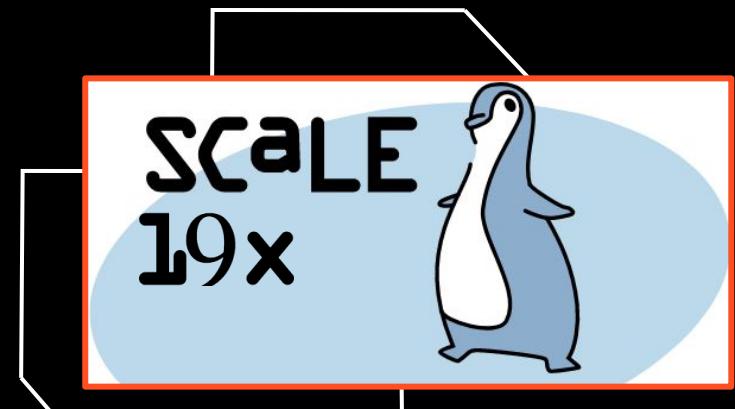




Engaging Students with Customized Linux Images for Cybersecurity Training

Atom & Marie Ramirez



Agenda

- Intros
- Cyberpatriots and Cybersecurity
- Why Custom VMs
- Approach to Customizing Linux VMs
- Demo
- Questions



Intros - Atom

- Freshman at UC Merced - Majoring in Applied Mathematics concentration in Computer Science
- Been in Cybersecurity for about 7 years
- Founded Cybersecurity club, President for 3 years
- I enjoy playing basketball and volleyball
- I have published three articles about Cybersecurity



@rksmissionpossible



Intros - Marie

- Rising senior at Bishop Amat High School
- Competed in CyberPatriots for 7 years
- President of Cyber Security Club
- I have published three articles about Cybersecurity
- I like volleyball and photography



@rksmissionpossible

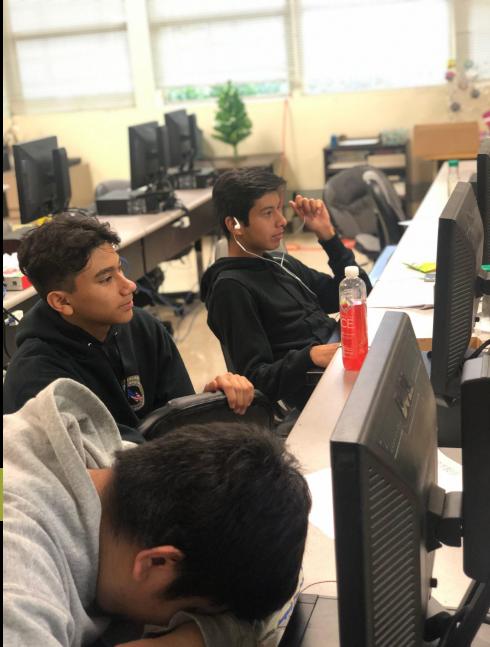
What is Cyberpatriots ?

- Cyber Defense
- National competition
 - But includes Canada, UK, AUS,Saudi Arabia
- High School & Middle School
- Teach cybersecurity and inspire students to pursue careers in Cybersecurity and STEM fields

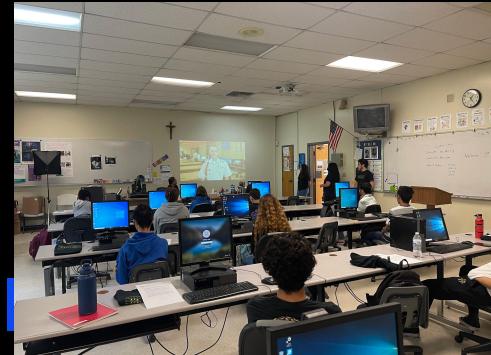
<https://www.uscyberpatriot.org/>



Cyberpatriot Competition



- Teams consists of up to 5 members
- Approx. 5,200 teams competed nationwide this year
- Uses standalone virtual machines
- Goal - Find vulnerabilities to reach 100 points per image
- Focus on cyber defense tasks



