

IC322 – Computer Networking

Fall AY2013

Project Overview (v1.0)

The IC322 project is intended to be an introduction to network administration, services, and Virtual Machines (VMs).

Teams of 4-5 midshipmen will build a network of multiple VMs and install various services on them. Each student will be responsible for maintaining multiple VMs on their own workstation. The VMs will be linked to each other via a hub or switch.

There will be four services running on each network:

1. Linux DNS server
2. Linux DHCP server
3. Windows webserver
4. Linux webserver

Each student in a group will be responsible for setting up one of these services. Groups with five students will add an extra Linux webserver.

Detailed instructions will be provided for each Milestone. They will explain how to build VMs and set up services. A checklist will be provided that will let you test whether each step is complete. You must hand in a completed checklist for each Milestone to pass this project, and demonstrate your working network to your instructor.

The goal of the project is to learn a subset of the skills required to administer a network. The project will culminate 29 Nov with a live demonstration of what you have learned. Each group will be given a series of challenges to complete. The groups will compete against each other and will be scored on how quickly each can finish the tasks. The challenges will be based on the skills that you learn in the project, such as adding users, changing network addresses, etc.

Project Milestone I

Due 1 Nov, start of class

Hand in your completed Milestone I checklist.

Set up your team's network and demonstrate the following items to your instructor:

- ✓ Each student has installed two Linux VMs.
- ✓ Each VM is on the same network and can ping any of the others.
- ✓ Each student must demonstrate that they can create a new login account for each of their personal VMs.
- ✓ Each student must demonstrate that they can return their PC to its original state on the Academy network at the end of the exercise.

The following portion will be a timed evolution:

- The group will be given a new network address. Each student must migrate their Host OS and their two personal VMs to the new network and verify that they can ping the other students.
- Each team will receive a new iso they must use to create another VM on their network. Each team must install the new machine, update its software, and correctly configure it to use the team network in class.

Project Milestone II

Due 15 Nov, start of class

Hand in your completed Milestone II checklist.

Set up your network and demonstrate the following items to your instructor:

- ✓ Working DHCP server
- ✓ Working DNS server
- ✓ Working Windows webserver
- ✓ Working Linux webserver

The following portion will be a timed evolution:

- Each group will be given a new network address. They must be able to change the IP address of each of their personal VMs to match this new network.
- Each group must update the webserver to the new network address.
- Each group must update the DNS server to the new network address.
- Each group must update the DHCP server to the new network address.
- Each group must demonstrate that all of their services are now working again on the new network address.

Project Milestone III

Due 29 Nov, start of class

Set up your team networks and have each student log in to their personal VMs.

This class is a head-to-head competition for managing and modifying your networks. For each round, the groups will receive points for completing a task first. All points are given to the entire team, and the members of the team will share the same grade at the end of the competition.

There are three types of tasks:

1. **TEAM** – all members of the team may work together on a single machine. (e.g. installing a new ISO on one Host PC.) The entire team is done when the task is complete.
2. **INDIVIDUAL** – each member of a team must individually finish a task. (e.g. adding a new user account to each of their personal VMs.) Team members may help each other out on these tasks, though each student must work their own mouse & keyboard. The team's task is completed when its last member is done.
3. **SINGLED-OUT** – one member will be selected at random from each team. That member must complete the task without any assistance from other team members. (e.g. change a setting on the DHCP, DNS, or webservers.) The purpose of this type of task is to make sure that the teams do not rely on a single “guru” – you cannot succeed at this task if only one person can manage a particular service.