Docker

* The problem
* It is very hard to reliably deploy applications.
  + Developer environment is usually carefully set up to run an application.
    - Path and environment variables
    - Certain software downloaded (a particular version of Java)
    - Files that must be in certain locations and named certain things.
  + “Well, it works on my machine.”
* What we want is a way to package our completed applications and easily run them on any computer.

Containerization

* A container is virtual environment.
  + We can environment variables.
  + We can create files.
  + We can download any software we want.
* We can put our applications into custom containers.
* We then know that it is guaranteed to run exactly like we want.
* **Images** are blueprints for containers.
* Containers are to images as objects are to classes.
  + You can have multiple container instances of the same image.
* Containers and virtual machines are not the same though similar.
  + Containers are significantly lighter weight.
    - Require much less resources. Memory and CPU.
  + Containers are very fast to spin up.
    - VMs can be little bit longer.
  + Virtual machine are complete machines.
    - Virtualized ram and CPUS
  + Containers run on a machine like a normal program.

Docker

* The most popular containerization software.
* Unicorn companies.
* Docker containers were originally designed to only run on Linux but have since added windows.

Pros and cons

* Pros
  + GREATLY simplifies deployment of applications.
    - Allowing you to do port mapping.
    - Not needing to know how to deploy applications written in different languages are weird setting.
    - Easily duplicate and share applications and their environments.
  + Really fast to deploy and create containers.
* Cons
  + Slight performance hit over manually deployment.
    - Anytime you run anything in a virtual environment it will be less efficient.
  + Containers are designed to be ephemeral.
    - Constantly created and destroyed.
    - Are not great for applications where you want to persist logs or other important artifacts in the application.
      * You should save these logs to some persistent storage like a bucket.