Modern Infrastructure Operations

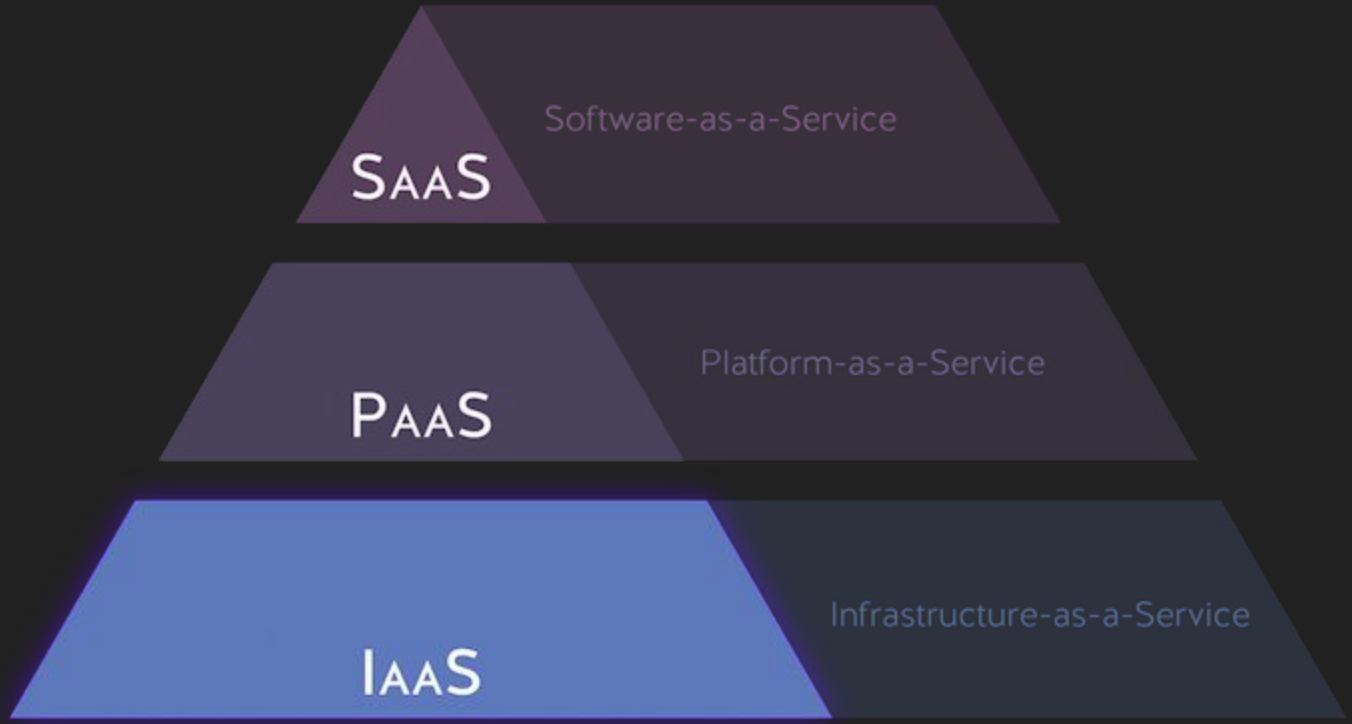
A whirlwind introduction

Who is this guy anyway?

