



# INTRODUCTION TO DOCKER

Software Engineering II course



K.N.TOOSI UNIVESRSITY  
OF TECHNOLOGY

# SPEAKERS



HOSSEIN RAHMATI



AMIR AHANGARI

Course Instructor : Dr. Saeed Sedighian Kashi



HISTORY

# SOFTWARE DEPLOYMENT

Software deployment is all of the activities that make a software system available for use.



K.N.TOOSI UNIVESRSITY  
OF TECHNOLOGY

# DEFINITION

- RELEASE
- INSTALL AND ACTIVATE
- DEACTIVATE
- ADAPT
- UPDATE
- BUILT-IN
- VERSION TRACKING
- UNINSTALL
- RETIRE



# PROBLEMS

- You're going to test using Python 2.7, and then it's going to run on Python 3 in production and something weird will happen.
- you'll rely on the behaviour of a certain version of an SSL library and another one will be installed.
- You'll run your tests on Debian and production is on Red Hat and all sorts of weird things happen.
- The network topology might be different, or the security policies and storage might be different but the software has to run on it.





SOLUTION

# CONTAINERS

Containers are like diapers: if they get shitty, throw them away and take a fresh one.



# WHAT IS CONTAINER?

Containers are a solution to the problem of how to get software to run reliably when moved from one computing environment to another. This could be from a developer's laptop to a test environment, from a staging environment into production and perhaps from a physical machine in a data center to a virtual machine in a private or public cloud.



# TYPES OF CONTAINERS

- LXC (almost 10 years ago)
- FreeBSD jails
- AIX Workload Partitions
- Solaris Containers
- Docker







INTRODUCTION

# DOCKER

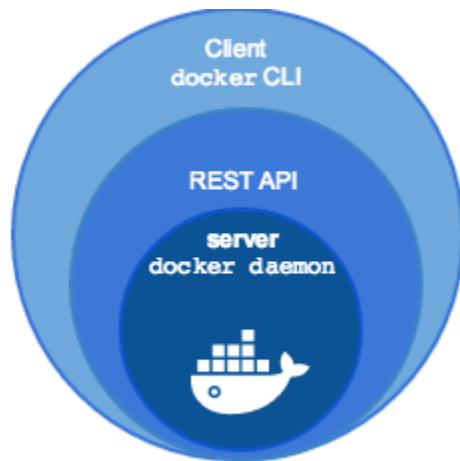
Docker is like teenage sex: everyone talks about it, everyone claims they are doing it, everyone thinks everyone else is doing it, nobody really knows how to do it!



