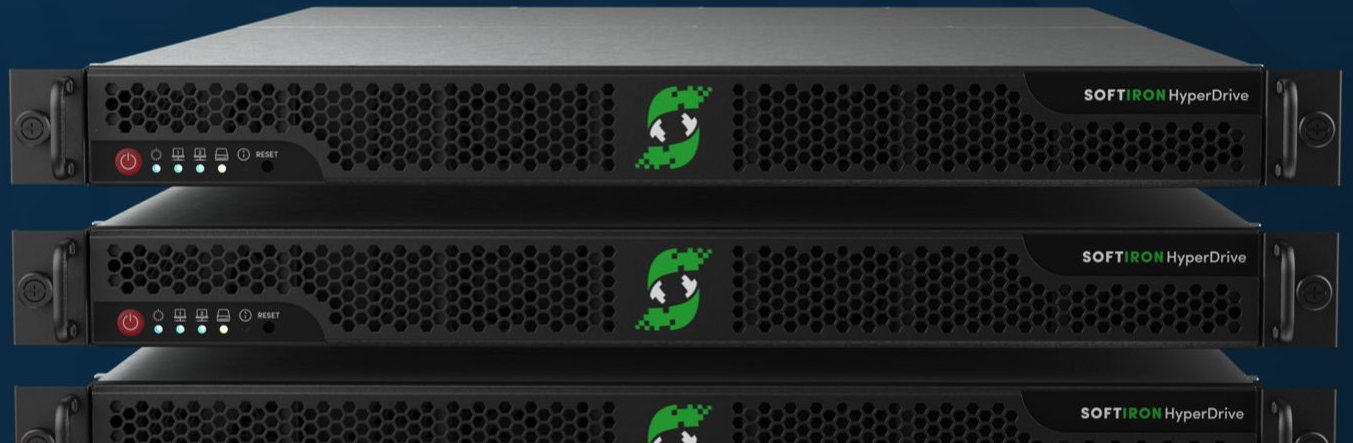
SOFTIRON

Deep Dive into Ceph

… and how to use it for iRODS



FOUNDED IN 2012
SOFTIRON IS A VENTURE BACKED COMPANY

TASK-SPECIFIC
DATA CENTER SOLUTIONS

50 STAFF MEMBERS & GROWING

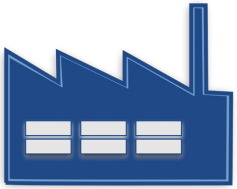
$40M+
EQUITY RAISED

FROM HIGH NET WORTH INDIVIDUALS, INSTITUTIONAL INVESTORS & PRIVATE COMPANIES.

WE ARE A GLOBAL COMPANY WITH OFFICES IN

UNITED STATES OF AMERICA • UNITED KINGDOM • CZECH REPUBLIC • AUSTRALIA • NEW ZEALAND

Fully supported - any Ceph, any location



HyperDrive

Lack of on-site expertise
Low space/heat/dust control

Skillset limitations
Strategic open source infrastructure adoption
Mixed cloud native/traditional workloads
Secure Provenance

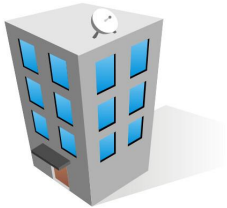
HyperDrive

Unamortized hardware
Production Ceph deployment

HyperSafe

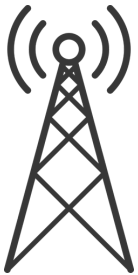
HyperDrive

Power restrictions
Shock/vibe ruggedness



HyperDrive

Power economics
Remote locations



HyperDrive

Power restrictions
Shock/vibe ruggedness

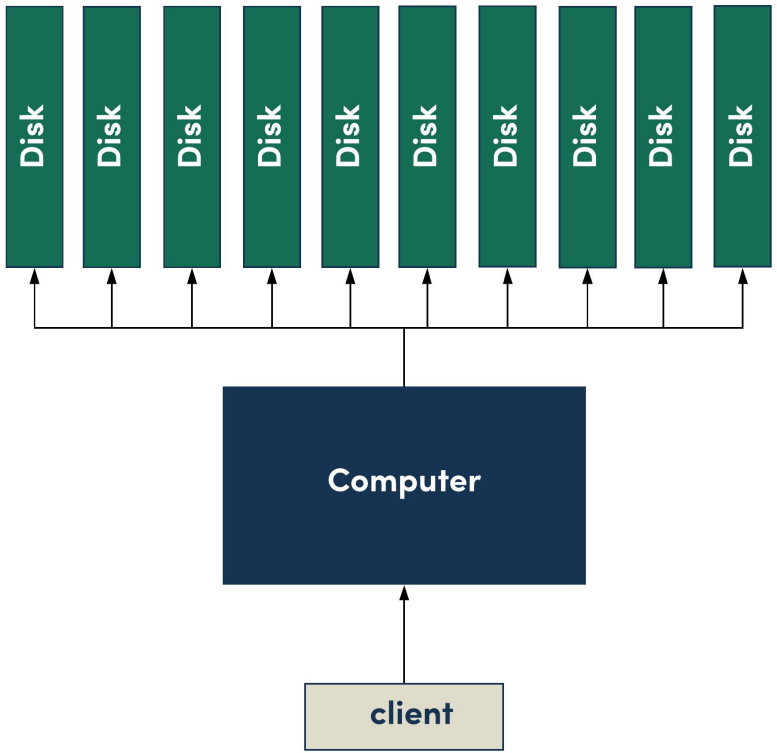
HyperDrive - where hardware matters most
HyperSafe - best in class enterprise Ceph support
SoftIron - the only vendor that can do it all

