

## Objectives

- Issue Tracking
- Virtualization

Feb 11, 2022

Sprenkle - CSCI397

1

1

## Review: Issue Tracking

- What do issue tracking tools do?
  - What are its key features?
- What are the problems in development that issue tracking tools can help solve?

Feb 11, 2022

Sprenkle - CSCI397

2

2

## Issue Tracking Recap

- Maintain a database of problems
- Problems
  - Have an id
  - Are categorized with priority, severity of bugs
  - Are assigned to someone
  - Have relevant discussion
  - Have a status
- Help with: searching for bugs, remembering history, keeping people accountable, prioritizing bugs (what should be worked on next)

Feb 11, 2022

Sprenkle - CSCI397

3

3

## Issue Tracking Tools Analysis

- Caveat: We are looking at tools from a “submitter” perspective, rather than a developer perspective
- For the first issue tracking software you looked at, in the Box Note, provide
  1. At least 2 pros and 2 cons for the software (relating to their functionality) – label these
  2. At least one link that will help support your pros/cons
  3. If you would recommend that software

Feb 11, 2022

Sprenkle - CSCI397

4

4

## Bug Bounty Programs

- For reporting bugs, specifically security vulnerabilities
- <https://www.hackerone.com/internet-bug-bounty>
- <https://hackerone.com/stripe?type=team>

Feb 11, 2022

Sprenkle - CSCI397

5

5

## VIRTUALIZATION

Feb 11, 2022

Sprenkle - CSCI397

6

6

## What is virtualization?

- The ability to run multiple operating systems on a single physical system and share the underlying hardware resources<sup>1</sup>
- Allows one computer to provide the appearance of many computers
- Goals:
  - Provide flexibility for users
  - Amortize hardware costs
  - Isolate completely separate users
  - Run anything anywhere

<sup>1</sup> VMWare white paper, *Virtualization Overview*

Feb 11, 2022

Sprenkle - CSCI397

7

7

## What is Virtualization?

- An abstraction
- Often performed via software
- Many different types
  - Hardware
  - Software
  - Data
  - Network

Feb 11, 2022

Sprenkle - CSCI397

8

8

## Hardware Virtualization

- Abstracts underlying physical hardware from operating systems and applications
- Allows multiple guest operating systems to run in parallel
- Physical resources are shared among all guest OS and virtualization software

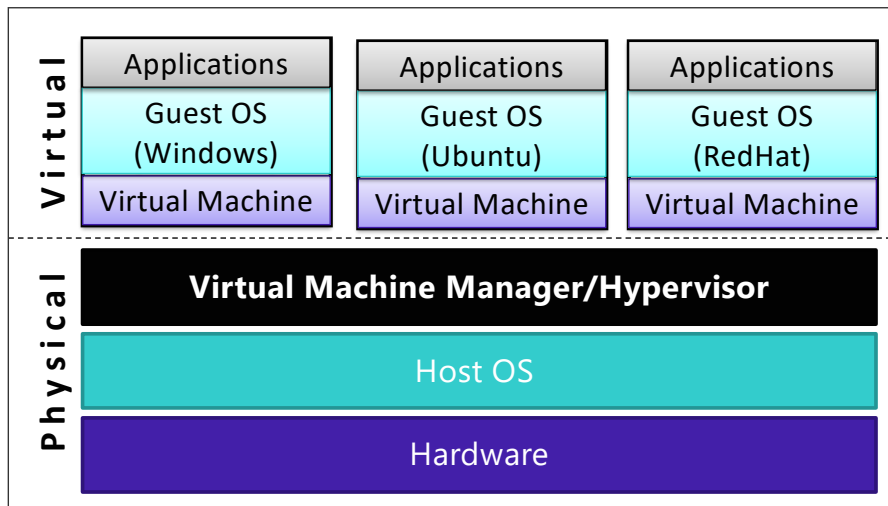
Feb 11, 2022

Sprenkle - CSCI397

9

9

## Virtualization Architecture



Hypervisor: The supervisor's supervisor (the operating system)