BEYOND

# Docker

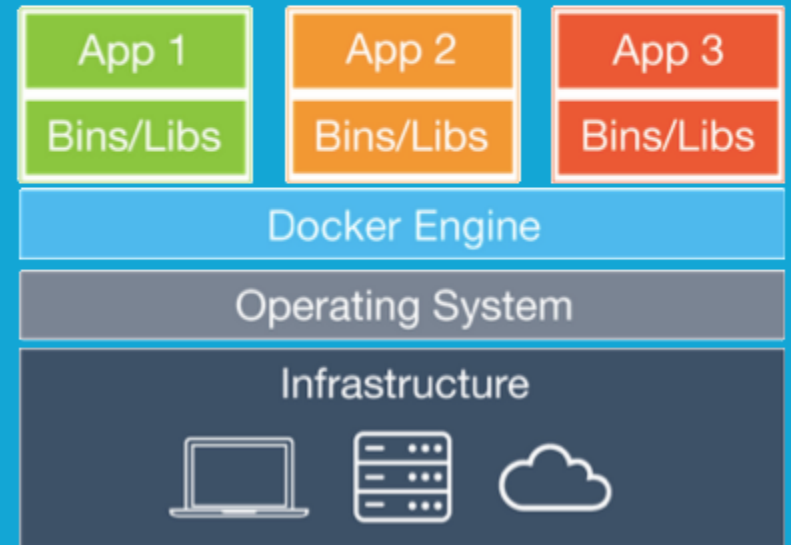
- GoLang
- Bridge (default)
- REST API



# VM

VS

# Docker





**BUILD**



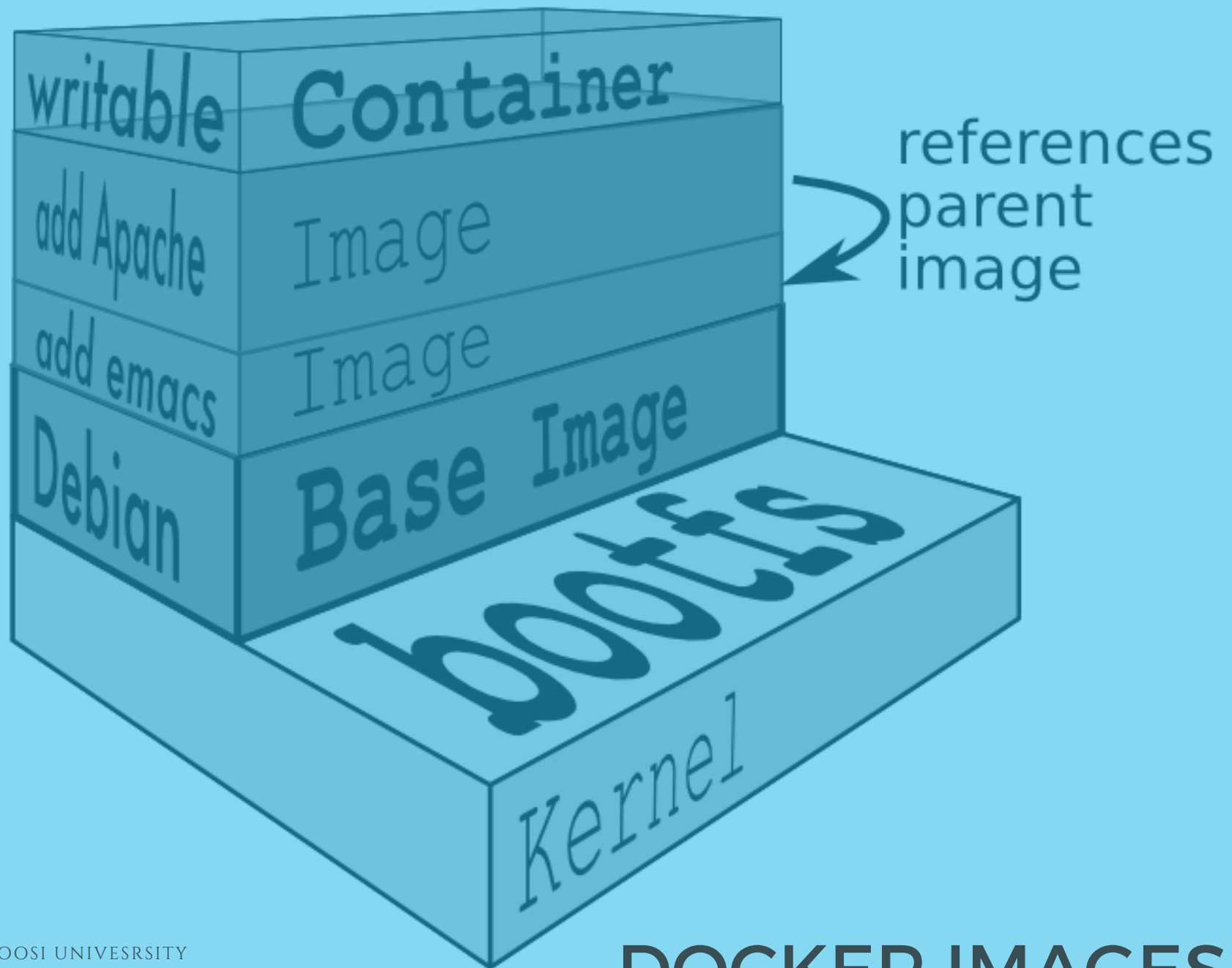
**SHIP**



**RUN**

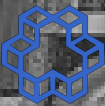


K.N. TOOSI UNIVERSITY  
OF TECHNOLOGY



# DOCKER BASIC COMMANDS

- docker pull
- docker run
- docker ps
- docker commit
- docker save
- docker load
- docker push

