

CSE 124 AND CSE 224: OVERVIEW AND INTRODUCTION

George Porter
April 1, 2025



ATTRIBUTION

- These slides are released under an Attribution-NonCommercial-ShareAlike 3.0 Unported (CC BY-NC-SA 3.0) Creative Commons license

WELCOME!



CSE 124/224: NETWORKED SYSTEMS

- Add networking support to software
 - Between two computers
 - Between computer and datacenter (“The Cloud”)
- Develop software that is:
 - Correct
 - Scalable (handles 100s of M to 1+ billion users)
 - Fault-tolerant (survives failures)
 - Evolvable (how to update services without making them unavailable to end users)

MODERN SOFTWARE INCREASINGLY NETWORKED



NETWORKED SERVICES DRIVEN BY DATA

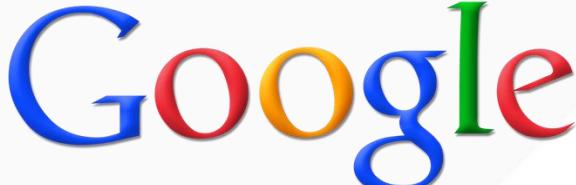
0 1 0 1 0 1 0 0 0 1 1 1
0 0 1 1 0 1 0 0 1 0 1 1
0 0 1 1 0 1 0 1 1 1 0 0
1 0 1 0 0 1 0 0 1 1 1 1
0 1 1 0 0 0 1 0 1 1 1 1
1 1 0 0 0 0 0 1 1 1 1 1
0 1 1 0 0 0 0 0 1 1 1 1
0 0 0 1 0 1 0 1 1 1 1 1
1 1 1 0 1 0 1 1 1 0 0 0

+  = Product Recommendations

0 1 0 1 0 1 0 0 0 1 1 1
0 0 1 1 0 1 0 0 1 0 1 1
0 0 1 1 0 1 0 1 1 1 0 0
1 0 1 0 0 1 0 0 1 1 1 1
0 1 1 0 0 0 1 0 1 1 1 1
1 1 0 0 0 0 0 1 1 1 1 1
0 1 1 0 0 0 0 0 1 1 1 1
0 0 0 1 0 1 0 1 1 1 1 1
1 1 1 0 1 0 1 1 1 0 0 0

+  Spotify® = Custom Stations

0 1 0 1 0 1 0 0 0 1 1 1
0 0 1 1 0 1 0 0 1 0 1 1
0 0 1 1 0 1 0 1 1 1 0 0
1 0 1 0 0 1 0 0 1 1 1 1
0 1 1 0 0 0 1 0 1 1 1 1
1 1 0 0 0 0 0 1 1 1 1 1
0 1 1 0 0 0 0 0 1 1 1 1
0 0 0 1 0 1 0 1 1 1 1 1
1 1 1 0 1 0 1 1 1 0 0 0

+  = Personalized Search

DATA-DRIVEN, PER-USER CUSTOMIZATION + ML

```

0 1 0 1 0 1 0 0 0 1 1 1
0 0 1 1 0 1 0 0 1 0 1 1
0 0 1 1 0 1 0 1 1 1 0 0
1 0 1 0 0 1 0 0 1 1 1 1
0 1 1 0 1 0 1 1 1 1 1 1
1 1 0 0 1 0 0 0 0 1 1 1 1
0 1 1 0 0 0 0 0 1 1 1 1 1
0 0 0 1 0 1 0 1 1 1 1 1 1
1 1 1 0 1 0 1 1 1 1 0 0 0