Built on Open Source

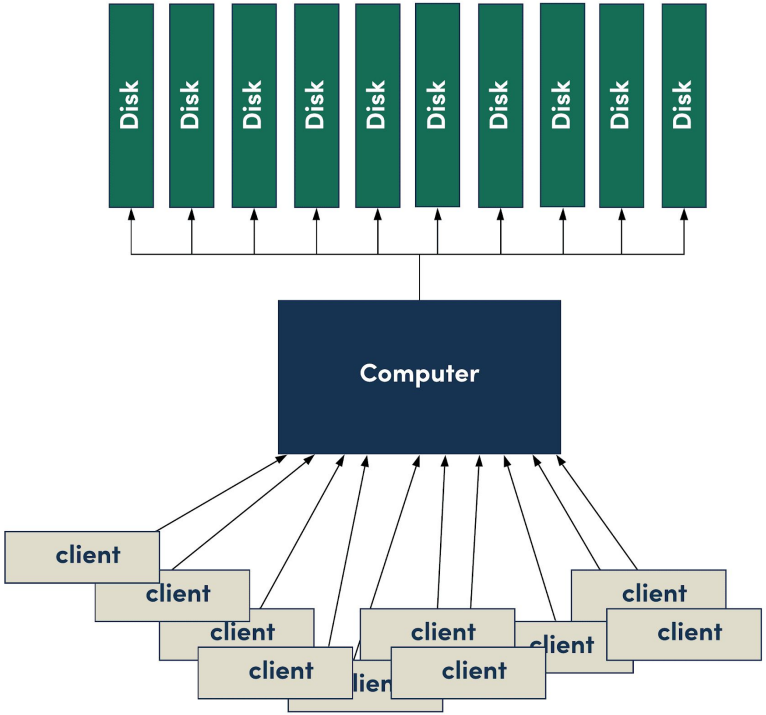
Ceph is the Swiss Army Knife of the SDS world

Ceph has that Linux-like magic combination of qualities that heralds its destiny: accessibility, openness, unparalleled flexibility, rich features, an impressive and growing roster of enterprise ambassadors, and a deep and devoted user community.

