CS 240
Computer Systems

#17: Isolation: Containerization and Visualization

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Isolation

Q: Would you let your friend/roommate on your computer?

...system developers share the same concerns. There are many levels of increasing isolation provided by modern infrastructure:

1) Process Isolation

2) User Account Isolation

3) Containerization

4) Virtualization

User Accounts	**Containers**	**Virtualization**

User Accounts

Every user of modern systems has a “user account”, with a default “super user account” (called `root` on Linux).

Advantages:

Disadvantages:

Containerization

Containers rely on a “Container Engine” (ex: Docker) that allows apps to interact with the host system in an isolated way.

Advantages:

Disadvantages:

Virtualization
Virtual Machines (VMs) rely on a “Hypervisor” (ex: VMWare) that allows entire operating systems to run on a host system.

Advantages:

Disadvantages:

User Accounts	Containers	Virtualization

Exploration of Different Use Cases:

1) linux.ews.illinois.edu

2) Amazon AWS EC2

	vCPU	ECU	Memory (GiB)	Instance Storage (GB)	Linux/UNIX Usage
t3.nano	2	Variable	0.5 GiB	EBS Only	$0.0052 per Hour
t3.micro	2	Variable	1 GiB	EBS Only	$0.0104 per Hour
t3.small	2	Variable	2 GiB	EBS Only	$0.0208 per Hour
t3.medium	2	Variable	4 GiB	EBS Only	$0.0416 per Hour
t3.large	2	Variable	8 GiB	EBS Only	$0.0832 per Hour

3) Running PrairieLearn

4) Our Class App?