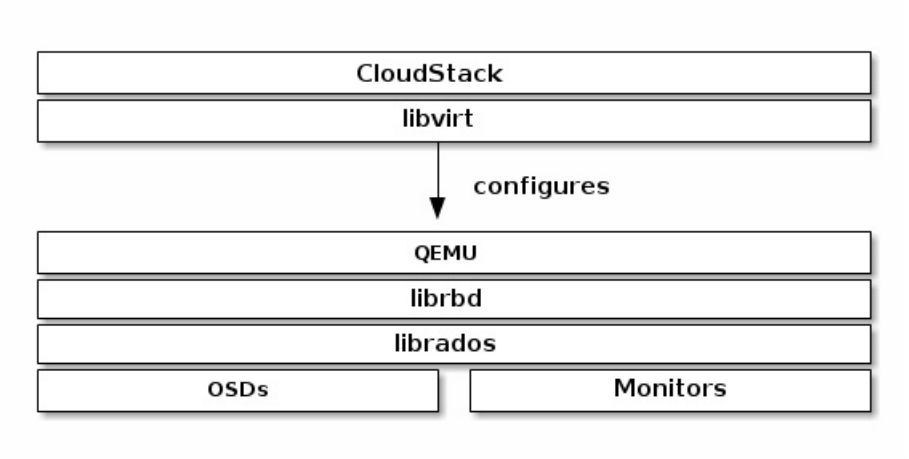
BLOCK DEVICES AND CLOUDSTACK

You may use Ceph Block Device images with CloudStack 4.0 and higher through `libvirt`, which configures the QEMU interface to `librbd`. Ceph stripes block device images as objects across the cluster, which means that large Ceph Block Device images have better performance than a standalone server!

To use Ceph Block Devices with CloudStack 4.0 and higher, you must install QEMU, `libvirt`, and CloudStack first. We recommend using a separate physical host for your CloudStack installation. CloudStack recommends a minimum of 4GB of RAM and a dual-core processor, but more CPU and RAM will perform better. The following diagram depicts the CloudStack/Ceph technology stack.



Important: To use Ceph Block Devices with CloudStack, you must have access to a running Ceph Storage Cluster.

CloudStack integrates with Ceph's block devices to provide CloudStack with a back end for CloudStack's Primary Storage. The instructions below detail the setup for CloudStack Primary Storage.

Note: We recommend installing with Ubuntu 13.04 or later so that you can use package installation instead of having to compile libvirt from source.

Installing and configuring QEMU for use with CloudStack doesn't require any special handling. Ensure that you have a running Ceph Storage Cluster. Install QEMU and configure it for use with Ceph; then, install `libvirt` version 0.9.13 or higher (you may need to compile from source) and ensure it is running with Ceph.

1. Install and Configure QEMU.
2. Install and Configure libvirt version 0.9.13 or higher.
3. Also see KVM Hypervisor Host Installation.

Note: Raring Ringtail (13.04) will have `libvirt` version 0.9.13 or higher with RBD storage pool support enabled by default.

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CREATE A POOL

By default, Ceph block devices use the `rbd` pool. Create a pool for CloudStack NFS Primary Storage. Ensure your Ceph cluster is running, then create the pool.

```
ceph osd pool create cloudstack
```

See Create a Pool for details on specifying the number of placement groups for your pools, and Placement Groups for details on the number of placement groups you should set for your pools.

ADD PRIMARY STORAGE

To add primary storage, refer to Add Primary Storage (4.0.0) or Add Primary Storage (4.0.1). To add a Ceph block device, the steps include:

1. Log in to the CloudStack UI.
2. Click **Infrastructure** on the left side navigation bar.
3. Select the Zone you want to use for Primary Storage.
4. Click the **Compute** tab.
5. Select **View All** on the *Primary Storage* node in the diagram.
6. Click **Add Primary Storage**.
7. Follow the CloudStack instructions.
    - For **Protocol**, select `RBD`.
    - Add cluster information (cephx is supported).
    - Add `rbd` as a tag.

CREATE A DISK OFFERING

To create a new disk offering, refer to Create a New Disk Offering (4.0.0) or Create a New Disk Offering (4.0.1). Create a disk offering so that it matches the `rbd` tag. The `StoragePoolAllocator` will choose the `rbd` pool when searching for a suitable storage pool. If the disk offering doesn't match the `rbd` tag, the `StoragePoolAllocator` may select the pool you created (e.g., `cloudstack`).

LIMITATIONS

- CloudStack will only bind to one monitor (You can however create a Round Robin DNS record over multiple monitors)
- CloudStack does not support cloning snapshots.
- You still need a (small) NFS based Primary Storage for the SystemVMs
- You may need to compile `libvirt` to use version 0.9.13 with Ubuntu.