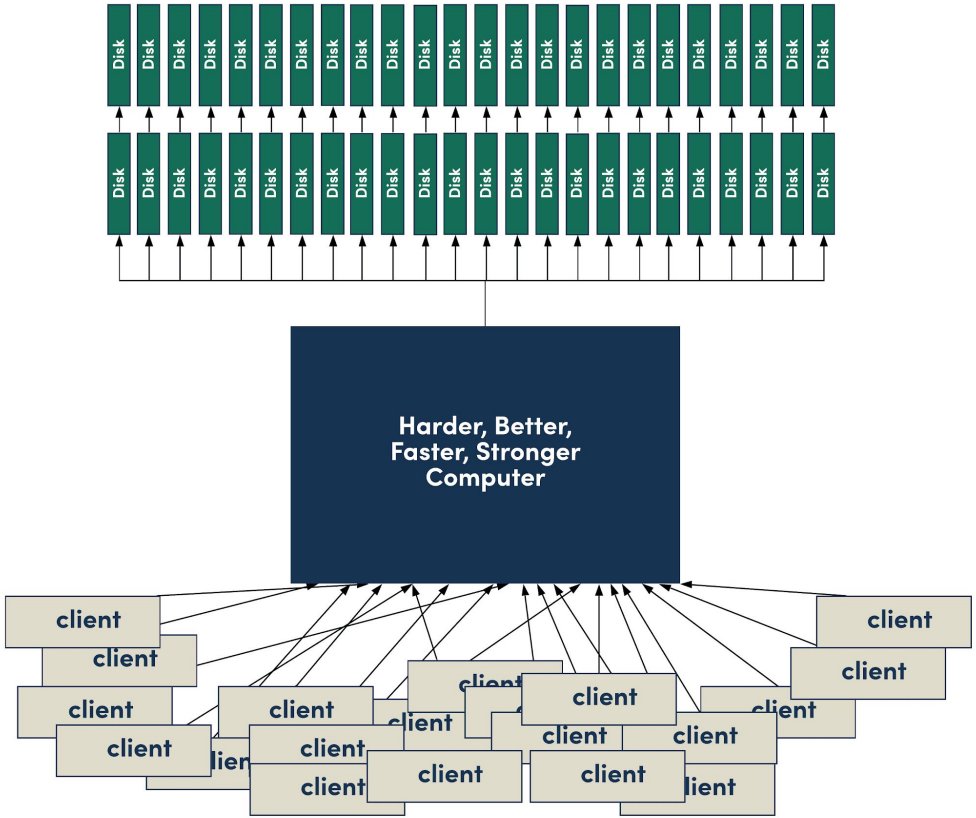
Traditional Storage Architecture



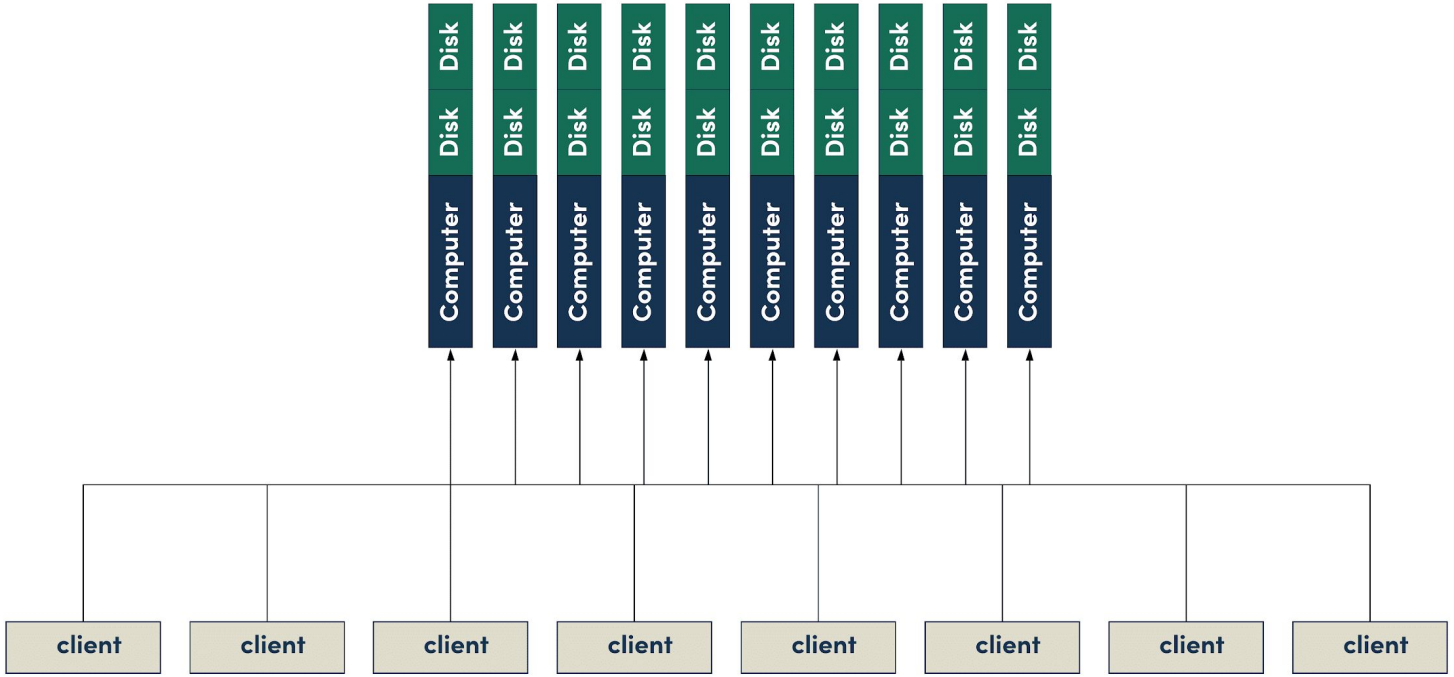