```

+ **amazon.com** = Product Recommendations

```

0 1 0 1
0 0 1 1
0 0 1 1
1 0 1 0

```

App 3

```

0 1 0 1
0 0 1 1
0 0 1 1
1 0 1 0

```

App ...

```

0 1 0 1
0 0 1 1
0 0 1 1
1 0 1 0

```

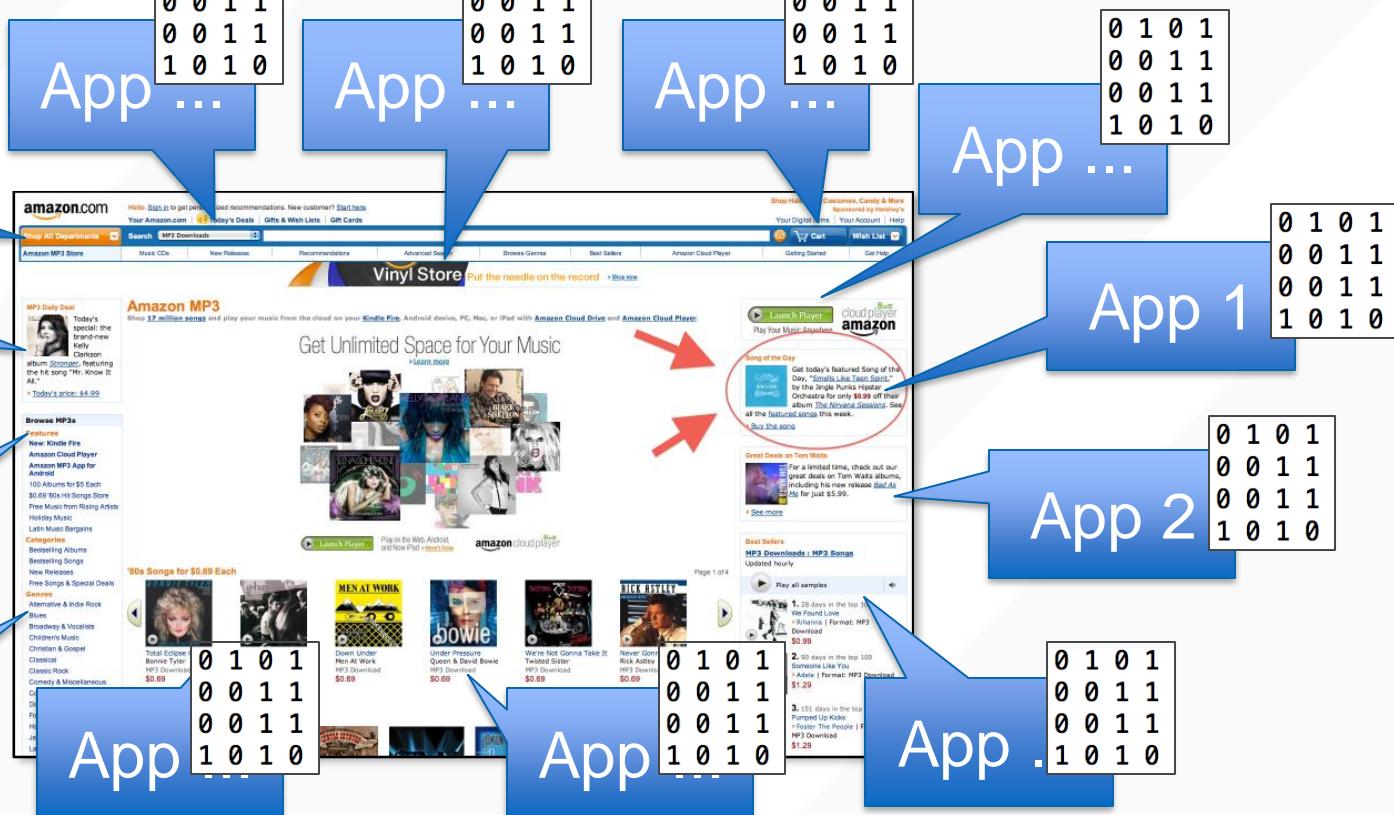
App ...

```

0 1 0 1
0 0 1 1
0 0 1 1
1 0 1 0

```

App ...



MODERN NETWORKED SERVICES

- As you can imagine, developing a data-driven, user-customized, fault-tolerant, globe-spanning application requires a different approach than single-machine software development

MAJOR THEMES OF THE COURSE

- Programming abstractions for communicating over the Internet through various network protocols
- Naming and indexing to find services and connect clients with servers (or clients with other clients)
- Managing scale; scale-out design
- Replicating and updating “mutable” data over the network
- Replicating and caching “immutable” data over the network (think Netflix, Disney+, Youtube, etc)
- Integrating fault-tolerance into your application

**THINK ABOUT HOW ONLINE NETWORK SERVICES
HAVE CHANGED OVER THE PAST 25-ISH YEARS...**

GOOGLE (1998)

The screenshot shows the original Google homepage from 1998. At the top center is the iconic "Google!" logo in its classic multi-colored, slightly shadowed font, with the word "BETA" in smaller capital letters below it. Below the logo is a search bar with the placeholder text "Search the web using Google!". Underneath the search bar are two buttons: "Google Search" and "I'm feeling lucky". The main content area has three teal-colored sidebar boxes. The left box contains links for "Special Searches", "Stanford Search", and "Linux Search". The middle box contains links for "Help!", "About Google!", "Company Info", and "Google! Logos". The right box contains a form for users to enter their email address to receive monthly updates, with "Subscribe" and "Archive" buttons nearby. At the bottom center is the copyright notice "Copyright ©1998 Google Inc."

