevent data loss and should be used to maintain uptime and availability for the organization. RAID consists of two or more disks working together to maintain the flow of data for actively storing, retrieving, uploading, and maintaining data.

We have four widely used RAID techniques:

**RAID 0: Striping**

With RAID 0, data is split evenly across two disks. A single file is evenly distributed, which enhances performance. However, if one disk is lost, the data is not available, as there is zero redundancy. It is not fault-tolerant and always carries the risk of data loss if one of the disks fails. The only advantage is the performance or speed of accessing data.

**RAID 1: Mirroring & Duplexing**

In RAID 1, data is duplicated between two physical drives. Every file is duplicated, which can cause performance issues, but it is the best option for data redundancy since the data is available if one of the disks fails. It is fault-tolerant, as there would be an exact copy on disk 1 and disk 2.

**RAID 5: Striping with Parity**

RAID 5 requires three or more disks for redundancy and is a common setup. It can handle large amounts of data and is fast. Instead of duplicating every bit of data on another disk, RAID 5 uses a partial copy of the data across four disks, known as striping with parity. Files are not duplicated, but space is still used for parity. Parity is used to rebuild the data in case of disk failure. The downside is that it reduces the total usable space for storage.

**RAID 10: Also known as RAID 1 + 0**

RAID 10 is a combination of RAID 0 and RAID 1, using a minimum of four disks. Disks 1 and 2 will be exact copies, and disks 3 and 4 will be exact duplicates of each other. It has the advantage of fault tolerance from RAID 1 and the speed of RAID 0. The downside is not being able to utilize the full storage capacity.