Traditional Storage Architecture



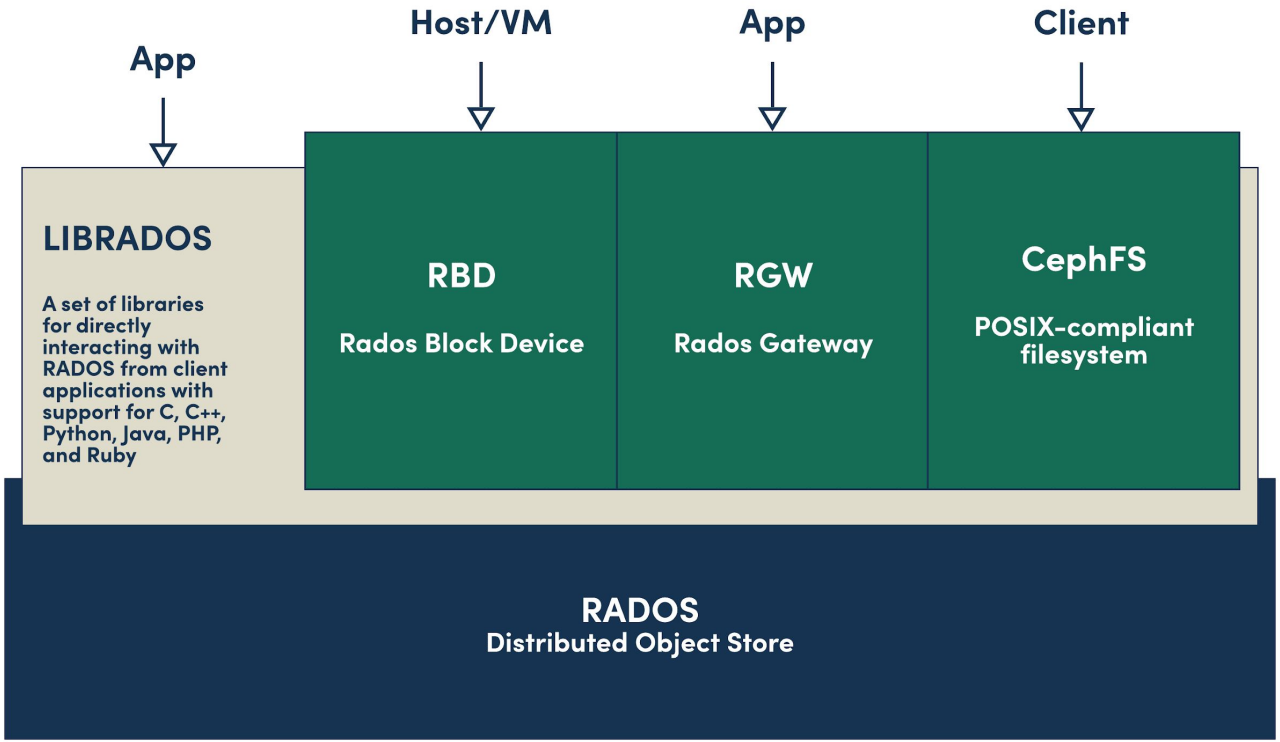
Scaling Up



Scaling Out (SDS)