Search the web using Google!

Google Search I'm feeling lucky

Special Searches
[Stanford Search](#)
[Linux Search](#)

Help!
[About Google!](#)
[Company Info](#)
[Google! Logos](#)

Get Google!
updates monthly:
your e-mail
Subscribe Archive

Copyright ©1998 Google Inc.

NETFLIX (2002)

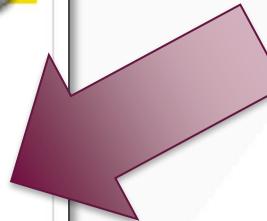
 Try Netflix for **FREE** Today! 

Rent all the DVD movies you want.
For 20 bucks a month. No late fees.

 World's Largest Selection  FREE & FAST HOME DELIVERY  NO LATE FEES 

Super Selection! Create a list online of all the movies you want to see	Free & Fast Home Delivery The movies you select arrive via first-class mail in 2-4 days.	No Due Dates or Late Fees Keep each DVD as long as you want. Have up to 3 movies on hand.	Free Shipping! Return one DVD in its prepaid envelope and get another DVD from your list.
---	--	---	---

\$19.95 PER MONTH One Flat Fee!
It's just 20 bucks a month. There are no late fees, no hidden charges, no commitments. If you have any questions, call 1-888-638-3549.



TWITTER (2007)

Find folks to follow! search or [Login / Join Twitter!](#)

A global community of friends and strangers answering one simple question: **What are you doing?** Answer on your phone, IM, or right here on the web!

[explore twitter](#)

Look at what [these people](#) are doing right now...

claudiof @ruimoura: a minha pergunta nao era pa ter a certeza, basta fazeres whols e ves que sim. era mais... "é isto? consolas?" [less than 5 seconds ago](#) from im [in reply to ruimoura](#)

mseeling: I've started the bad habit of forgetting to eat breakfast and lunch. No wonder i'm always tired. [less than 5 seconds ago](#) from [txt](#)

cbsiskin @sharongs: It's on its way via email. Not online so can't send a link.. [less than 5 seconds ago](#) from web [in reply to sharongs](#)

groovesalad: Mushroom Nation - Helsinki (Pancake Mix) [less than 5 seconds ago](#) from web

2525: weer thuis [less than 5 seconds ago](#) from [twitternific](#)

erockenjew: Billions of dollars spent on dirty contractors in iraq: <http://tinyurl.com/ywkt3c>, but 35 billion over 5 years for poor children is soci ... [less than 5 seconds ago](#) from [twitternific](#)

Becks6735: mein bruder isch jetzt au bei twitter.... sein nickname isch Jesusfan!! Bis dennes ihr hennes!! [less than 10 seconds ago](#) from web

Levoix: End of my blog : <http://levoix.canalblog.com> [less than 10 seconds ago](#) from web

rauski: El diseño gráfico es la peor de las parejas y la mejor de las amantes, así pasa... Porqué siempre nos gustan las cabronas? jajaja [less than 10 seconds ago](#) from web

Please Sign In!

Username or Email

Password

Remember me [Forgot?](#)

[Sign In!](#)

Already using Twitter with your Mobile or IM?
[Activate »](#)

Want an account?
[Join for Free!](#)

