**FIU** FLORIDA INTERNATIONAL UNIVERSITY

**uff** Universidade Federal Fluminense

**LAGrid** Latin American Grid

**Partnership for International Research and Education**
**A Global Living Laboratory for Cyberinfrastructure Application Enablement**
**Project Title:** Maximizing Resource Utilization for IT Automation Training
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CI-PIRE

**NSF** **National Science Foundation**

# I. Research Overview and Outcome

## Background

One of new methods of teaching IT Automation Solutions to students is through the use of "Virtual Labs". In this method, students are provided with a number of dedicated virtual machines (called virtual labs) with pre-installed software packages and pre-configured virtual networks. Virtual labs are scheduled on demand and are hosted on powerful physical machines. A typical virtual lab for an IT Automation solution such as Kaseya, there is a need for at least 5 dedicated virtual machines per student. Our current physical servers are capable of running 15 such virtual machines and hence are capable of supporting 3 students at any given time. Although this approach improves the utilization of resources comparing to using actual physical machines in a physical lab setting (not that for a physical lab setting, we need 5 physical machines per student for the above scenario), the current approach to virtual labs is still suffering lack of scalability as we need one strong server per 3 students. Considering a class size of 36 students, we need 12 strong servers for all these students to take their lab exercises at the same time.

## Scenario
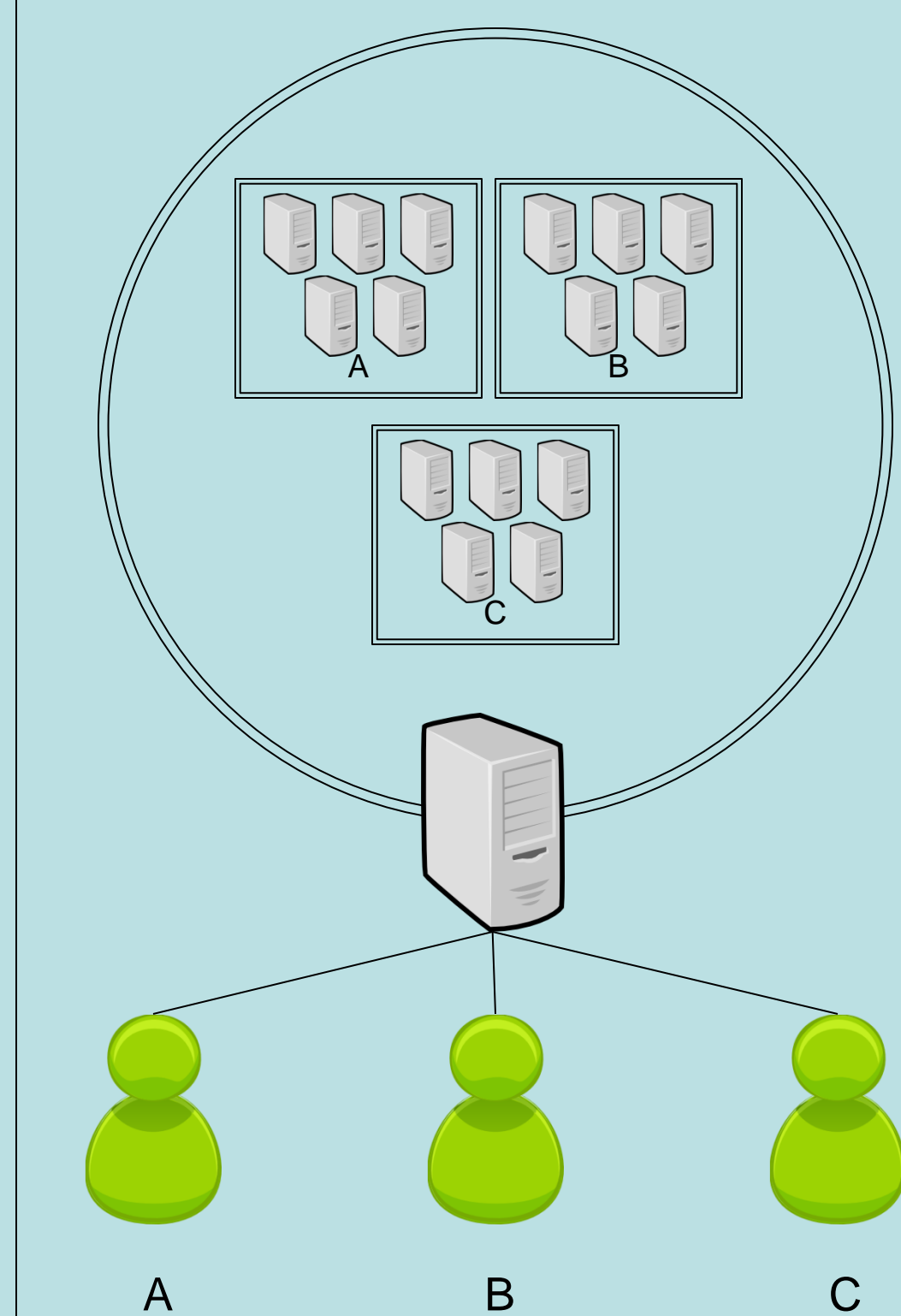
Setting up an environment for Kaseya training requires at least 5 VMs, which our servers at the moment can only host a maximum of 15 VMs. This equates to having only 3 users available for training. Therefore multiple servers would be needed to facilitate a full group of users.

