Welcome to Systems Security (SysSec)

UBNetDef, Spring 2022
Week 1
Lead Presenter: Radhika Jois
Special Thanks: Phil Fox

Agenda - Week 1

1. Welcome
    1.1. Introductions
    1.2. Opening remarks
    1.3. Ground rules
    1.4. Learning Objectives
2. Overview
3. Virtualization
    3.1. In Class exercise: Login to vCenter
    3.2. In Class exercise: Virtualization Activity
4. Coursework
    4.1. Workflow
    4.2. Support
    4.3. Reporting
    4.4. Topology
    4.5. Assignment: Homework 1
        4.5.1. In class exercise: Launch a new Virtual Machine (VM) from .iso
5. Summary/Wrap-up

Mattermost

Introductions

UB SecDev, Spring 2022

Radhika Jois **(@radhikaj)** - SecDev Lead, White Team Lead, CPTC, CCDC

Anthony Magrene **(@magrene)** - Lockdown Red Team Lead, CCDC, CPTC

Vasudev Baldwa **(@vasudevb)** - Infrastructure/Lockdown Black Team Lead, CCDC, CPTC

Lucas Crassidis **(@luke)** - Lockdown Red Team, CCDC, CPTC

Alec Duffy **(@jaduffy)** - Lockdown Green Team Shadow

Alex Skowronski (**@adskowro**) - Lockdown White Team Shadow, CCDC

Chandra Neppalli (**@cpneppal**) - Lockdown Red Team Shadow, CCDC

Ethan Viapiano (**@ethanvia**) - Lockdown Black Team Shadow, CCDC

Introductions

UB NetDef Faculty

Prof. David J. Murray (@djmurray)

Prof. Kevin Cleary (@cleary.kevin.p)

UB SecDev Alumni Volunteers

Prof. Dominic Sellitto (@dsellitto)

Stephen James (@stephenorjames)

Aaron Fiebelkorn (@aaron)

Nick Brase (@nickbrase)

Chris Klimek (@chrisklimek)

Shreya Lakhkar (@shreya)

Phil Fox (@xphilfox)

Aibek Zhylkaidarov (@aibek)

UB SecDev Student Volunteer Staff

Rashid Abubeker (@riabubek)

John Ryan (@jpryan2)

Edward Lynch (@edwardly)

*Indicates a F21 lead instructor role

Opening Remarks

Featuring Prof. Murray

UBNetDef Goals:

Learn, Have Fun, Be Your Best

Ground Rules

- Attendance: Taken weekly during lecture time. IT IS PART OF YOUR GRADE!!
- Homework: Weekly, deliverables due Thursdays 6:29 pm
- Late Policy: Late submissions are not accepted
- COVID: Follow all guidelines put forward by the University and SUNY

Learning objectives

- Learn the CIA triad
- Understand the basics of virtualization
- Learn the components of the System Security class

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5. Summary/Wrap-up

Overview - What is UBNetDef?

It’s an organization!

We host:

- Camps
- Competitions
- Courses

As:

- Faculty
- Students (grad and undergrad)
- Alumni and volunteers

Overview - What are UBNetDef roles?

All sorts!

- Learners
- Curriculum development
- Course instruction
- UB team competitors
- Infrastructure maintenance and management
- Mentorship and advising
- Administration (this is mostly Prof. Murray)

