Media Server

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What Are Media Servers?

- **Media Servers are storage servers that house the media of the application in a decentralized manner**

- **They are typically replicated to allow for faster content provision without having bottlenecks in a geographical region**

Networked Storage

- **A network must exist to allow for server communication**

- **High speed communication mediums are required to enable swift querying of media**

- **Common storage forms:**

  - Network Attached Storage

  - Storage Area Network

Network Attached Storage (NAS)

- **This a file level storage device attached over a TCP network**

- **Appears as a shared folder on the OS**

- **Uses Ethernet as the connection medium**

- **Offers a simple management interface but at the cost of less features and cost**

NAS Use Cases

- **File storage and sharing**
- **Low volume unstructured data such as emails, photos, videos, etc.**

Storage Area Network (SAN) – I

- **A dedicated block-level storage connected using high speed connections such as fiber optics**

- **Uses dedicated protocols for accessing disks mostly Small Computer System Interface (SCSI) which provides low latency disk access**

- **More expensive to manage**

Storage Area Network (SAN) – II

- **Appears to the OS as a locally attached disk**

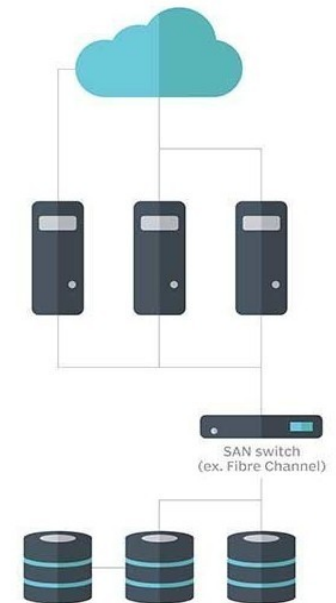- **Requires a dedicated switch to access storage**

NAS vs. SAN Storage

NETWORK-ATTACHED STORAGE
- Shared storage over shared network
- File system
- Easier management

NAS device

STORAGE AREA NETWORK
- Shared storage over dedicated network
- Block storage
- Fast, but expensive

SAN switch (ex. Fibre Channel)

SAN Use Cases

- **Structured data such as database files, virtual machine storage**
- **High volume data**

Object Storage

- **A new form of storage is *Object Storage***
- **Manages data as objects rather than files or blocks**
- **Data is stored along with metadata tags and a unique ID**
- **Data is stored in a flat address space, that may be grouped into buckets**
- **Objects are accessed through HTTP/REST interfaces**

Object Storage – II

- **Designed to overcome the scalability limitations of NAS and the high costs of SAN**

- **Decouples existing file system from the storage layer, thereby only monitoring high level abstracts only**

- **Allows for data recovery using *Erasure Coding,* in which files are fragmented on multiple servers and encoded to allow for easier recovery**

Ceph

- **An open source, object storage and block storage module designed to run in the Linux kernel**

- **Built for commodity hardware rather than high end hardware**

- **Built as layers to support multiple endpoints**

Ceph Layers
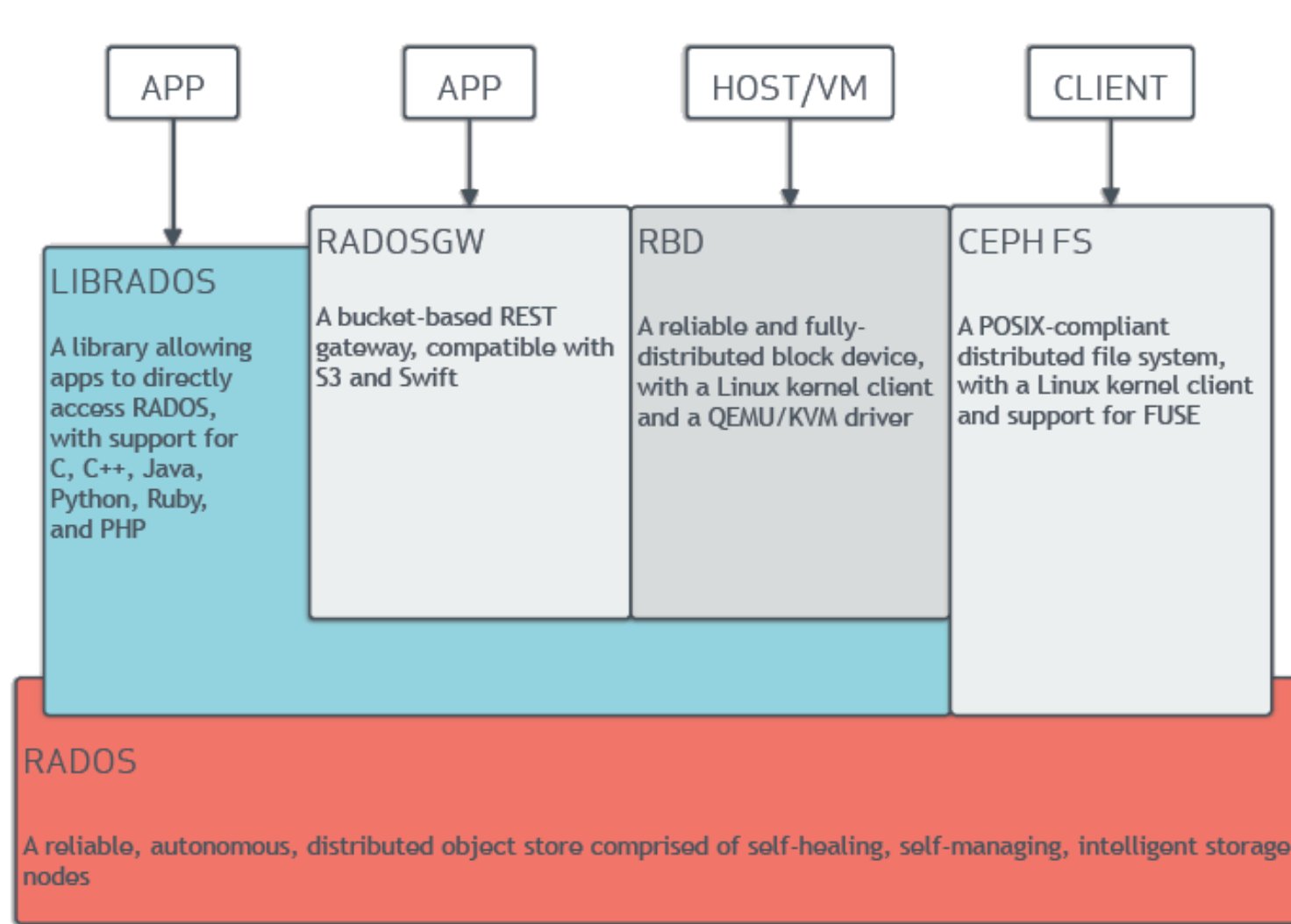
Ceph Storage Cluster

- **Ceph stripes the data across the clusters in a fashion similar to RAID 0 to achieve higher throughput**

- **Striping is achieved using an algorithm called CRUSH (Controlled Replication Under Scalable Hashing)**

- **CRUSH allows clients to communicate with the nodes to find files rather than having a dedicated server that keeps track of files**

Ceph Storage Cluster – II

- **CRUSH keeps a map of the object store devices and the buckets (group of objects) they carry**

- **This map is replicated on the nodes such that they can respond to queries individually**

- **CRUSH then distributes the data in a pseudo-random manner across the nodes**

Any questions?