Feb 11, 2022

Sprenkle - CSCI397

10

10

## Terminology

- Host Machine
  - The physical hardware/server
- Hypervisor/Virtual Machine Manager (VMM)
  - The virtualization software
  - Acts as the true OS for the server
- Virtual Machines
  - Instances of the virtualized OS
  - Also known as the Guest OS

Feb 11, 2022

Sprenkle - CSCI397

11

11

## Why Virtualize?

- Low CPU and memory utilization
- Overpowered and overpriced hardware
  - Buying hardware to grow into it; excess capacity
- Physical machine sprawl
  - Need a separate machine for each purpose
- Using one machine for lots of different tasks
- Power and HVAC to cool machines
- High administrative labor costs

Feb 11, 2022

Sprenkle - CSCI397

12

12

## Benefits

- Fewer servers, with better system utilization
  - Sharing of pooled resources
- Easier redundancy and disaster recovery
  - Migrate VM to another machine
- Decreased downtime
- Isolate VMs from each other
  - Testbeds
  - No worries about conflicts in applications

Feb 11, 2022

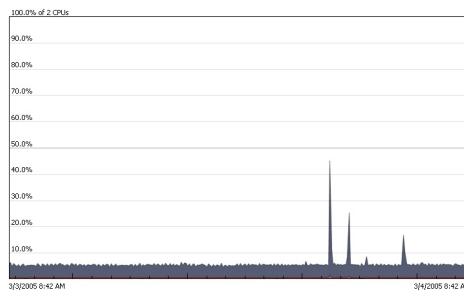
Sprenkle - CSCI397

13

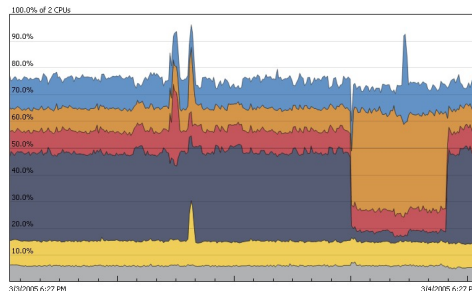
13

## Virtualization Increases Hardware Utilization

Before VMware



After VMware



Virtualization enables consolidation of workloads from underutilized servers onto a single server to safely achieve higher utilization

Source: VMWare

14

## VMWare

- First to commercialize virtual x86 machines

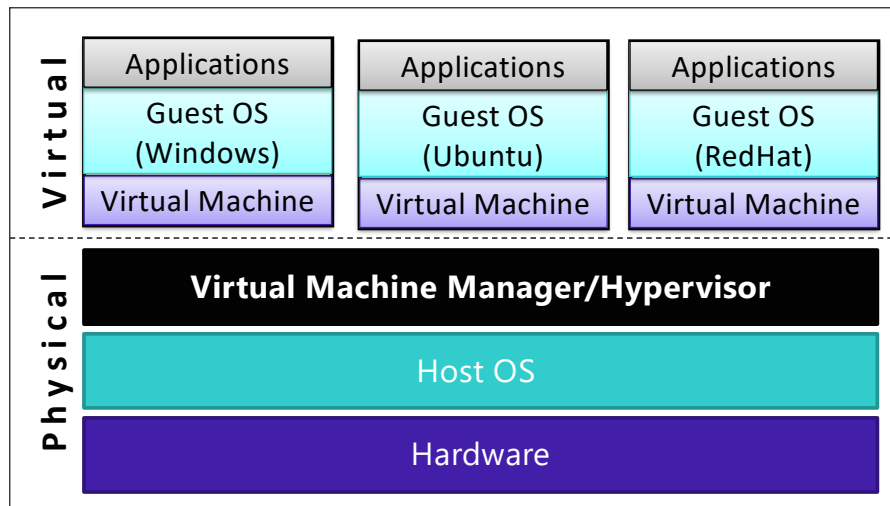
Feb 11, 2022

Sprenkle - CSCI397

15

15

## Virtualization Architecture



Could be implemented in hardware or software

Hypervisor: The supervisor's supervisor (the operating system)

Feb 11, 2022

Sprenkle - CSCI397

16

16



## Looking Ahead

- Docker on Monday
- Assignment 1 due Thursday at 11:59 p.m.