VIRTUALIZATION
(CSE4011)

Project – Review 1

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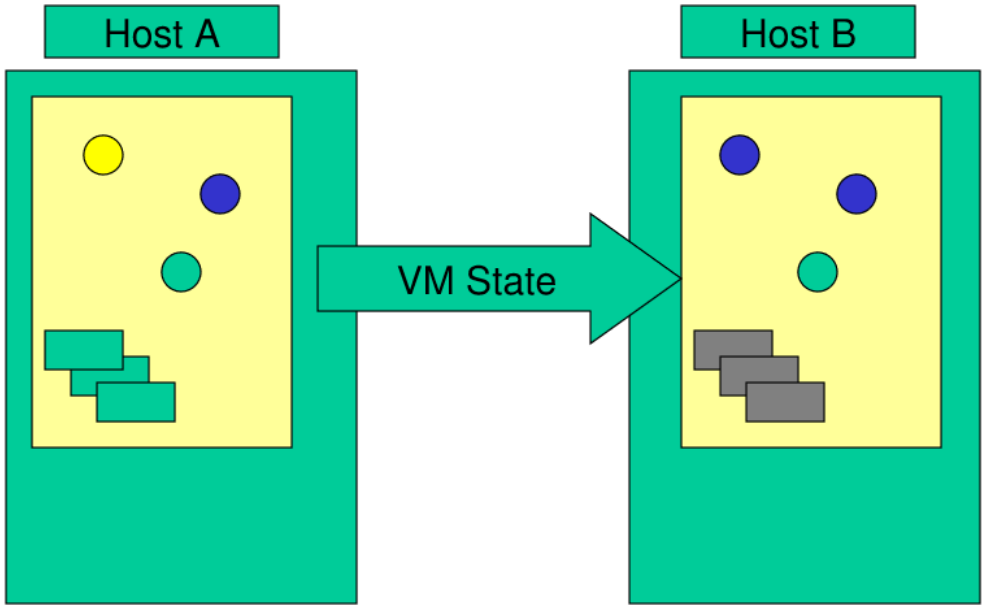
Live Migration on KVM

INTRODUCTION:

Live migration refers to the process of moving a running virtual machine or application between different physical machines without disconnecting the client or application. Memory, storage, and network connectivity of the virtual machine are transferred from the original guest machine to the destination.



REQUIREMENTS:

1. OS – Ubuntu 16.04 (any OS can be used but all the host involved in Live Migration should have the same OS).
2. Hypervisor – KVM (any linux based hypervisor can be used eg. Xen for managing the VMs)
3. Shared Storage – NFS (most important requirement for the Live Migration)
4. Virtual Machines – Any number of VMs can be created and can be managed by using KVM (Kernel Virtual Machine)

CONCEPTS:

1. **VIRTUAL MACHINE**

   A Virtual Machine is an Operating System or application environment that is installed on software which imitates dedicated hardware. The end user has the same experience on a Virtual Machine as they would have on dedicated hardware.

2. **LIVE MIGRATION**

   Live Migration refers to the process of moving a running Virtual Machine or application between different physical machines without disconnecting the client or application.

3. **KVM (Kernel Virtual Machine)**

   Kernel-based Virtual Machine (KVM) is a virtualization infrastructure for the linux kernel that turns it into a hypervisor.

4. **NFS**

   NFS, or Network File System, is a distributed file system protocol that allows you to mount remote directories on your server. NFS provides a relatively quick and easy way to access systems over a network and works well in situations where the shared resources will be accessed regularly.

MODULES AND STEPS INVOLVED:

1. Setup

   - Start guest on destination, connect, enable dirty page logging and more

2. Transfer Memory

   - Guest continues to run
   - Bandwidth limitation (controlled by the user)
   - First transfer the whole memory
   - Iteratively transfer all dirty pages (pages that were written to by the guest).

3. Stop the guest

   - And sync VM image(s) (guest's hard drives).

4. Transfer State

   - As fast as possible (no bandwidth limitation)

- All VM devices' state and dirty pages yet to be transferred

5. Continue the guest

- On destination upon success
- Broadcast "I'm over here" Ethernet packet to announce new location of NIC(s).
- On source upon failure (with one exception).