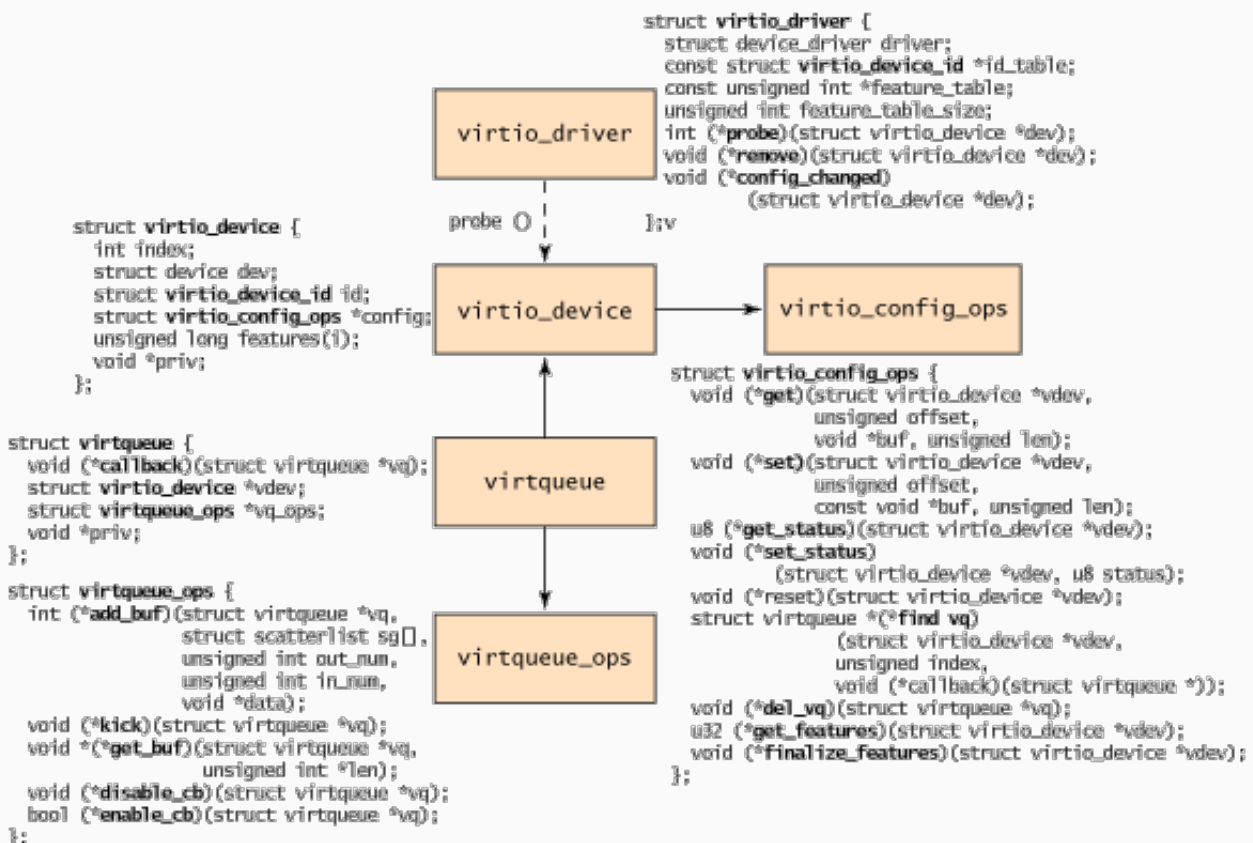# VirtIO

VirtIO provides an abstraction for paravirtualized drivers. This means that it provides a transport mechanism for communication of guest driver to host, mechanism for probing and configuring the devices. Using these, front end drivers(used in the guest OS) and corresponding backend drivers(present in the hypervisor) can be made.

Structures in VirtIO

Virtio abstraction consists of virtio_driver which has probe function to probe for devices for that driver. It has associated virtio_devices. virtio_device has virtio_config_ops which has operations for configuring the device. This has a find_vq function which gives virtqueue for the device. The find_vq function also permits the specification of a callback function for the virtqueue, which is used to notify the guest of response buffers from the hypervisor.

Virtqueue

Virtqueue is used for communication to and from the backend driver. virtqueue has virtqueue_ops which has functions for all the operations that can be performed with the queue. add_buf adds a buffer to the queue. A buffer is a scatter-gather array which is an array of buffers containing data all of which are added to the queue in order. add_buf also takes an argument called data which is returned by the get_buf call when this buffer has been consumed. kick function performs a VMExit and notifies the backend driver that there are

buffers to consume. get_buf is used to get which buffer has been consumed by the host. It return the data that was passed along with the buffer in the add_buf call.

disable_cb disables the callbacks(which was provided in the find_vq call) of buffers consumed by the hypervisor. enable_cb does the opposite. enable_cb returns false if a buffer was consumed by the hypervisor/host after the last get_buf call i.e. there is a consumed buffer in the virtqueue. The typical workflow is to disable callbacks, get all the consumed buffers and enable callbacks again so that any new consumed buffer will transfer the control to callback function. But if a buffer is added after the get_buf call and before enable_cb, there is a possibility that it will never be acknowledged.

References

- http://www.ibm.com/developerworks/library/l-virtio/
- http://dl.acm.org/citation.cfm?id=1400097.1400108