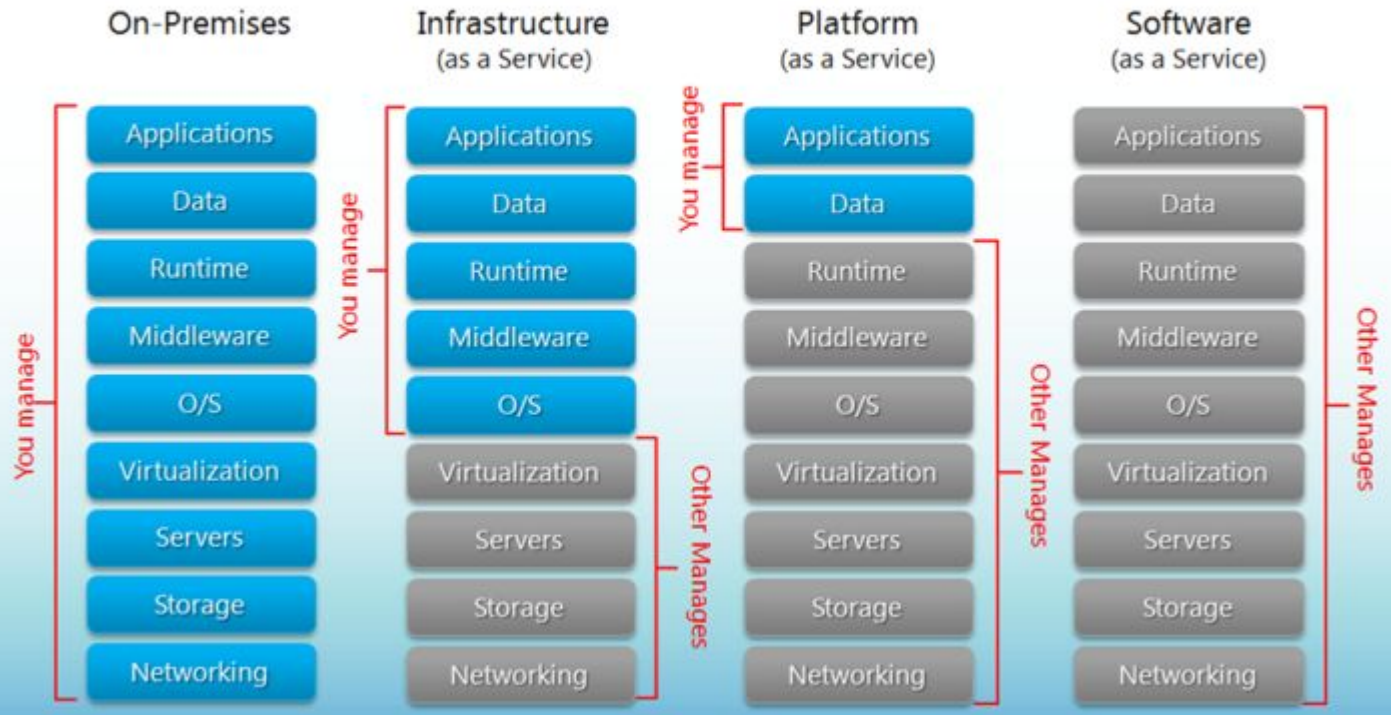
Who is this guy anyway?

- Completed my Undergrad and Graduate degrees at UB where I was a TA for several courses (115/6,191,250,442,4/521,4/589, etc)
- I found I enjoyed building complex systems and teaching people about them (UB Autograding Project)
- Currently work as a Cloud Engineer at Stark & Wayne and have 6 yrs experience as a Systems/Network Admin and 3 yrs as a Cloud/DevOps Engineer

What is Modern Infrastructure Operations?


SaaS
Software-as-a-Service
PaaS
Platform-as-a-Service
IaaS
Infrastructure-as-a-Service

Separation of Responsibilities

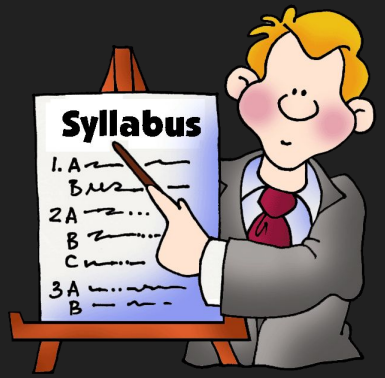


So, why learn about Infrastructure Operations?

- As a CS/CEN Student, you'll end up either required to maintain infrastructure of your own, or be writing and deploying software that runs on top of it
- Regardless of position, company, or industry everyone is dependent on infrastructure
- Studying how infrastructure is designed, deployed, and maintained will improve your understanding of what abstractions you're using, where things can break, and what happens "under the hood" in the life of an application
- Debugging infrastructure can often be complex, especially as the number of connected systems scale and in doing so you'll refine your troubleshooting skills

So, what are you hoping to learn?