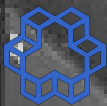


# DOCKER HUB

- PROXY
- PERSONAL REPOSITORY
- VPS

## 403 Forbidden

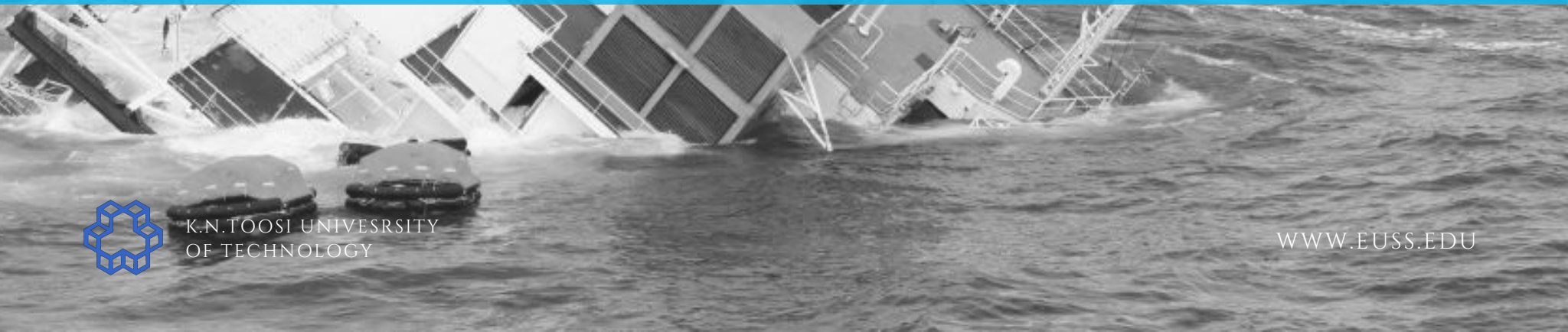
Since Docker is a US company, we must comply with US export control regulations. In an effort to comply with these, we now block all IP addresses that are located in Cuba, Iran, North Korea, Republic of Crimea, Sudan, and Syria. If you are not in one of these cities, countries, or regions and are blocked, please reach out to <https://support.docker.com>





IMPORTANT !

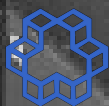
# CONTAINERS ARE STATELESS





# VOLUMES IN DOCKER

- TO MANAGE DATA
- CAN BE SHARED AND REUSED AMONG CONTAINERS.
- CHANGES TO A DATA VOLUME ARE MADE DIRECTLY.
- DATA VOLUMES PERSIST EVEN IF THE CONTAINER ITSELF IS DELETED.



# PORTS IN DOCKER

- DOCKER DAEMON CONNECTS CONTAINERS TO BRIDGE NETWORK BY DEFAULT.
- DOCKER CONTAINERS CAN MAKE CONNECTIONS TO THE OUTSIDE WORLD, BUT THE OUTSIDE WORLD CANNOT CONNECT TO CONTAINERS.