Overview - UBNetDef Learners

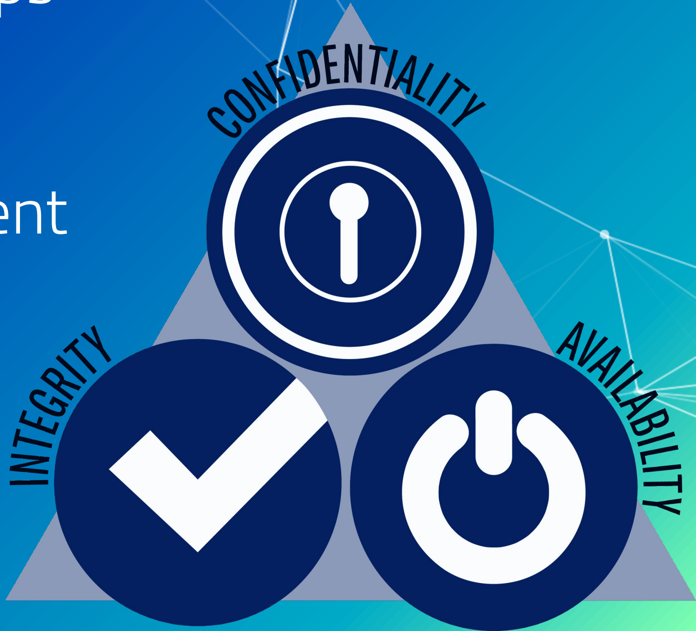
The (for-credit!) courses

- SysSec: The gateway
- Network Security (NetSec)
  - Linux software and networking deep dive
  - Packet analysis
  - Report writing
- Scripting Security (`Phil` will always call this 'ScripSec' whether it catches on or not)
  - Bash programming
  - Security project
- Security Development (SecDev)
  - Course and curriculum development/instruction
  - Infrastructure management

Overview - SysSec

What about *this* course?

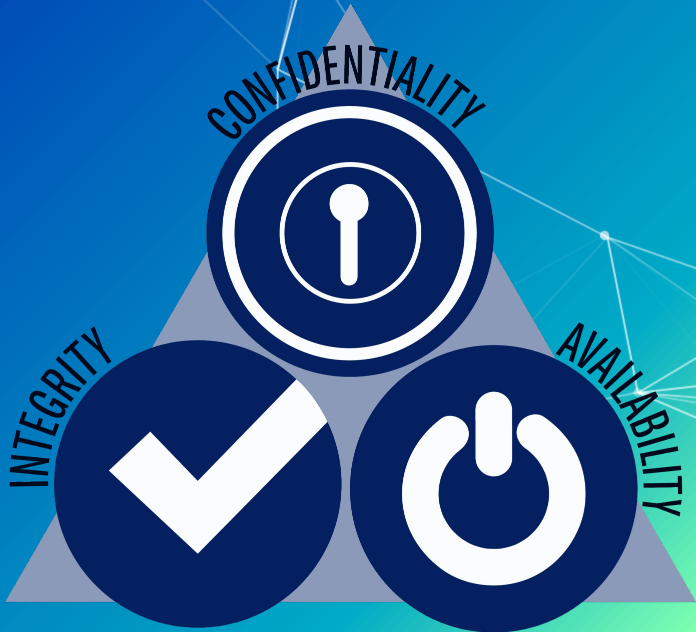
- Investigating the boundaries and overlaps between:
  - Information Technology (IT)
  - Information Systems (IS) Management
  - Computer Hardware and Software
- …through the lens of "cybersecurity"
  - Observe: The "cybersecurity triad"



Overview - Cybersecurity

What’s the difference?

- Confidentiality
- Integrity
- Availability



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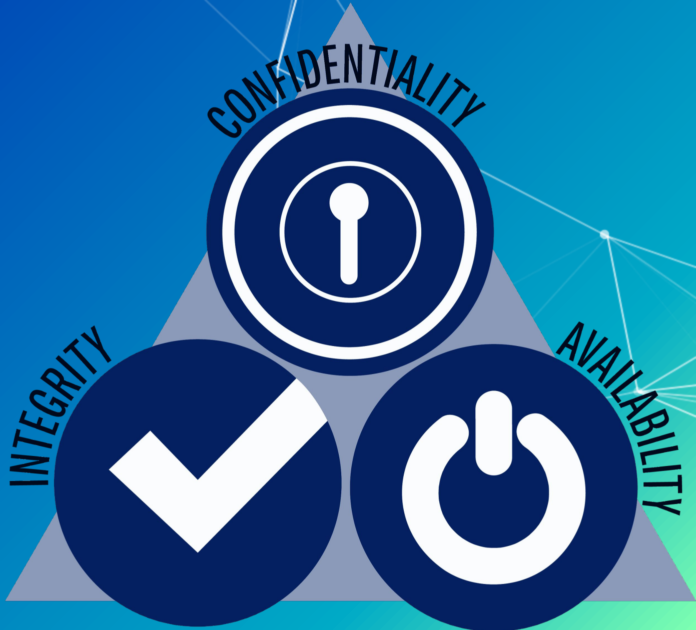
Which is most important?



Overview - Cybersecurity

What's the difference?

