Making Classroom Computing Fast and Reliable

Bradley Auble – Brigham Young University – Idaho

Services and Development Division – Paul Sanguinetti

Lawrence Livermore National Laboratory

Introduction

We undertook to transform the technological way tasks are completed at the CTC. One of the main tasks we have is to deploy images to the computers in each of the classroom to meet the demanding needs of the classes offered. The task is to try to find the most efficient way of deploying the images to the computers. We have tried to implement three ways of deploying images: multicasting a Ghost image to each computer, storing images in Virtual PC on each computer's hard drive, and accessing a virtual image on a server.

Methods

Multicasting takes a long time because we must physically be at each computer station to instantiate the session. Storing the images in Virtual PC also takes a bit of time and there is a slight degradation in performance due to the shared nature of Virtual PC. Using a virtual image on a server would take much less time but would also run into problems if each computer has a different hardware configuration needing different drivers.

Virtual Image on a Server

Using Ardence Desktop Edition software the entire process of deploying images is eliminated. In this method, a main server stores all of the operating system and application images. During the boot sequence of each computer, Ardence Desktop Edition streams the required image – pre-assigned via the system administrator – to each desktop from the central main server. Each desktop computer runs the image immediately, without having to wait for the entire OS to download, and starts with the desired configuration. This would simplify the deployment of images immensely.

Pros	Cons
The image will be centralized and end-users will not be able to alter or destroy the configuration	If the computers have different hardware configurations there will be conflicting drivers
Enhanced continuity of configuration creates an easy classroom atmosphere	Would receive limitations of bandwidth if server and switches are not fast enough
All of the computers receive the latest patches that are installed on the image upon reboot. This eliminates the tedious nature of patching multiple computers.	
There is no need to deploy images	

Software We Used

Multicasting an Image

Symantec's Norton Ghost 9.0 provides advanced backup and recovery for your PC. Norton Ghost also allows you to make a copy or image of your hard drive and paste that image of your drive to other computer drives. In the Computation Training Center, we use this method to blast the computers in each classroom with a copy of a drive that includes the software we have installed for a particular class.

Pros	Cons
Quicker than installing software on each computer manually	Requires that you go to each computer and instantiate the multicasting session
Each computer has exactly the same configuration, creates an efficient classroom setup	If computers have different hardware configurations problems arise with the need of other drivers

The Computation Training Center

Images in Virtual PC

Microsoft Virtual PC 2005 is a program that allows you to run multiple PC-based operating systems simultaneously on one workstation. By utilizing this software, we could install many different images into each computer. By doing this, we no longer needed to continually re-image the machines. We would leave each image on the machine creating an image library from which to choose.

Pros	Cons
Saves time from erasing and installing images, images would only need to be installed once and reused from there.	Requires more RAM. The host operating system and the guest operating system(s) share the RAM. If more RAM is not installed expect slower operation of programs.
Allows end-users to manipulate system without having to worry about damage to critical files or settings.	Requires more hard disk space. The approximate size of a standard Virtual PC image is 4 gb.
Restarting without saving erases all changes previously made during session.	Takes extra time installing the images on each computer.
End-users can flip back and forth between operating systems quickly.	Some slight hardware incompatibilities.

A class having fun in the Training Center

This work was performed under the auspices of the U.S. Department of Energy by University of California Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.