Setting up the Lab Cluster

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Wednesday, June 18, 2008

Introduction

This short how-to is a guide to setting up the Syzygy cluster in the REU Lab, in a setup that we like to call the Canvas. Note that this setup is only valid in Altgeld 102, the REU Lab, and WILL NOT WORK elsewhere. This is because our script, designed for extremely easy setup within the lab, references an IP table for the computers in the lab.

Beyond that, the Canvas Cluster is very portable within the lab. One can set up a cluster on any three computers in the lab that meet the following requirements:

- Each computer must be running Mac OS X 10.5.
- Each computer must have Syzygy installed to `/sw/syzygy/wii/szg` as seems to be the case on all machines in the IP table as of June 18, 2008.
- The IP table DOES NOT INCLUDE the following computers:

  ```
  ellipse
  bigmac
  ```

  where `bigmac` refers to the 8-core machine in the corner. Otherwise, all other computers in the REU Lab are fair game. If problems arise, see the Perl script `szgscript.plx` for the IP table.

Setup Process

It is recommended that three adjacent computers are used to set up the Canvas. The virtual space that defines the Canvas in the configuration files places the three "walls", in our case screens, immediately adjacent to one another with the left and right screens "folded" inward toward the middle screen by 45°, as with a typical three-column poster.

On the computer you wish to be the middle screen (which will also be the input simulator screen), change directories to the community cluster directory:

```
$ cd /b1/imath08/szgbin/
```

We first need to set up all of the environment variables correctly. Thankfully, Chase Boren has written a shell script to do all of this automatically. To run the script, type:

```
$ source szgenv
```

We next need a Syzygy server for the other two computers to connect to, so start the server on the middle middle computer by typing:

```
$ startszg <left> <middle> <right>
```

where `left, middle,` and `right` are the left, middle, and right computers, respectively. For instance, `middle` is the computer that you should be on now. Keep the terminal open for the duration of your Canvas' life. If we want to use `euclid`, `descartes`, and `bolyai`, we would execute the command as

```
$ startszg euclid descartes bolyai
```

and `descartes` is our "command" computer.

The process for the other two computers is much the same. Simply navigate to /b1/imath08/szgbin and do the following from the command line:

```
$ source szgenv
```

```
$ startszg <left> <middle> <right>
```

where `left, middle,` and `right` should be in exactly the same order as before. If all goes well, on the middle computer, you should see some Syzygy remarks that a couple IP addresses have connected to the server.

After a few seconds (to make sure the two side screens have fully connected) press return on the middle computer's terminal to go to a clean line. To test the Canvas setup, type:

```
$ dex vmac cosmos
```

`dex` is the command from the main computer to the rest of the cluster that we are starting an application; `vmac` is the name of our virtual Syzygy computer that runs everything; `cosmos` is a built-in test application that resides in /b1/imath08/szgbin/. As you can see, all one needs to do to test their application in the cluster setting is to put their executable (along with any other required files) into /b1/imath08/szgbin/, to which everyone has read/write permissions. That said, don't touch anything that's not yours! It could very well cripple the cluster setup we have designed.

To stop an application in the cluster setting, at the control (middle) computer, type the following:

```
$ dkillall vmac
```

Of course, what we want to do with this is test our own applications' abilities to "share" - that is, we want to gauge how well our applications work in the cluster setting. With this setup, there should be no problem doing this. As stated before, you can just drop your executables (which MUST be Mac OS X Syzygy compiled) in the /b1/imath08/szgbin/ directory, along with any other necessary files, and execute the following command once the cluster is set up:

```
$ dex vmac <program name>
```

Where `program name` is the executable you wish to test with the cluster.

So there you have it! You are ready to use the Canvas Virtual Environment. Special recognition goes to Chase Boren for writing the shell and Perl scripts to make all this possible.

Further Improvements

Over the course of the remaining time we have left, there are a few things that could see improvement in the Canvas Virtual Environment.

- Once we have the ability to enable PySZG natively on Mac OS X, it will be only small additions to add this functionality to the Canvas.
- As the real virtual environments in Beckman (soon to be moved to the south end of campus) run on Syzygy in Windows, it would also be helpful to advantageous to create a Canvas for the virtual Windows machines running in VMWare Fusion.
- Because we are using the `wii` version of Syzygy, it may be a simple addition to add wii functionality to the Canvas. This is just icing on the cake though.

Needless to say, the Canvas already accomplishes its primary purpose - enabling the developer to debug cluster sharing capabilities of his or her applications without having to use the actual virtual environments. These features *should* be platform independent, and it is good practice to have programs that will compile in both UNIX and Windows.