# CUSTOM IMAGES IN DOCKER

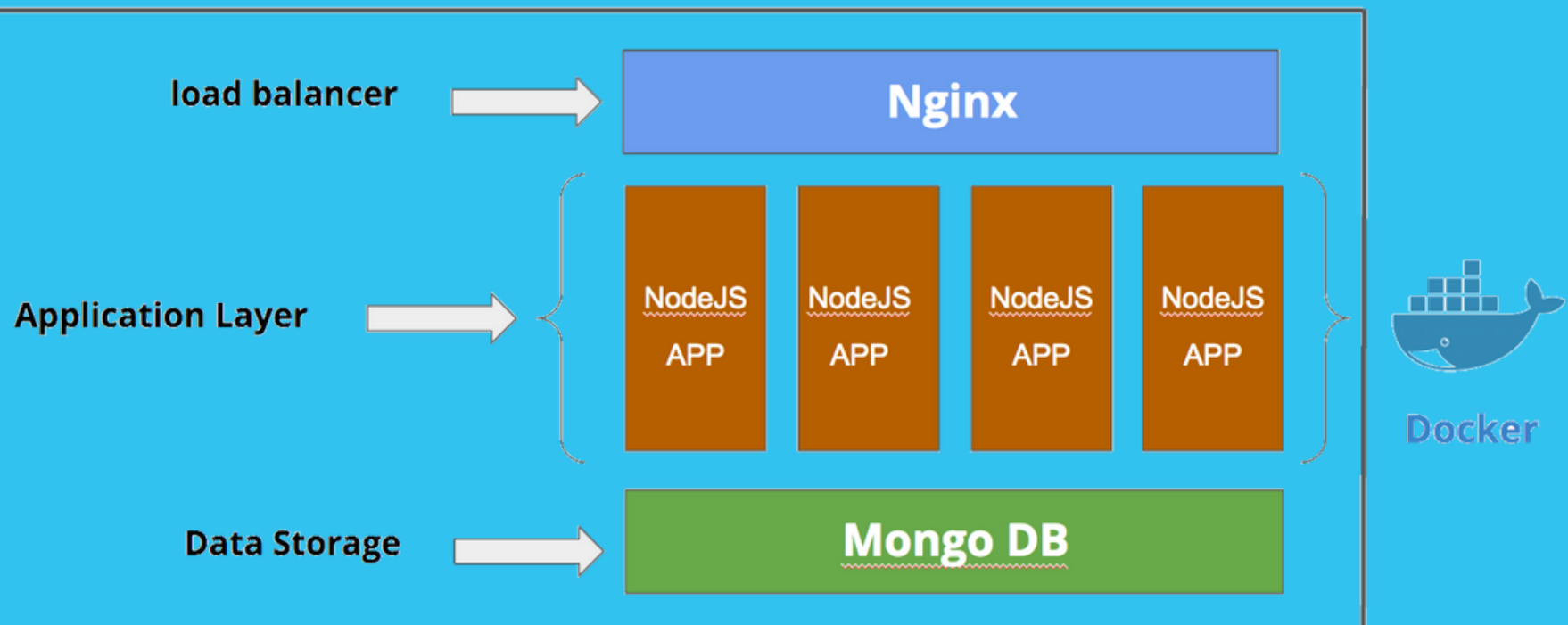


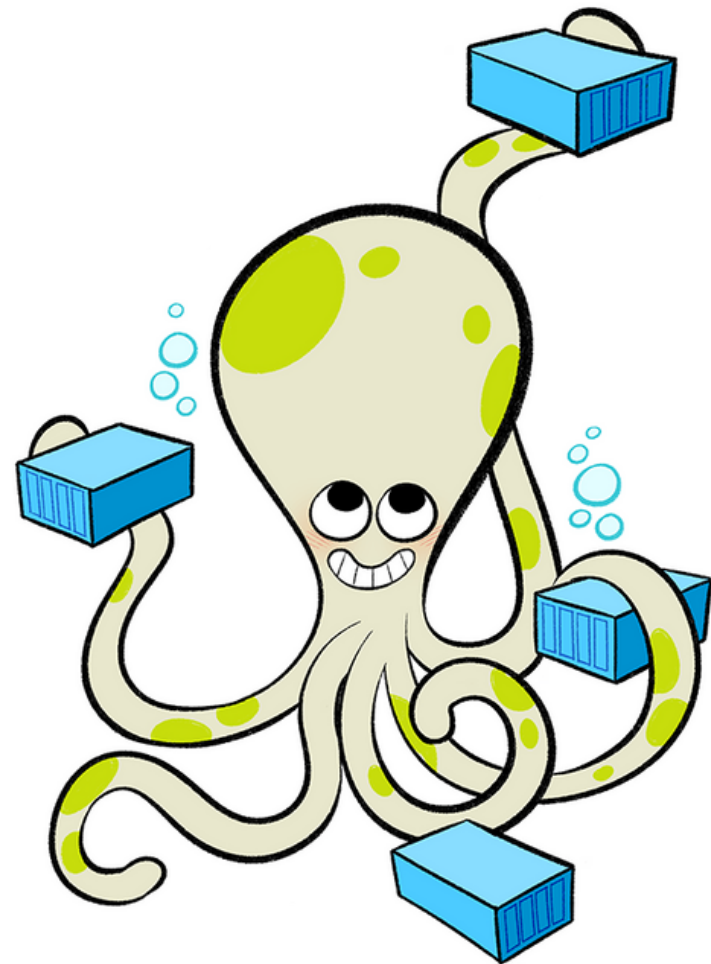
# DOCKERFILE

- A text document that contains all the commands a user could call on the command line to assemble an image.
- The **docker build** command builds an image from a Dockerfile and a context.



