LIA
Week 2: VM Migration

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15 February 2013
Submission Date: 22 February 2013

Abstract

These lab assignments will briefly introduce you to VM migration. We use the lab setup created in the first week of lab assignment. Topics covered are live migration, shared storage for VM images and secure VM migration.

1 VM Migration Basics

Migrating VMs can be very useful, for instance when the need to upgrade the hypervisor arises. VM migration is also a key feature in currently hot topics like Cloud Computing and Green IT.

→ Read about VM migration in Xen and write your own summary in about 400 words.

To practice Xen VM migration, you will work together with one of your classmates.

→ Form a group of two and think about how you are going to migrate VMs to each other's hypervisor. Write down the decisions that you make and document each steps. Do not yet worry about security.

→ Migrate VMs and adjust your plans to match reality when needed. Document what goes well and what goes wrong.

With "regular" VM migration, the VM is stopped, its memory is transferred, and the machine is resumed at its destination hypervisor. With live migration, the VM is stopped right *after* its memory has been transferred. This reduces downtime to milliseconds, hence the "live" in live migration.

→ Perform live migrations with your partner. Think of a way to adequately measure downtime, and measure the downtime for both "regular" and live migration.

2   Shared Storage for VM Images

VM migration requires shared storage, which eliminates the need to copy disk images. There are various ways to set this up, for instance using NFS and SMB, two protocols that allow you to mount remote filesystems.

→ What are the most important differences between NFS and SMB? Explain in approximately 200 words.

→ Configure both NFS and SMB as VM shared storage repositories. Benchmark the performance of both and compare the results.

→ Would you choose NFS or SMB to share disk images with? Explain in less than 100 words.

Besides NFS and SMB, there are several other means to shared storage. All have their unique characteristics, so not all means are suitable to store VM disk images on.

→ List two other approaches to implement shared storage. Compare them to NFS and SMB and tell why they can (or cannot) be used to store VM disk images on.

3   Secure VM Migration

In most environments, VMs must be migrated securely.

→ Give a definition of "secure VM migration". You can either search for an existing definition you agree with, or come up with your own.

→ Look at the Xen daemon configuration file and search for items related to security. List these items and divide them into groups that reflect the aspects covered in your definition of "secure VM migration".

→ Define at least three levels of VM migration security. Perform migrations on all security levels and measure the downtime. Publish the benchmark results and write a summary of about 100 words on the impact of security on the performance of VM (live) migration.

4   Green IT and VM Migration

'Green IT' is all about saving energy. Yeah, we gotta care about this plant of ours :-)

→ What is the role of virtualization and VM migration in reducing energy consumption in data centers? Explain in about 200 words.