A    B    C

Before
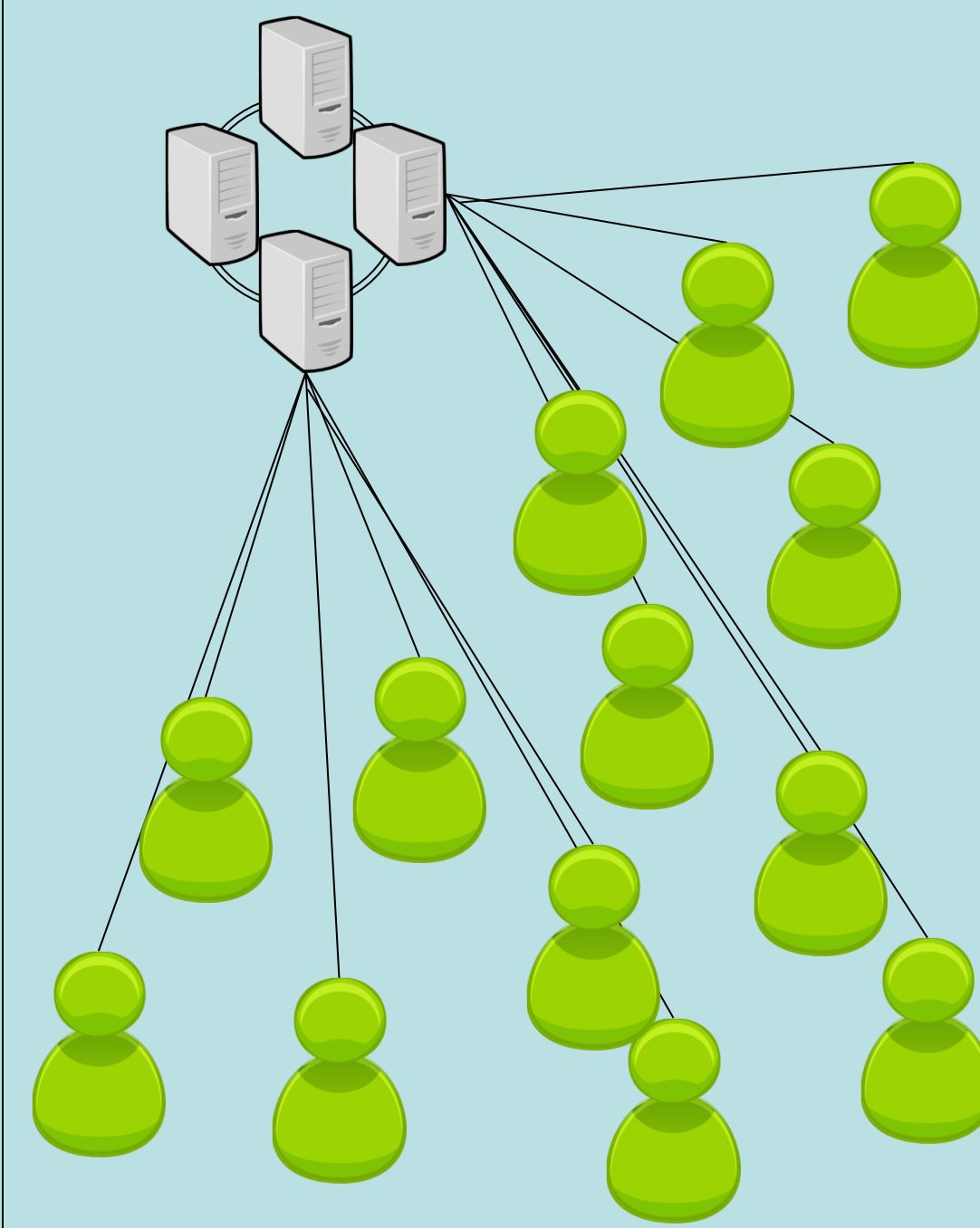
With IsTVs, a single server or a server farm can be used in order to host the video files. This method can allow multiple users to access the simulated virtual environments without the need for actual VMs. In this model, no VMs would be required. This would cut the amount of resources needed by 90%, as large VM images are no longer required.