Cyberpatriot Competition Challenges



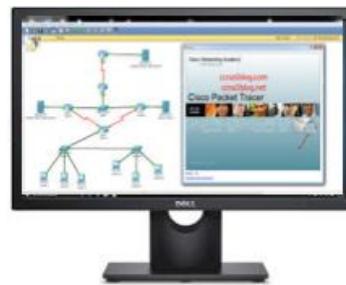
Ubuntu16



Windows Server
2019



Windows 10
Desktop



Cisco Packet
Tracer

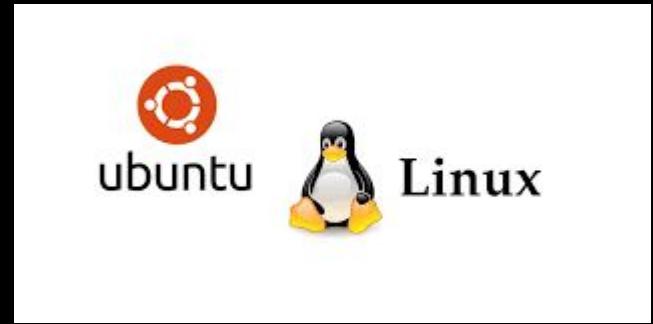


Quiz/Internet
Searches

Each team is given 3 VMs - Ubuntu/Linux, Windows 10, Windows Server

The Cyber Training Linux Image

- Ubuntu 18 or 20 (never the latest)
- VMWare based virtual machine
- Competitors are given a zipped up VM to download during the competition
- Contains vulnerabilities, mis configurations, and policy violations



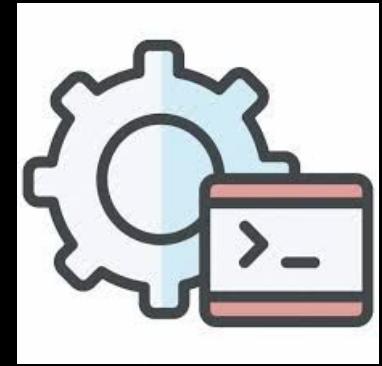
Cyberpatriot Cyber Defense

- OS updates
- Firewall
- Local Security policies
 - Password policies
 - Lockout policies
- Software management
- User Account management
- Unauthorized software



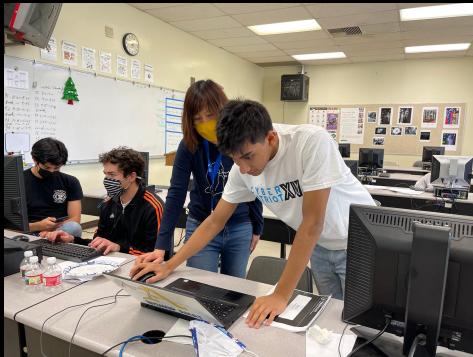
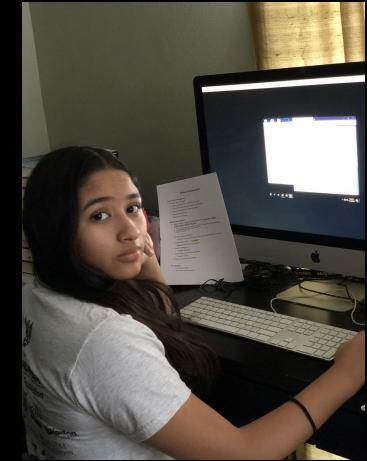
Approach to Customizing Linux VM

- Understanding the students interests
We were once student
- Identify what can be customized
- Identify how it can be automated
- Create script to automate customization settings



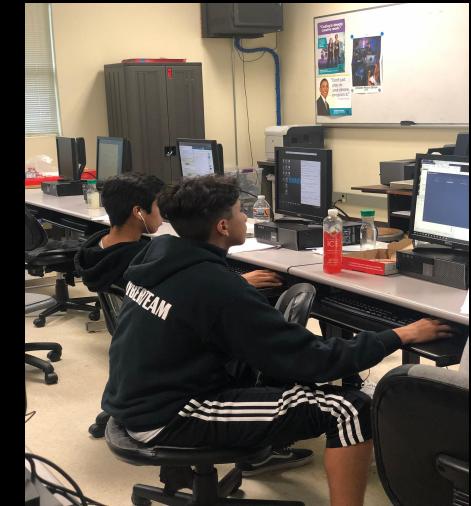
Cyber Camps Training

- Each student is given a Linux VM
- Hands on training
 - Command line
 - GUI administration
- Presented with challenges similar to the competition



Why Custom VMs?