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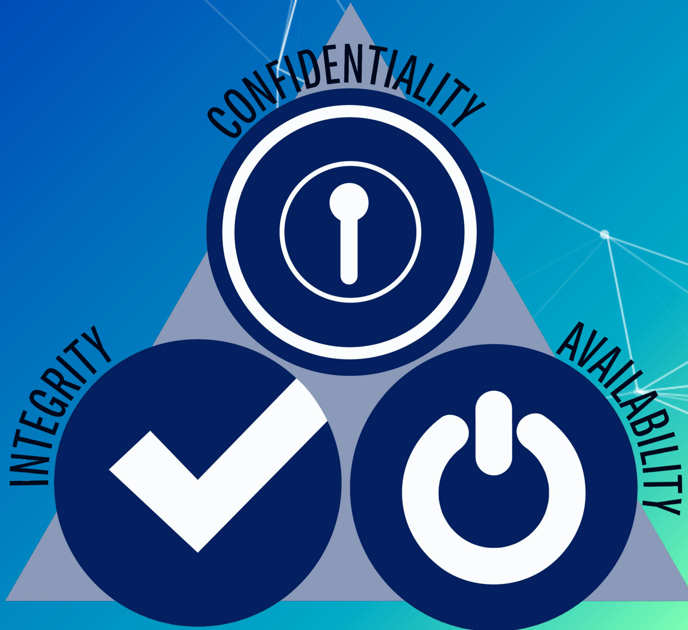
Which is most important?

Can priorities between the three change?



Overview - Cybersecurity

What's the difference?

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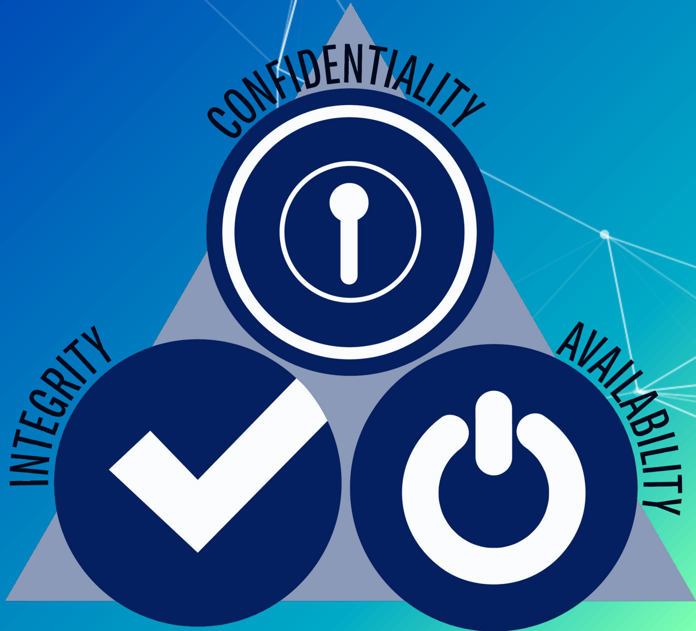
Which is most important?

Can priorities between the three change?

Challenge: Subdivide one pillar



Overview - Cybersecurity Roles

Discussion:

Who does what?

- Executives
- Managers
- Evaluators
  - E.g., consultants, analysts, auditors, testers
- Technicians
- Programmers/Developers
- Educators

Overview - Cybersecurity Components

- Computer/controller software
- Network
  - Wireless
- Algorithmic/cryptographic
- Computer/controller hardware
- Physical
- Governance
- Others?

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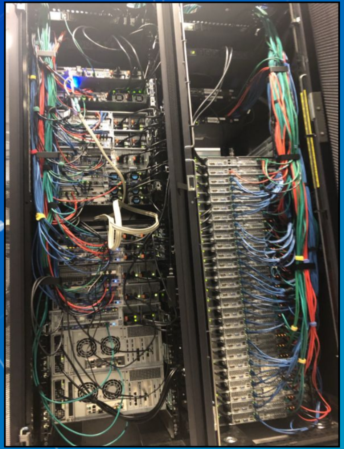
Distribution of Class Materials

- Important Note: Please do not damage the equipment

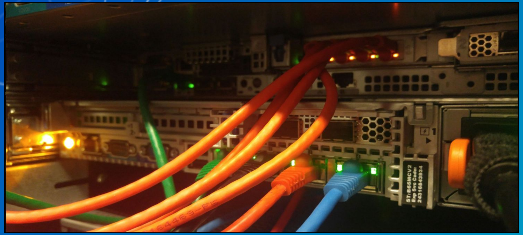
UBNetDef resources

As it turns out, UBNetDef has you *all* covered already. (Whew!)