After

## Methodology/Solution

We propose the use of Interactive Simulated Training Videos (IsTV) to complement the Virtual Labs. First the virtual labs were setup with Kaseya implemented. Once completed, each of the virtual labs hands-on training videos was individually recorded using Adobe Captivate 5. This allows us to screen capture both audio and video. We then post process the capture with click and type events. This allows us to create the "interactive" aspect of the training videos. This process helps us eliminate the need for individual virtual labs. The videos can be hosted on a server or a server farm which can be streamed to many different users. This reduces the need of having multiple virtual machines on multiple servers and eliminates the need for processing large virtual machine images for each environment. Once students are well trained using the interactive videos, they can then schedule virtual labs to have more freedom during their training process and to learn from their mistakes. In summary, using IsTV, we limit the hours of virtual labs required for each students.

## Results

Using a IsTV as a complementary approach to virtual labs, we hope to be able to decrease the hours required for each student to play with the virtual labs. The interactive training videos demand much less resources and are more scalable comparing to virtual labs. At this point, we do not have any real data to show the effectiveness of IsTV. We plan to collect data from the IT Automation class that will be offered in Spring 2011. Currently, there are 35 students enrolled in this class.

# II. International Experience

## Brazil

Traveling abroad is always an exciting experience. Nothing can replicate this; not the classrooms and not any video exercise. Exploring places from Copacabana, Sao Fransisco, Ipanema, Leblon and Barra de Tijuca. All areas in Brazil offering the same beautiful scenery and rich culture that Brazil is known for. From the beaches to Christ the Redeemer; Brazil has a lot of history underneath the beauty.

The best aspect about Brazil has to be their food. Everything from breakfast to dinner is wholesome and delicious. Their use of natural ingredients cannot match the taste of our processed food markets. Many of their popular drinks come from the same fruits that grow in Brazil. Guarana and Acaî are two of the most popular fruits that are transformed into soda drinks and smoothies. While their "kilo" restaurants are sure to not let anyone go home

My experience in Brazil was a life changing experience. I was able to make friends and memories that will last a lifetime. Being engulfed in their culture for 2 months has given me a different perspective on life; work to live and not live to work. PIRE has given me the opportunity to experience this first hand and the knowledge that I have obtained through this experience will never leave me.

# III. Acknowledgement