- Problem keeping kids engaged
- Making custom VMs to help students associate cyber task with something they are familiar with
- Great Teaching tool



Customizations

- Themed background
- Hostname
- User Accounts with passwords, some weak others complex
- Unauthorized software
- Scenario a.k.a. README file
- Unauthorized files e.g. media files

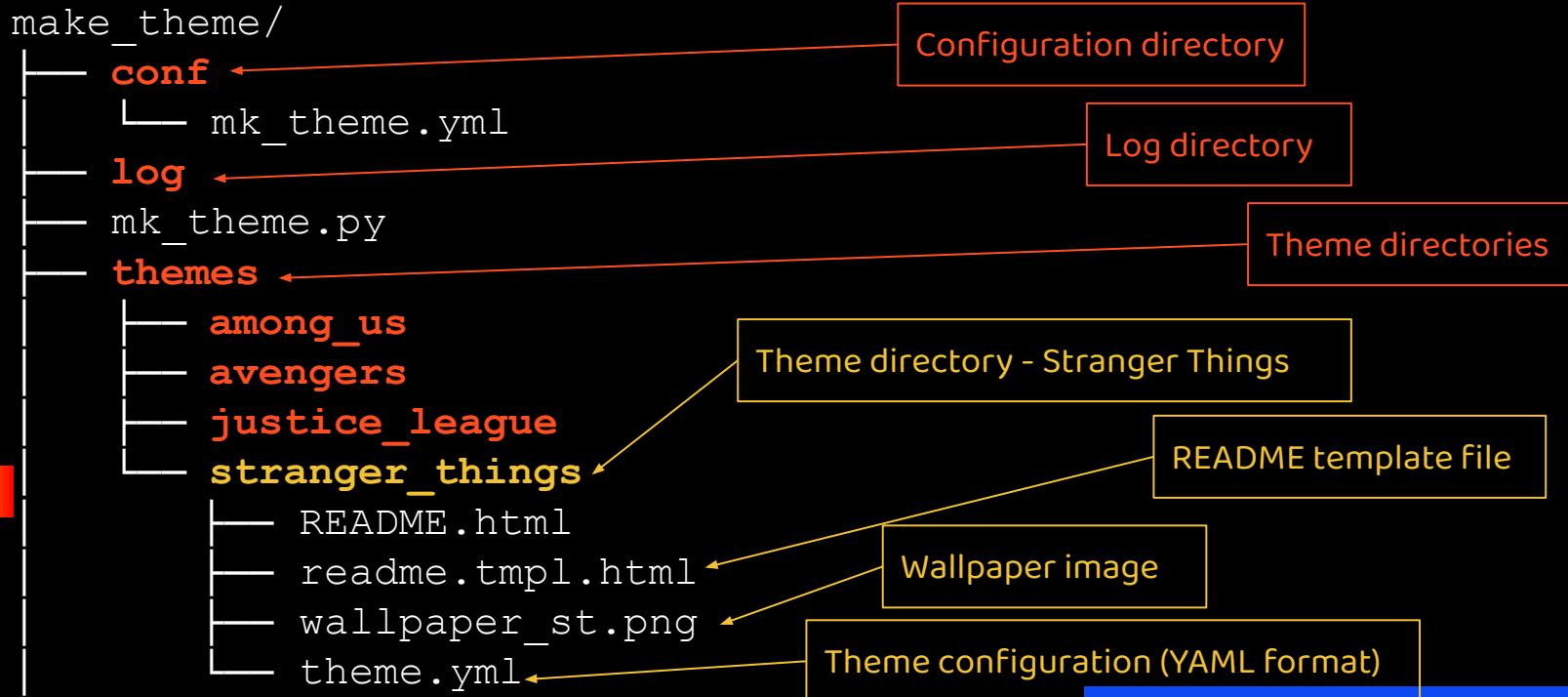


Customizing with Python

- Our constraints
 - No external modules - Standalone script
 - Keep it simple - just enough to run the commands
- Some features
 - Command line options
 - Use YAML configurations to define each theme



make_theme.py Layout



make_theme.py command line

```
$ make_theme.py [options]
```

[options]