# SAMPLE PROJECT





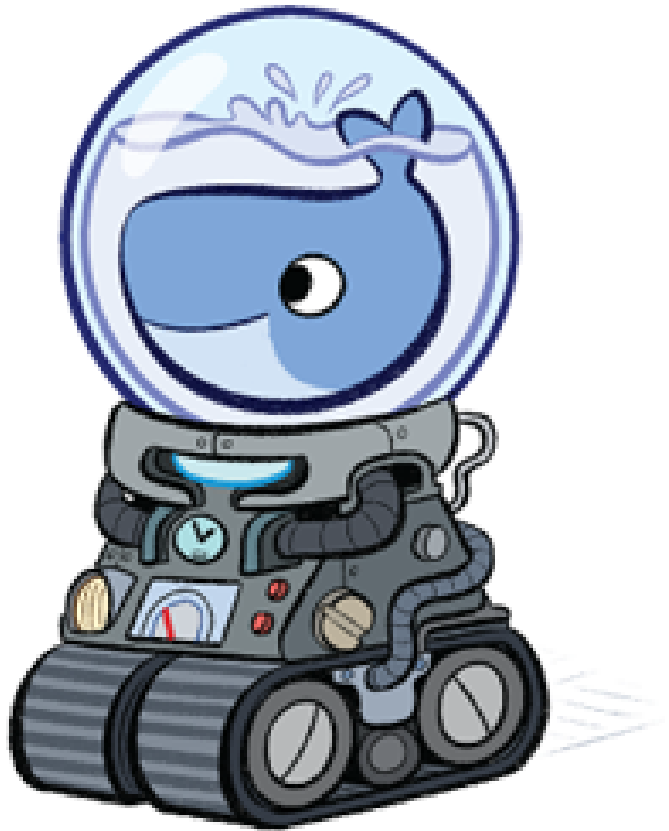
docker  
COMPOSE



K.N.TOOSI UNIVESRSITY  
OF TECHNOLOGY

# DOCKER COMPOSE TOOL

A tool for defining and running  
multi-container Docker applications

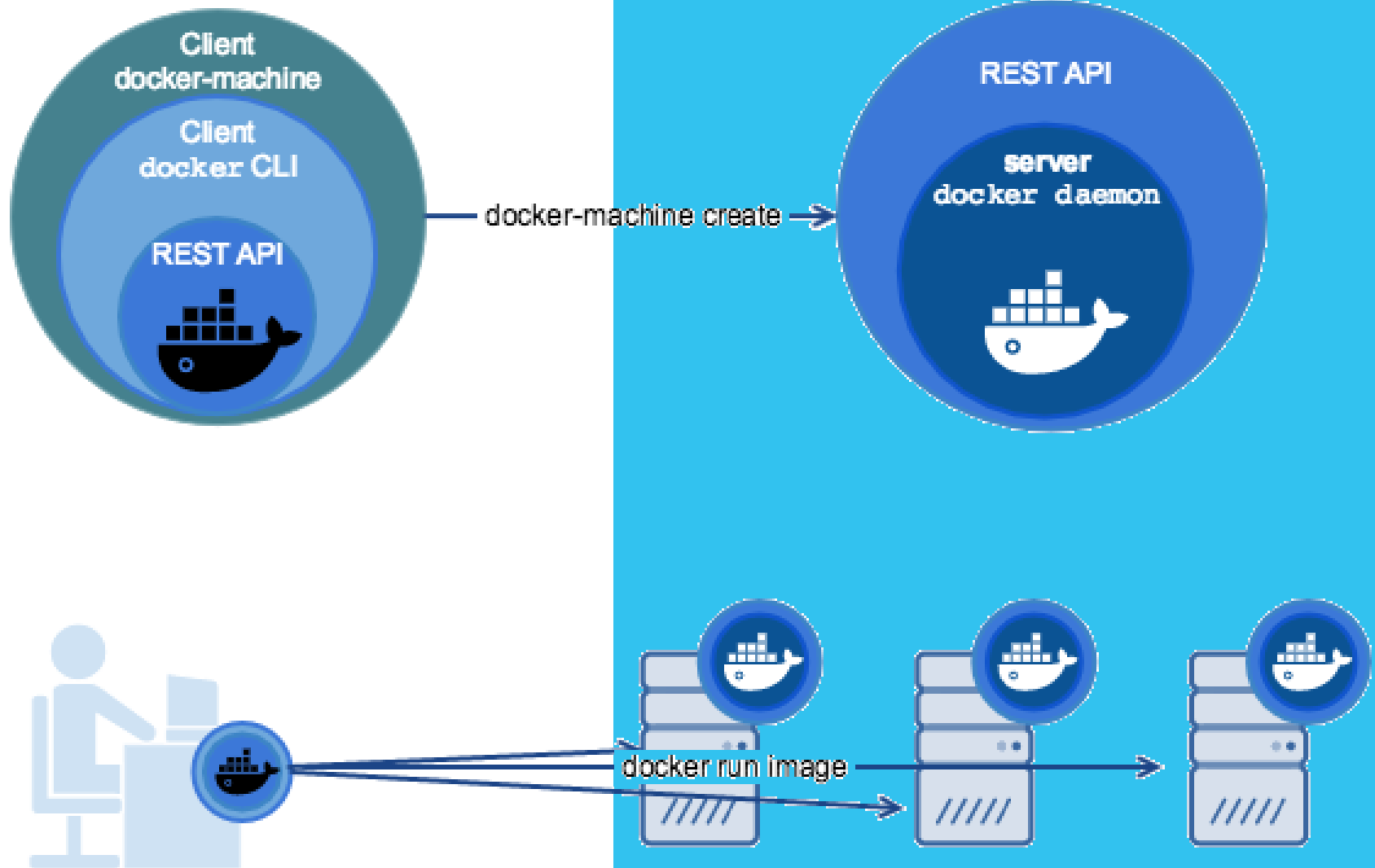


# DOCKER MACHINE

- Manage Virtual Hosts (Mac, Windows)
- Manage Remote Hosts
- Manage Swarm Clusters