We have these:



… and all you have to do is drive over to Davis Hall and pick your gear up.



Converging the analog: Virtualization

Instead, we're going to get you the resources you need for this class through virtualization!

- Remote access to all kinds of different computing solutions
- No need for your own hardware *or software*
  - Not even a VirtualBox download (for those of you with experience)!
- Effective 24/7 access
- UB and program donors foot the bill!
  - No small expenditure

In Class Activity

Login to vCenter

Virtualization: Let’s look inside

- Login to VPN if off campus
- Login to vCenter
  - vCenter: https://cdr-vcenter.cse.buffalo.edu/
  - Use your full UB email for the login ID
  - Course links available at https://ubnetdef.org/courses/syssec/
    - Also available on UBLearns!
  - Favorite/Bookmark vCenter!

In Class Activity

Virtualization Activity

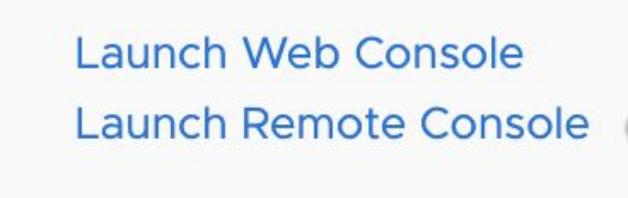
Virtualization Activity

- Windows
  - Open your Windows1
    - User: sysadmin
    - Password: Change.me!
  - Try to use it. What do you observe?

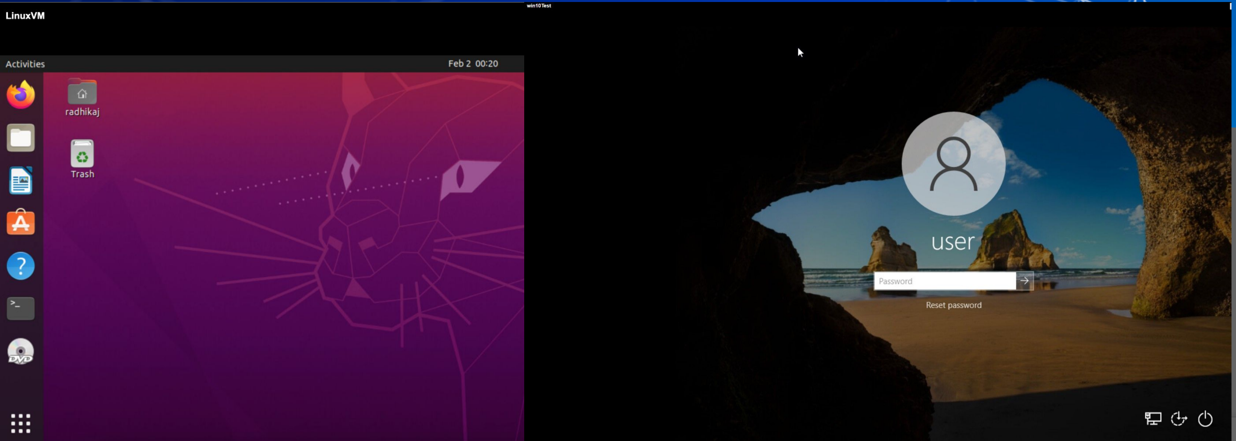
Virtualization Activity

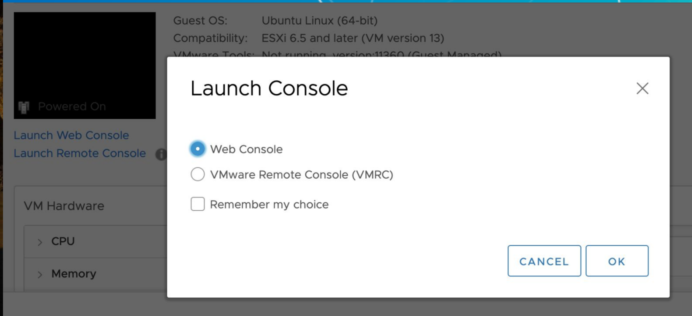
- Windows
  - Open your Windows1
  - Try to use it. What do you observe?
  - And now, open Windows2
    - User: sysadmin
    - Password: Change.me!
  - What do you observe?

