

# Summer 2025 Training #1

# Linux Fundamentals



# Outline



## Environment Setup

- What is Docker, and how do we run the “lab” for today’s training?

## Basic Linux Navigation

- How do you use the terminal, and how can we modify it?
- What utilities are included with Linux?

## Linux Administration

- What are servers and services?
- How do we set up and troubleshoot services on Linux?



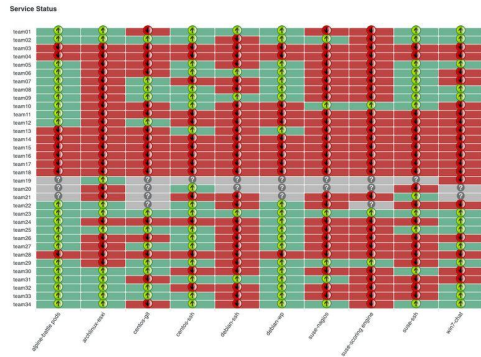
# 1. Environment Setup

What do we need to configure our “lab” to practice?

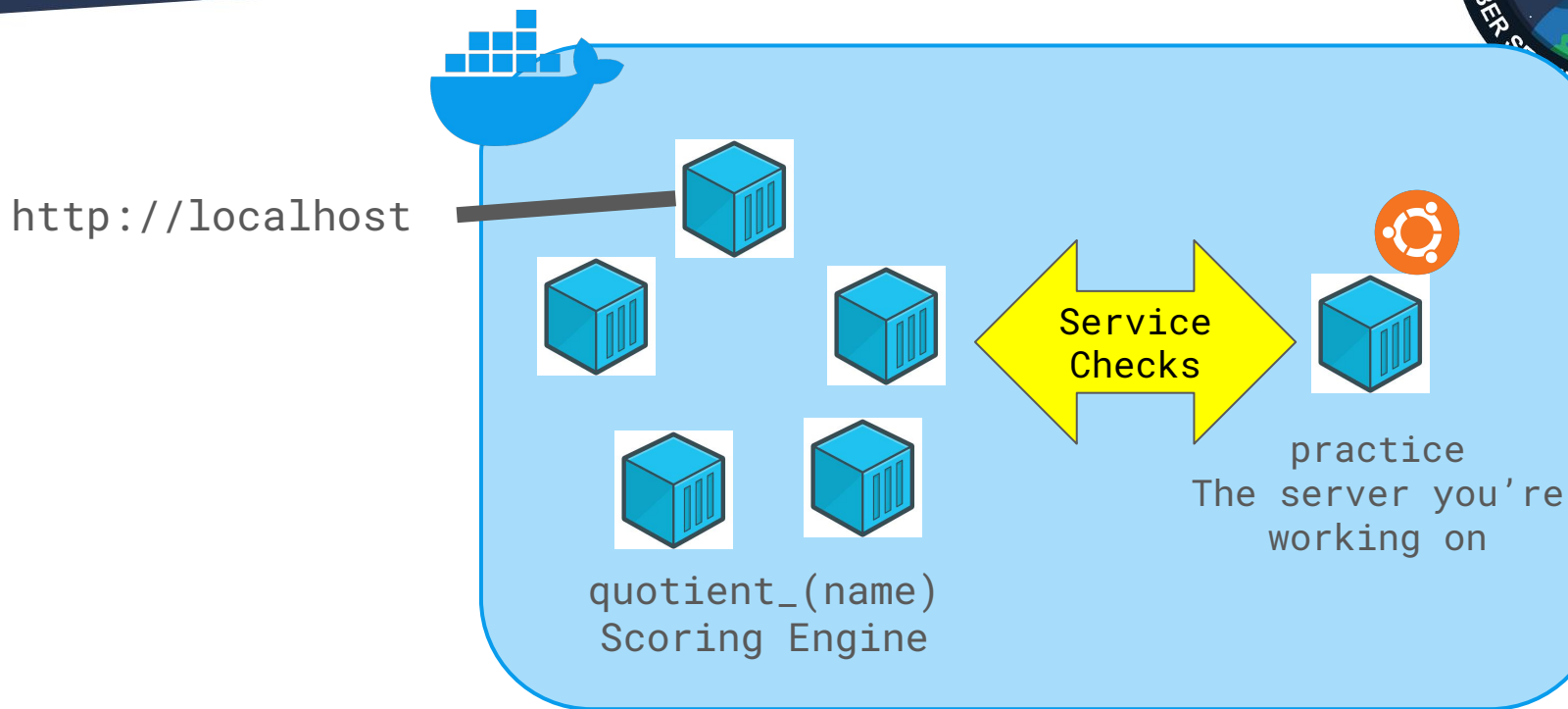
# What Does The Lab Look Like?