Let’s talk Syllabus



Course Information

- Lecture Time : T/R 1700-1820
- Lecture Location : Bell 325

- Office Hours : T/R 1830-1930
- Office Hours Location: 310 Davis Hall

- Instructor Email: daviddob@buffalo.edu

Learning Outcomes

By the end of the class, students should have a solid understanding of

- The process of capacity and network planning
- The practical skills for equipment racking, cabling, installation and booting of servers
- Security practices and implications
- Virtualization and Containerization
- Basic implementation of Infrastructure as Code
- Basic Infrastructure Automation (CI/CD) practices
- Tools and practices for monitoring production infrastructure

Schedule

Week	Topics
1	Introduction and Capacity Planning
2	Network Planning
3	Data Center Security
4	Server Racking and Cable Management
5	Hardware Configuration and Mgmt
6	Virtualization
7	VM Creation and Guest OS Configuration
8	x.509 Certs
9	Private vs Public Networking and Configuration
10	Infrastructure as Code
11	Docker and Containers!
12	CI/CD and Automation
13	Capacity Management - Monitoring
14	Platforms - K8s, BOSH, etc - where do we go from here?

Assignments and Grading

- Assignments will be done in pairs
  - Try to find a partner with the same interests as you
  - Try to find a partner who is interested in getting the same grade as you
  - If any part is plagiarized, **both partners fail**. If you have concerns about work your partner has submitted, immediately approach me or send me an email.
- Assignments build on each other
  - Start assignments early and try not to fall behind!
  - Seek help early and often (While ‘hand-holding’ will not occur on assignments, i’ll be more than happy to provide guidance where possible or go over topics again)

Assignments and Grading

- 20% Homework (Usually related to the Lab)
- 20% Quizzes (Weekly/Bi-Weekly depending on content)
- 60% Hands-On Labs

- No Midterm Exam
- No Final Exam

Grade	Quality Points	Percentage
A	4.0	93.0% -100.00%
A-	3.67	88.0% - 92.9%
B+	3.33	84.0% - 87.9%
B	3.00	80.0% - 83.9%
B-	2.67	76.0% - 79.9%
C+	2.33	72.0% - 75.9%
C	2.00	66.0% - 71.9%
C-	1.67	62.0% - 65.9%
D+	1.33	58.0% - 61.9%
D	1.00	50.0% - 57.9%
F	0	49.9% or below

How to get the most out of class

- Show up to class
  - Be here on time - Classes start at 17:05 and end at 18:20
  - Try to be present (I don’t just mean in the room)
- Don’t be afraid to interrupt and ask questions or add to the discussion
  - Class material is going to be pretty flexible
  - Classes are intended to be interactive - be prepared to participate!
- Be prepared to learn both inside and outside of class
  - Not all Lab material will be explicitly covered step by step in class - outside resources are encouraged **(within the guidelines of Academic Integrity)**
- Try to find ways to make the Labs useful/interesting
  - i.e. managing game servers, personal websites, etc and using the labs as an opportunity to do so using ‘Class Time’

Academic Integrity

- Academic Integrity violations are taken very seriously
- It impacts not only you and your classmates, but also those who have received degrees from this department (including myself)
- While this may be my first time as primary instructor, I have TA'd enough courses and found enough instances of AI violations to know its not worth it
- Whenever possible, automated systems will be used to detect and flag AI violations both against classmates and other sources
- Again, If any part of a team assignment is plagiarized, **both partners fail**.

https://academicintegrity.buffalo.edu/policies.php
https://engineering.buffalo.edu/computer-science-engineering/information-for-students/policies/academic-integrity.html

Accessibility Resources

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 60 Capen Hall, 645-2608, and also the instructor of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations.

https://www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html

The University at Buffalo and the School of Engineering and Applied Sciences are committed to ensuring equal opportunity for persons with special needs to participate in and benefit from all of its programs, services and activities.

Questions?