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## DATA PLACEMENT OVERVIEW

Ceph stores, replicates and rebalances data objects across a RADOS cluster dynamically. With many different users storing objects in different pools for different purposes on countless OSDs, Ceph operations require some data placement planning. The main data placement planning concepts in Ceph include:

- **Pools:** Ceph stores data within pools, which are logical groups for storing objects. Pools manage the number of placement groups, the number of replicas, and the CRUSH rule for the pool. To store data in a pool, you must have an authenticated user with permissions for the pool. Ceph can snapshot pools. See [Pools](#) for additional details.
- **Placement Groups:** Ceph maps objects to placement groups (PGs). Placement groups (PGs) are shards or fragments of a logical object pool that place objects as a group into OSDs. Placement groups reduce the amount of per-object metadata when Ceph stores the data in OSDs. A larger number of placement groups (e.g., 100 per OSD) leads to better balancing. See [Placement Groups](#) for additional details.
- **CRUSH Maps:** CRUSH is a big part of what allows Ceph to scale without performance bottlenecks, without limitations to scalability, and without a single point of failure. CRUSH maps provide the physical topology of the cluster to the CRUSH algorithm to determine where the data for an object and its replicas should be stored, and how to do so across failure domains for added data safety among other things. See [CRUSH Maps](#) for additional details.

When you initially set up a test cluster, you can use the default values. Once you begin planning for a large Ceph cluster, refer to pools, placement groups and CRUSH for data placement operations.