Ceph Architecture



Ceph Daemons

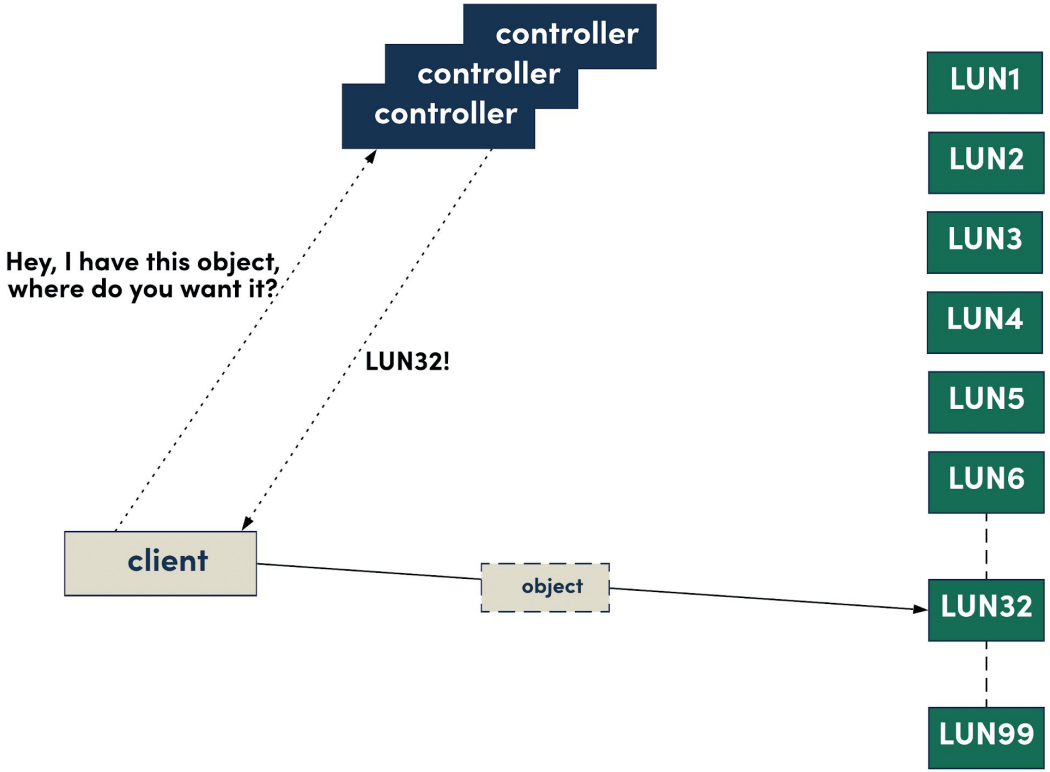
OSD

Monitor

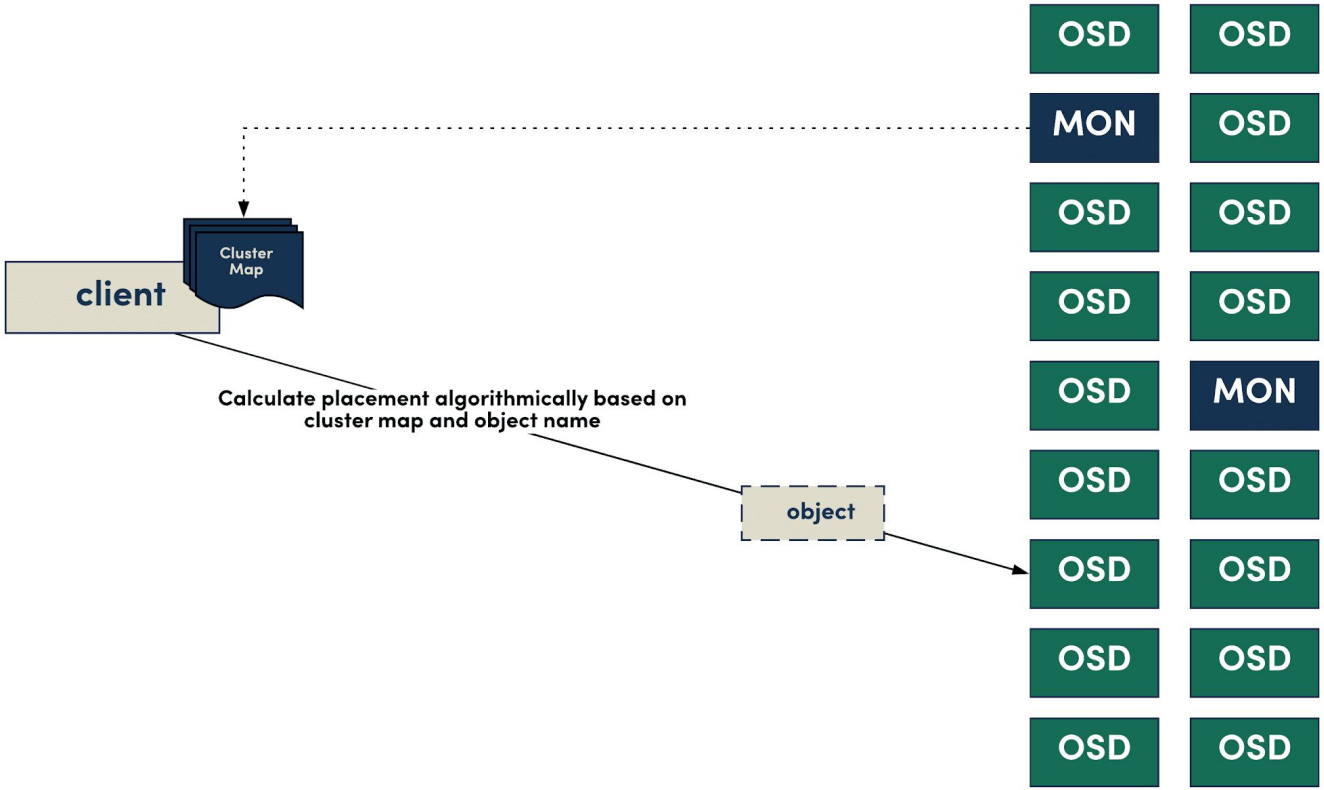
Manager

RGW

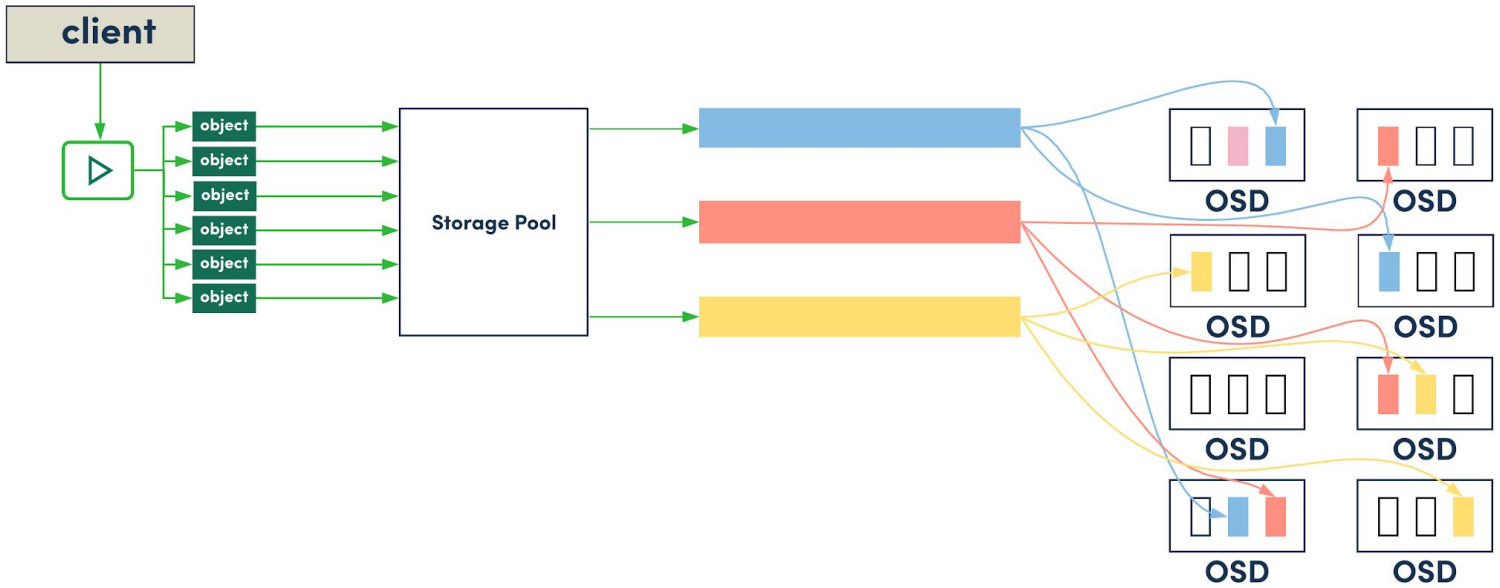
Traditional Data Placement