Back to virtualization: How did we do that?


Launch Web Console
Launch Remote Console

- A virtual machine is a computer inside a computer.
- A hypervisor lets you interact with virtualized machines!
- VMWare’s vSphere presents the hypervisor to you!




Guest OS: Ubuntu Linux (64-bit)
Compatibility: ESXi 6.5 and later (VM version 13)
VMware Tools: Not running, version:11360 (Guest Managed)

Powered On

Launch Web Console
Launch Remote Console

VM Hardware
CPU
Memory

Launch Console

● Web Console
○ VMware Remote Console (VMRC)
□ Remember my choice

CANCEL OK

Break slide

Please return on time!

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SysSec Coursework

- Assigned weekly
- Delivery and turn-in via UBLearns
  - Required .pdf format uploads
- Select weeks: System state
  - Scored separate of report deliverable
  - Full credit system state may be required for in class activities
- Due the subsequent **Thursday, 6:29 pm**

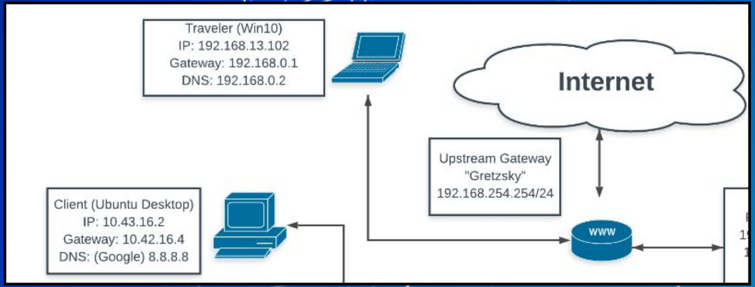
Coursework Support

- Office hours (as posted on the https://ubnetdef.org/courses/syssec course page)
- General support in the Systems Security Mattermost channel
  - Subject to availability
  - Limited availability on Thursdays before class
- Open Source Research
- Peer collaboration to achieve system state is acceptable

Weekly coursework components

- Instructional Reports
  - Screenshot technical walk-through
- Informational Reports
  - Written professional report
- Topology
  - Visual network diagram
- A style guide will be released for each component

Common coursework component: Topology



- Topology: A network diagram
- Requirements
    - Generated with a diagram platform
        - draw.io/diagrams.net (recommended)
        - Lucidchart
        - Others that look as or more professional
    - Professional organization of network
    - All devices represented as if physically available
    - Device details correspond exactly to system states

Common coursework component: System State Remedy

- Some assignments are dependent on the completion of others.
  - Deliverables will specify a requisite, gradable “system state.”
  - This state can be a “prerequisite” for the next assignment
- We will provide near-term feedback for remediation.
  - Aiming for end-of-lecture (i.e., a 3 hr. turnaround)
- Address remediation instructions seriously!
  - If not remediated, you may not be able to participate in class or start the next HW!
  - Seek after-class help.

Homework 1 (HW01)

- Posted to UBLearns by 9:30 pm
- Install two clients from .iso on your network segment/vCenter folder
  - Client 1: Windows 10
  - Client 2: Ubuntu Linux Desktop version 21.10 (Impish)
  - All usernames and passwords must match:
    - `sysadmin`
    - `Change.me!`
- Perform simple network tests on each using the CLI. Take screenshots!
- System state: Both client installations are complete and are network-connected.
- Provide a topology of your network

In Class Activity

Launch a new VM from ISO

Launch a VM from a new .iso

- In vCenter:
  - Right click on the VM
  - Click on `Edit Settings…`
  - Scroll down to `CD/DVD drive 1`
  - From the drop down select `Datastore ISO File`
  - Select `cdr-iscsi1`
  - Scroll down to `ISOs`
  - Select either a Windows or Linux ISO
  - Click `OK` and make sure the connected option is checked

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Summary and wrap-up

Today's achievements:

- We met each other
- We learned about what UBNetDef is
- We talked about the cybersecurity triad at a **high** level
- We did some virtualization
  - Launch a machine
  - Experienced the difference between hardware settings
- We communicated the standards for reporting
- We described the homework process, this week's HW, and course resources

Don’t leave (yet)!

- Clarification on activities
- Homework help available
  - An early start gives you a huge edge on timely completion
  - Good time to address feedback for remediation when necessary

Parting questions

Now is the time!

Class dismissed

See you next week!