```
[ceph: root@server /]# ceph fs rm fs-name --yes-i-really-mean-it
```

User Space Implementation of an NFS Server

Red Hat Ceph Storage 5 provides access to Ceph storage from an NFS client, with NFS Ganesha. NFS Ganesha is a user space NFS file server that supports multiple protocols, such as NFSv3, NFSv4.0, NFSv4.1, and pNFS. NFS Ganesha uses a File System Abstraction Layer (FSAL) architecture, to support and share files from multiple file systems or lower-level storage, such as Ceph, Samba, Gluster, and Linux file systems such as XFS.

In Red Hat Ceph Storage, NFS Ganesha shares files with the NFS 4.0 or later protocol. This requirement is necessary for proper feature functioning by the CephFS client, the OpenStack Manila File Sharing service, and other Red Hat products that are configured to access the NFS Ganesha service.

The following list outlines the advantages of a user space NFS server:

- The server does not implement system calls.
- Caching is defined and used more efficiently.
- Service failover and restarting are faster and easier to implement.
- User space services can be clustered easily for high availability.
- You can use distributed lock management (DLM) to allow multiple client protocols.
- Debugging of server issues is simpler, so you do not need to create kernel dumps.
- Resource management and performance monitoring are simpler.

You can deploy NFS Ganesha in an active-active configuration on top of an existing CephFS file system through the ingress service. The main goal of this active-active configuration is for load balancing, and scaling to many instances that handle higher loads. Thus, if one node fails, then the cluster redirects all the workload to the rest of the nodes.

System administrators can deploy the NFS Ganesha daemons via the CLI or manage them automatically if either the Cephadm or Rook orchestrators are enabled.

The following list outlines the advantages to having an ingress service on top of an existing NFS service:

- A virtual IP to access the NFS server.
- Migration of the NFS service to another node if one node fails, providing shorter failover times.
- Load balancing across the NFS nodes.

Note

The ingress implementation is not yet completely developed. It can deploy multiple Ganesha instances and balance the load between them, but failover between hosts is not yet fully implemented. This feature is expected to be available in future releases.

You can use multiple active-active NFS Ganesha services with Pacemaker for high availability. The Pacemaker component is responsible for all cluster-related activities, such as monitoring cluster membership, managing the services and resources, and fencing cluster members.

As prerequisites, create a CephFS file system and install the `nfs-ganesha`, `nfs-ganesha-ceph`, `nfs-ganesha-rados-grace`, and `nfs-ganesha-rados-urls` packages on the Ceph MGR nodes.