2 new pieces of software that make up the lab

- [Docker](#) - A way to deploy complex applications with their dependencies
- [Quotient](#) - The official scoring engine of WRCCDC



# Lab “Diagram”



# Setup Instructions



1. Install Docker Desktop (hopefully you've done that)
2. Clone the Lab Repo
  - a. <https://github.com/NuclearFizzler/Quotient-Lab>

# Setup Instructions



3. Open the Lab Repo Directory
4. Rename `config/event.conf.example` to `event.conf`
5. Create a file called `users.credlist` in `config/credlists/` and make a comma-separated list of usernames and passwords.
6. Navigate to the Lab Repo directory in a terminal, then issue:
  - a. `docker-compose up --build --detach`

# Setup Instructions



7. Log into the Quotient Console on <http://localhost>
  - a. Credentials: `admin:admin`
  
8. Enable Scoring Engine
  - a. Admin > Team Configurations > Set team01 to "Active"
  - b. Admin > Engine/Scoring Data > "Resume Engine"



# Enter The Practice Server



9. Enter the command prompt on the container
  - a. `docker exec -it practice /bin/bash`
10. You should now be in a root prompt!



## 2. Basic Linux Navigation

How do we get around the Linux terminal, and how can we change how it works?

My “Main” Resource:



<https://linuxjourney.com/>

# “Scored” Tasks



1. Create a file called *example.txt*
2. Create the folder */var/ftp/*
3. Fill *example.txt* with the following sentence:
  - This example file teaches me to use a text editor!
4. Move *example.txt* into */var/ftp*

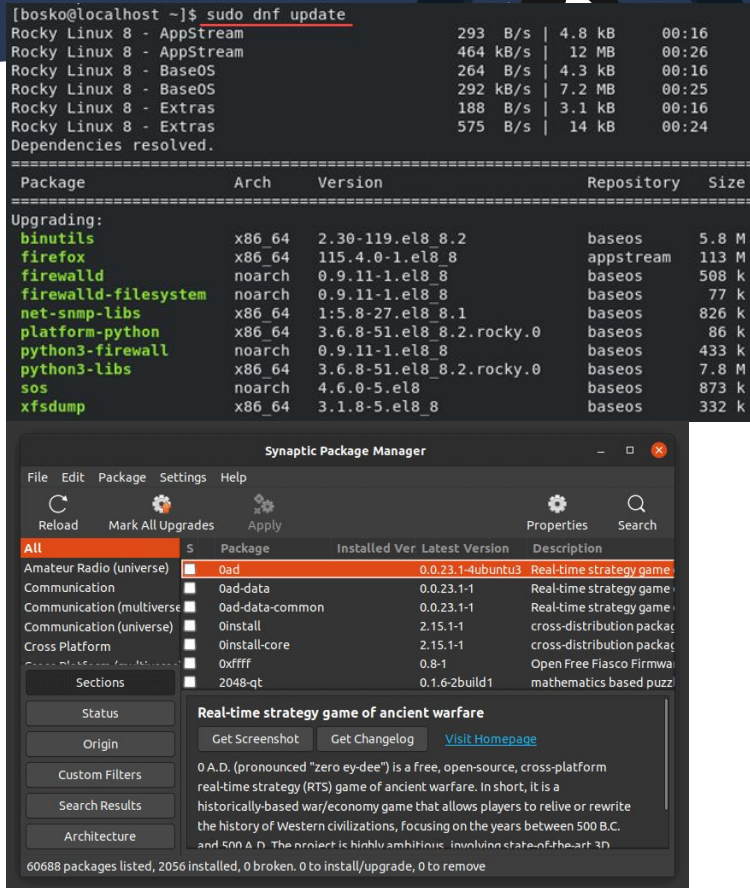


## 3. Linux Administration

How do you administer a Linux Server?

