# Lab Five: Containers and Configuration Management

Write up due 4/3 in the dropbox.

## Introduction/ Use Case:

In our labs so far we have been exploring the use of CM in a virtual machine environment and in the last lab we looked at containers as a technology with the goal of answering some basic questions about how they do what they do. In this lab we are going to sum it all up by combining CM with containers to create a containerized environment that is managed through the use of a centralized CM tool. Pretty exciting stuff.

The reason we are doing this is that we want to combine the security and ability to manage at scale of CM with the lightweight images made possible by the resource sharing model of containers. Our goal in this is to build and environment can support the deployment of large scale service oriented architectures in a loosely coupled distributed model. This is the model that is favored by all the big web scale companies because of the ability it gives them to run a large application that is deployed as a series of loosely coupled services in a large data center.

To see if we can actually do this we are going to migrate the architecture that we built for lab three with its three separate sets of services (basic network services, basic file services, and a web services environment) into our containerized environment. I will not tell you how to combine the sets of services onto host operating systems, that is up to you. You can decide.

## Goals for This Lab

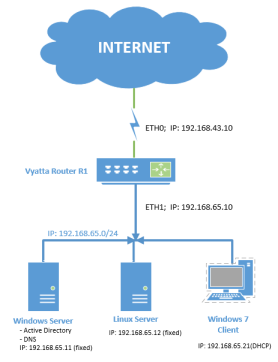
Our goal for this lab is to migrate the virtual machine managed through CM environment that we built for lab three into a containerized architecture. While I recommend using at least two separate container servers, it is not required and you can use as many (up to four) or as few as you want. In other words we want to create a containerized environment where we host the three sets of services from lab three and manage it with a CM tool.

## Lab Outcomes:

The main outcome for this lab is to migrate the CM managed VM environment from lab three into a containerized architecture. The exact architecture that you build is up to you, consider yourself empowered.

Outcome One:

Develop a Visio drawing that displays the architecture of the lab after you have completed your work. This should be done **before** lab so you have a sheet to work off of. Include in your drawings things like machine names, IP addresses for those machines that will receive their addresses statically and services provided by the machines. I have included an example below, but it is not a correct version of what you will have after this lab. It is just to look at.



Prior to lab you are to develop a Visio drawing of what you are building complete with the servers and clients that you plan to deploy and the relevant information needed to accurately deploy them (computer name, IP Address, services to be deployed, relationship to other machines, etc.). The drawing above is illustrative of what I want, but it obviously does not have the correct information on it. It is resizable, just drag on a corner.

### Deliverables:

Visio drawing is complete with devices displayed and network illustrated. IP addresses are shown and services deployed shown.

|  |  |  |  |
| --- | --- | --- | --- |
| How difficult do you feel this part of the lab will be for your group? | Way hard | Not so hard | Easy |
| What resources do you plan to use to help you complete this part of the lab? | |  | |
| **Outcome one completed:** Visio drawing completed of acceptable quality. | | **Your signature:** | |

## Outcome Two:

The main outcome for this part of the lab is for you to migrate the lab environment from lab three with its three sets of services managed through a CM tool into a containerized environment.

**Deliverables:**

The services deployed in lab three are deployed onto one of more container servers and is centrally managed using a CM tool.

|  |  |  |  |
| --- | --- | --- | --- |
| How difficult do you feel this part of the lab will be for your group? | Way hard | Not so hard | Easy |
| What resources do you plan to use to help you complete this part of the lab? | |  | |
| **Outcome Two completed:** | | **Your signature:** | |

**Outcome Three:**

As you know we always test what we build. In this case we want to test the ability of our container server to host the services deployed in lab three managed by a CM tool. Before you declare your migration a success make sure that you can accurately and consistently modify the configurations of your servers and services and gather the metrics that you need to be able to tell if they are able to provide services in a consistent and reliable fashion to the users of your services.

**Deliverables:**

A test has been developed that allows you to be certain that your services are both manageable and useful to users.

|  |  |  |  |
| --- | --- | --- | --- |
| How difficult do you feel this part of the lab will be for your group? | Way hard | Not so hard | Easy |
| What resources do you plan to use to help you complete this part of the lab? | |  | |
| **Outcome Three completed:** | | **Your signature:** | |

## Results:

Please answer the following questions in a short (one or two paragraph) answer:

1. Based on your experience in this class do you feel that containers are a useful technology for the deployment of services?
2. Does the deployment of a service in a container impact your ability to manage it effectively?
3. How can you distinguish the performance of one container from other containers given that they are all running on one physical or virtual machine?
4. Is there a significant difference between managing VMs with a CM tool compared to managing containers with a CM tool? Why or why not?

**How Would You Do This Differently Next Time?**

Please take a few minutes and tell me how this went for you. How could we do this better next time?