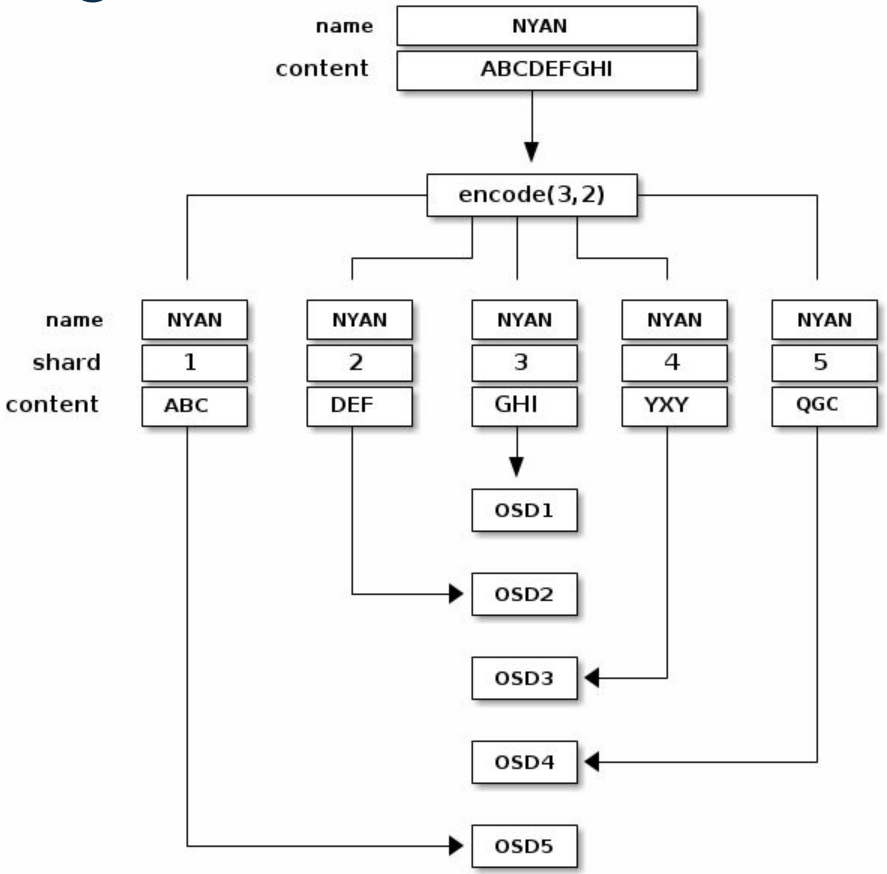
CRUSH


OSD
OSD
MON
OSD
OSD
OSD
OSD
OSD
OSD
MON
OSD
OSD
OSD
OSD
OSD
OSD
OSD
OSD
Cluster Map
client
Calculate placement algorithmically based on cluster map and object name
object