# Add and Removing Software

- Docker Images don't come with a lot
- We'll need to install a lot of utilities to make it work
- To install stuff, you'll need a **package manager**



The image shows two screenshots related to software management on a Linux system.

The top screenshot is a terminal window showing the command `sudo dnf update` being executed. The output displays the progress of updating various packages, including `Rocky Linux 8 - AppStream`, `Rocky Linux 8 - BaseOS`, and `Rocky Linux 8 - Extras`. The output shows the download speed, size, and time for each package. The command `dnf update` is highlighted in red.

The bottom screenshot is a screenshot of the Synaptic Package Manager window. The window shows a list of installed packages, including `binutils`, `firefox`, `firewalld`, `firewalld-filesystem`, `net-snmp-libs`, `platform-python`, `python3-firewall`, `python3-libs`, `sos`, and `xfsdump`. The package `binutils` is highlighted in green. The window also shows the package details for `binutils`, including its version, architecture, and repository.

| Package              | Arch   | Version                  | Repository | Size  |
|----------------------|--------|--------------------------|------------|-------|
| binutils             | x86_64 | 2.30-119.el8_8.2         | baseos     | 5.8 M |
| firefox              | x86_64 | 115.4.0-1.el8_8          | appstream  | 113 M |
| firewalld            | noarch | 0.9.11-1.el8_8           | baseos     | 508 k |
| firewalld-filesystem | noarch | 0.9.11-1.el8_8           | baseos     | 77 k  |
| net-snmp-libs        | x86_64 | 1:5.8-27.el8_8.1         | baseos     | 826 k |
| platform-python      | x86_64 | 3.6.8-51.el8_8.2.rocky.0 | baseos     | 86 k  |
| python3-firewall     | noarch | 0.9.11-1.el8_8           | baseos     | 433 k |
| python3-libs         | x86_64 | 3.6.8-51.el8_8.2.rocky.0 | baseos     | 7.8 M |
| sos                  | noarch | 4.6.0-5.el8_8            | baseos     | 873 k |
| xfsdump              | x86_64 | 3.1.8-5.el8_8            | baseos     | 332 k |

# How Package Managers Work



- 1) Package Managers retrieve up-to-date information about packages from **sources** (/etc/apt/sources.list)
  - a) Command: *apt update*
- 2) If asked to install something, checks if package is installed or can be updated
  - a) Command: *apt install* (or *apt upgrade* to update everything)
  - b) Command: *apt remove* to uninstall stuff

# How to Add Users



- “Adding a User” actually involves several steps!
  - Creating a home directory, allowing login, etc.
  - Have to modify many different config files to work!
- Fortunately, it’s been automated...
  - Install *adduser* to deal with all those steps
  - Add the users!





# User Controls

## OS User Configuration Files

- `/etc/shadow`
- `/etc/passwd`
- `/etc/group`

## User Permissions

- Numbers / bits representing the level of access users have to files
- `chmod (number)`
- Also there are more attributes with `lsattr`!

## User Authentication Modules

- PAM - Pluggable Authentication Modules, responsible for authenticating users and the rules associated with them

# “Services”

- **Service** - Some kind of software running in the background that your computer needs
  - Is “brought up” at specific times, may talk to other computers, etc.
- Configured with more files, but when you install stuff it should work for you
- Controlled via “service” or “systemd”



# “Scored Tasks”



- 1) Set up SSH Server
  - a) Make sure the users are there as well!
- 2) Set up FTP Server
  - a) Configure it to look for *example.txt*
- 3) “Repair” the Web Server
  - a) Change the port it works on