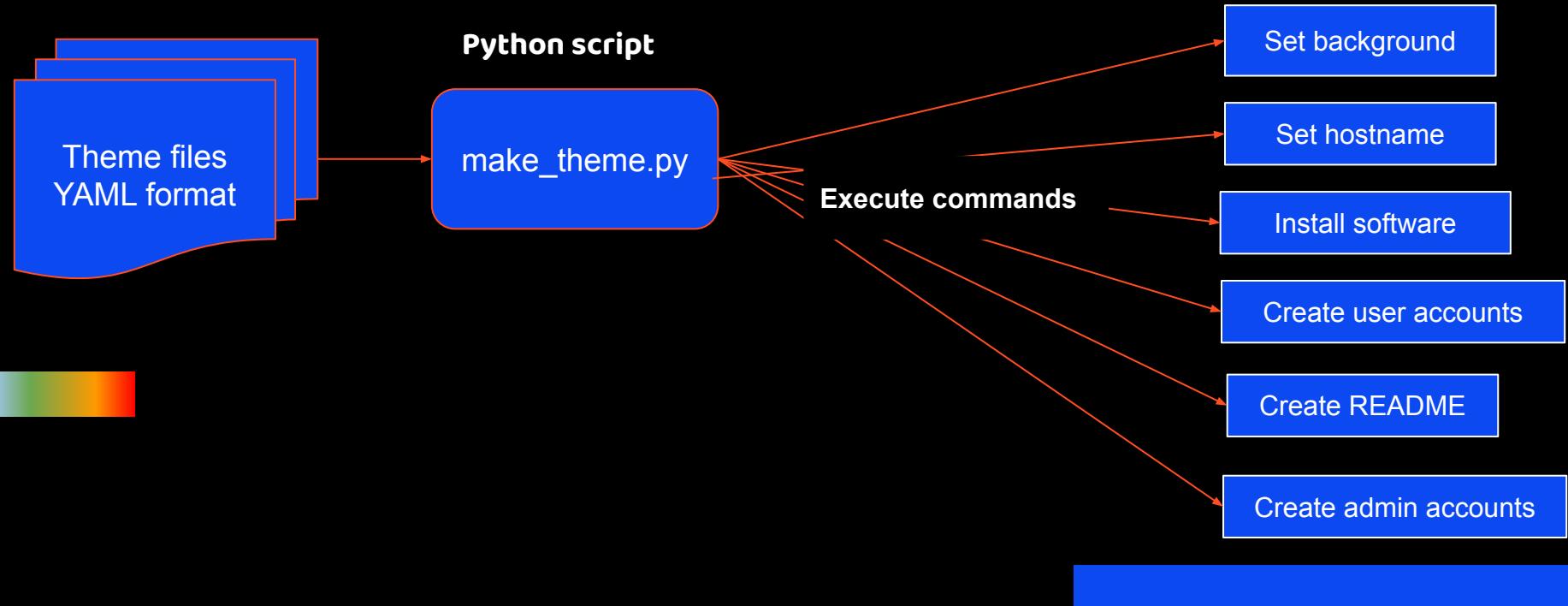
- theme <theme_name>
- undo Undo the -theme specified
- list List supported themes
- v Run in verbose mode
- h Display the help

Sample YAML file

https://github.com/gravityatom/make_theme/blob/main/themes/stranger_things/theme.yml



Make_theme.py Workflow



Customization Demo



Question Time !!!!

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Source code for make_theme available on github

https://github.com/gravityatom/make_theme