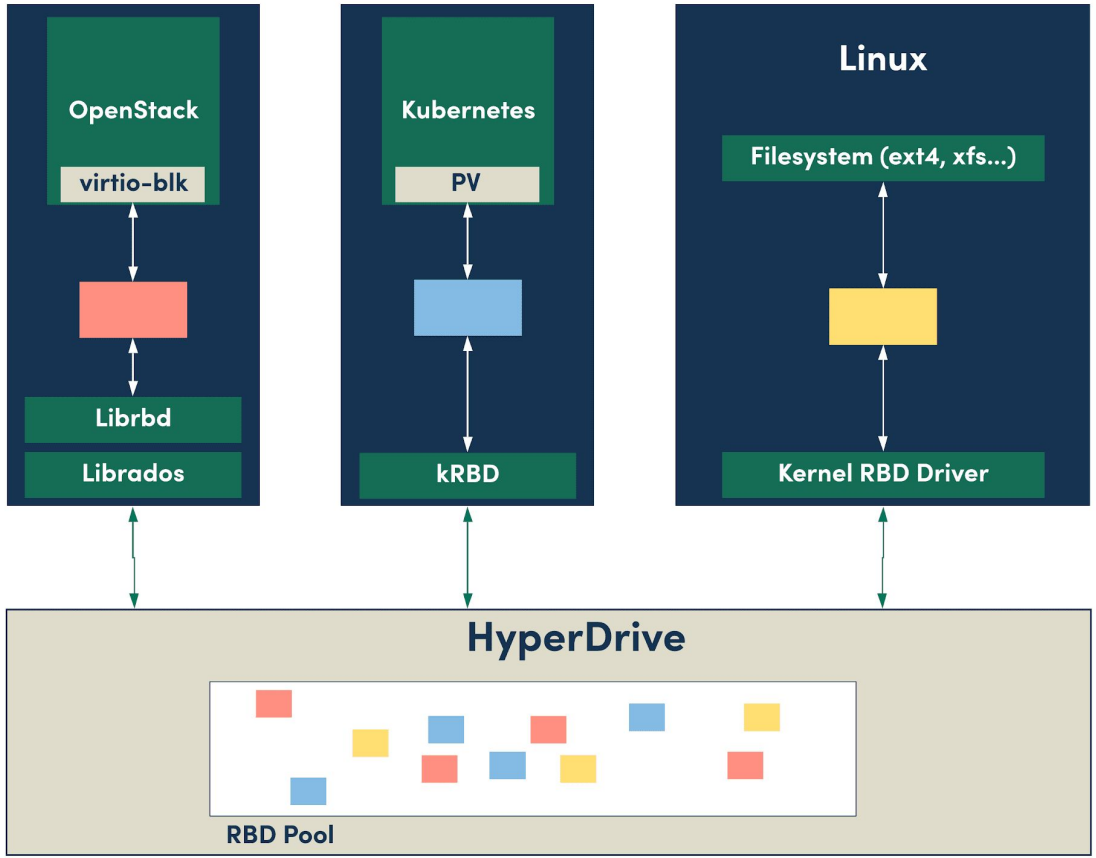
Placement Groups



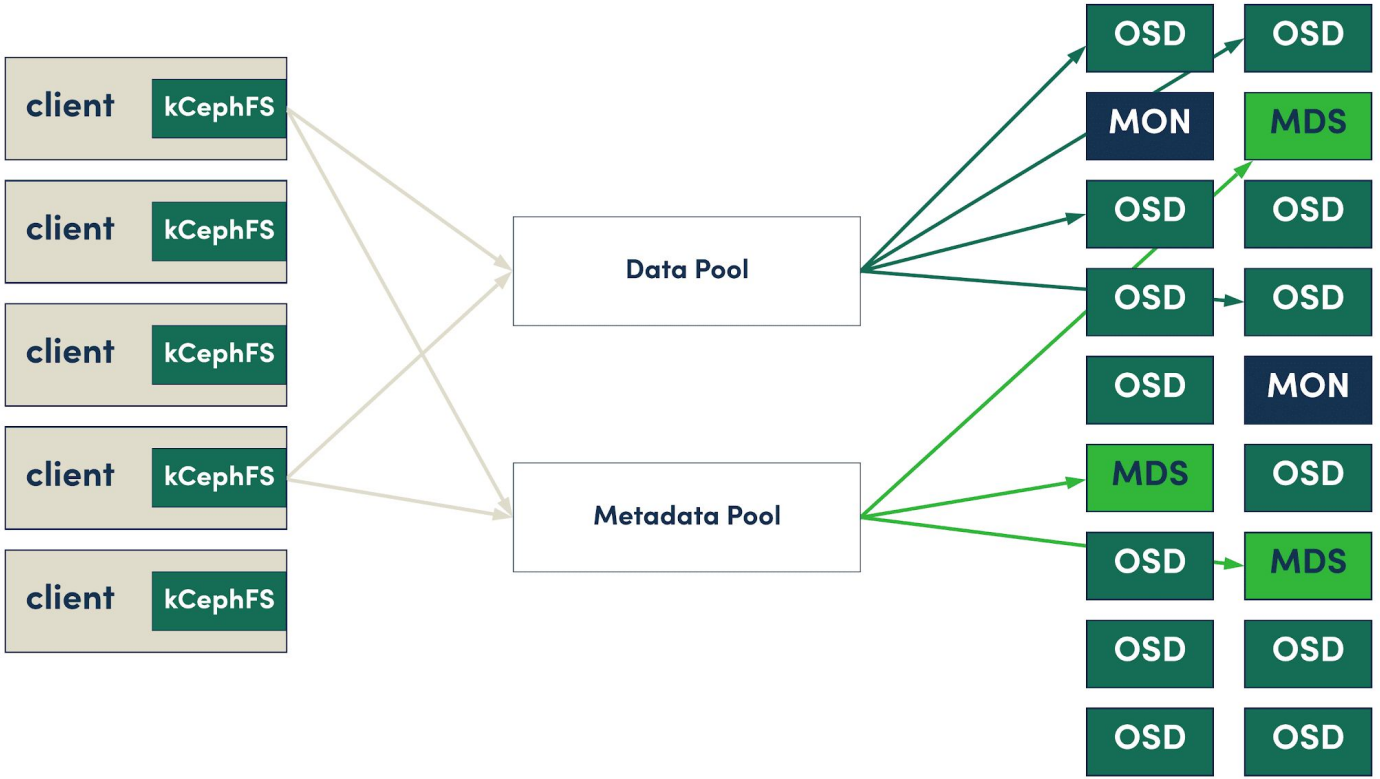
Erasure Coding



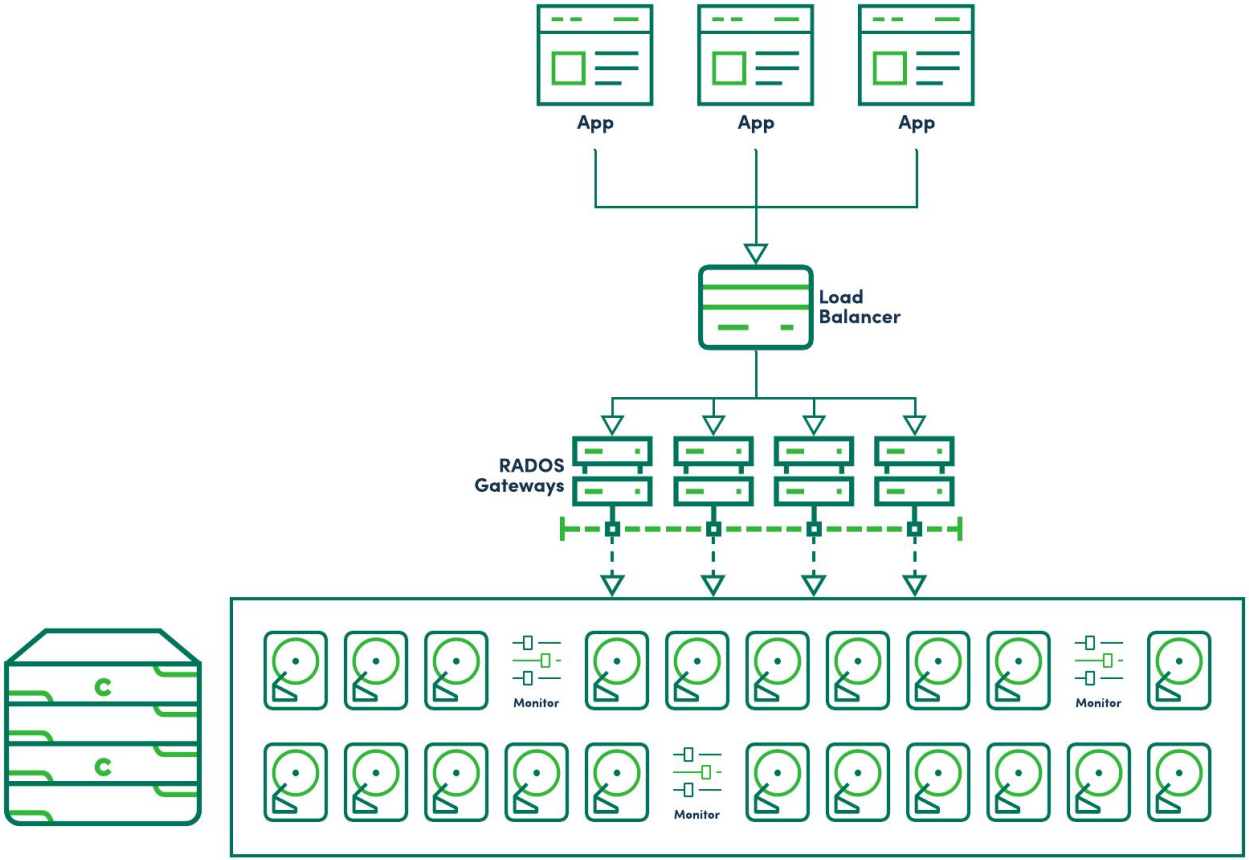
RBD


OpenStack
virtio-blk
Librbd
Librados
Kubernetes
PV
kRBD
Linux
Filesystem (ext4, xfs...)
Kernel RBD Driver
HyperDrive
RBD Pool

CephFS


client
kCephFS
client
kCephFS
client
kCephFS
client
kCephFS
client
kCephFS
Data Pool
Metadata Pool
OSD
OSD
MON
MDS
OSD
OSD
OSD
OSD
OSD
MON
MDS
OSD
OSD
MDS
OSD
OSD
OSD
OSD

RGW


App
App
App
Load Balancer
RADOS Gateways
Monitor
Monitor
Monitor

Recent releases and key features

Nautilus - March 2019

- Easier to use and manage Placement groups
- Encryption in transit
- Improved S3 performance due to backend server replacement

Octopus - March 2020

- S3 Bucket Replication
- S3 Bucket Notifications
- S3 Object Lock

Pacific - March 2021

- New and official Ceph RESTful API
- Multiple CephFS Filesystems
- CephFS Windows Support

Example – Enterprise Class Storage needs integrated management

- Eliminate the need for “command line warriors”
- Hardware auto-discovery wizard
- Rules to prevent bad setups and prompts
- Quick physical location of the actual disc that needs attention
- Easily add or remove machines to a cluster
- Multiple admin “lockout” feature
- ONLY possible with task specific hardware

iRODS Integration

S3 Resource Plugin

- Can address Ceph just like any other S3 interface in iRODS

UnixFilesystem Resource Plugin

- Can mount CephFS (or even RBD) straight into iRODS via Unix

RADOS Resource Plugin

- Works, but hasn't been updated in a couple of years
  Had some issues recently, which have been fixed