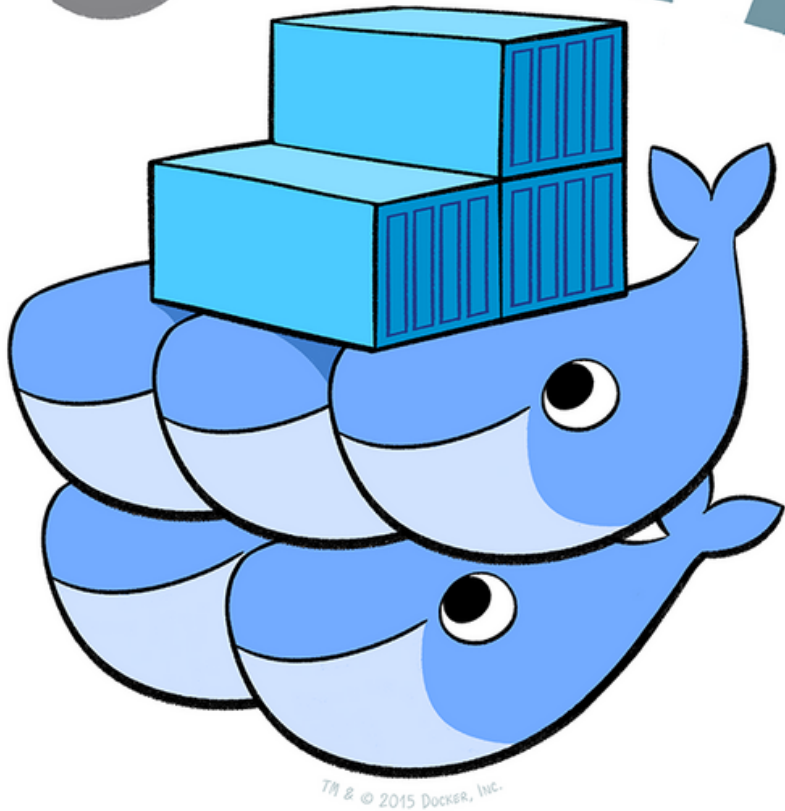


# DOCKER MACHINE





# docker SWARM

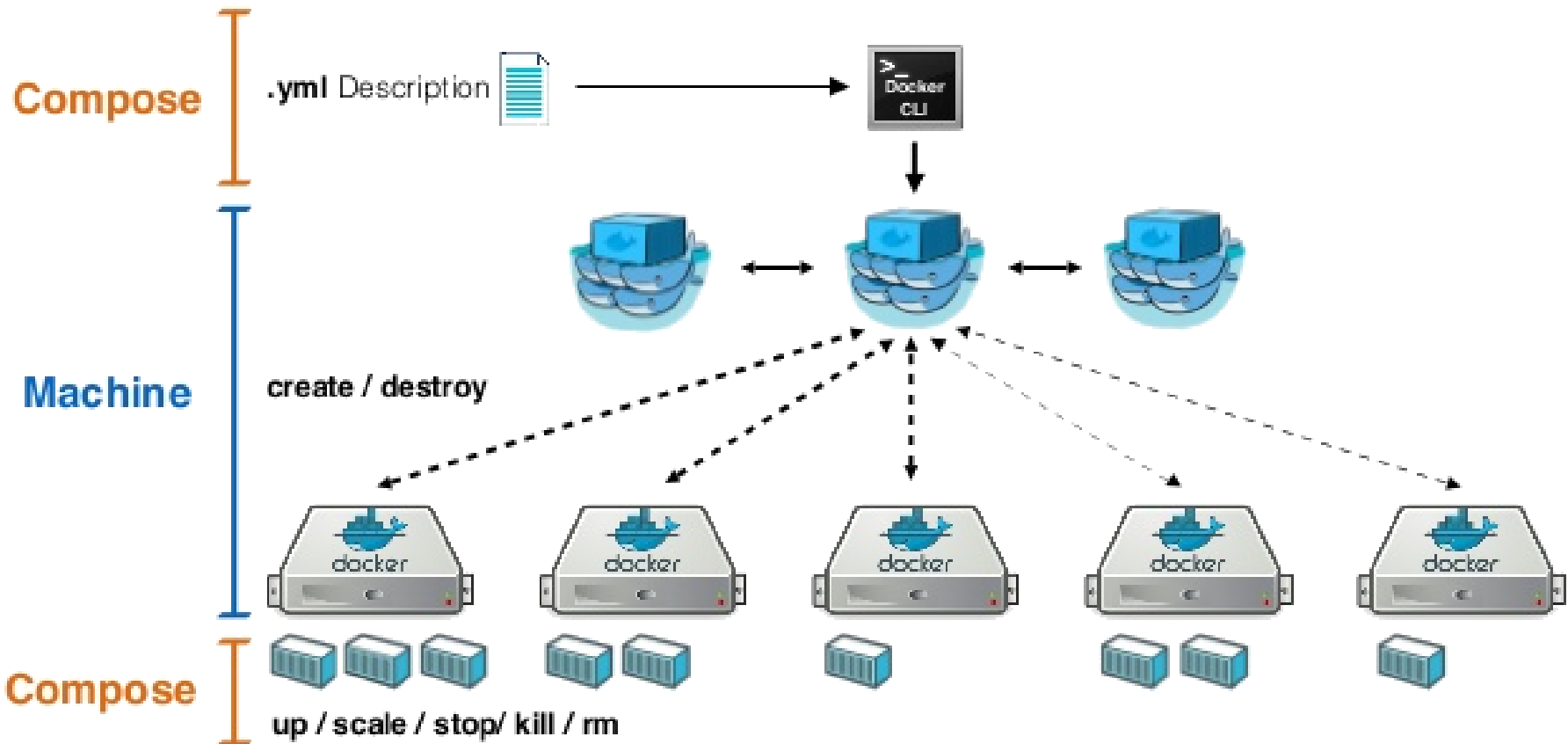


K.N.TOOSI UNIVESRSITY  
OF TECHNOLOGY

## DOCKER SWARM

- Docker Swarm is Native Clustering for Docker.
- Manages Multi-Hosts, Multi-Containers.

# DOCKER SWARM



An aerial photograph of a dense forest, showing a mix of evergreen and deciduous trees. A large, semi-transparent blue rectangle is overlaid on the center of the image. The text "ANY QUESTIONS?" is written in white, bold, sans-serif capital letters across the blue area.

**ANY  
QUESTIONS?**

An aerial photograph of a dense forest, showing various tree species and their canopy. A large, semi-transparent blue rectangle is overlaid on the center of the image. The text "THANK YOU" is written in white, bold, uppercase letters across the middle of the blue rectangle.

**THANK YOU**