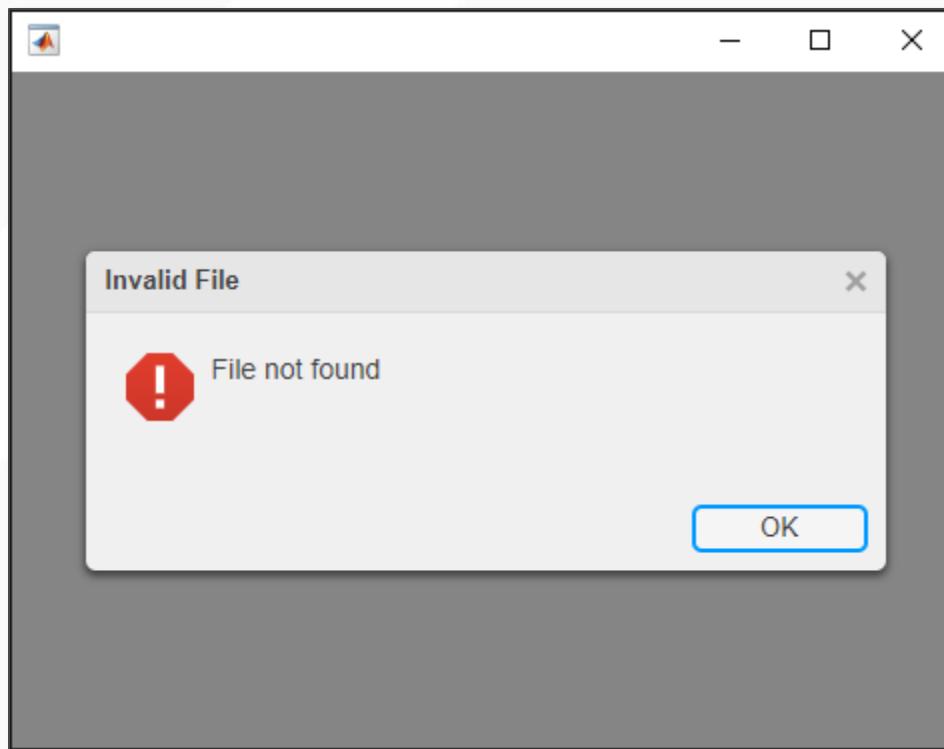
It's fast and easy!

Featured!

 [FreeBurma](#)
 [Amie Street](#)
 [WIREDScience](#)
 [New Media Expo](#)
 [New York Times](#)
 [MTV VMAs](#)
 [MacRumors Notify](#)
 [Lincoln@APEC2007](#)
 [Chuck Bartowski](#)
 [AIBE](#)

© 2007 Twitter [About Us](#) [Contact](#) [Blog](#) [Explore!](#) [API](#) [Help](#) [Jobs](#) [TOS](#) [Privacy](#)

YOUTUBE (2004)



YOUTUBE (2005)

Home | My Videos | My Favorites | My Messages | My Profile

Sign Up | Log In | Help

YouTube

Your Digital Video Repository

Search Videos

[Upload Your Videos](#)

nansheng : azlan : werelband : ny : superbike : japan : sinceretheory
: jozef : party : amazon : board : skale : buckley : shubs : falls : de :
stockshot : cubbyhole : burnout : satellite : coughkeepsie : cruise : heritage
: orgel : chin : themed : mill : music : new : live : to : farmer : mtv :
puenbrouck : sicily : fairfield : musical : coffeehouse : bud :
2005 : trip : jfk : woordjes : death : xianz : skill : olle : nature : ads :
dance :

[See More Tags](#)

Featured Videos

[>> Watch More Videos](#)

Denny's Added: June 14, 2005 by jrhley Views: 86 Comments: 1	On top of the world! Added: May 3, 2005 by jawed Views: 82 Comments: 0	Father's Day Special Added: June 19, 2005 by ATrain Views: 46 Comments: 0	Jingle en Joe Added: June 21, 2005 by Lena Views: 27 Comments: 0	River Otter in Central Park Zoo Added: June 28, 2005 by TH Views: 6 Comments: 0

[About Us](#) | [Contact Us](#) | [Terms of Use](#) | [Privacy Policy](#) | Copyright © 2005 YouTube, LLC™ | [RSS](#)

FACEBOOK (2004)

The screenshot shows the homepage of Thefacebook.com from 2004. At the top right, there's a blue header bar with the text "[thefacebook]" in white, and links for "login", "register", and "about". Below the header is a large, pixelated profile picture of a man's face. To the left of the main content area is a login form with fields for "Email:" and "Password:", and buttons for "register" and "login". The main content area has a title "[Welcome to Thefacebook]" and a sub-headline: "Thefacebook is an online directory that connects people through social networks at colleges." It mentions that it's now open to Harvard University. A list of features follows: "You can use Thefacebook to:" with items like "Search for people at your school", "Find out who are in your classes", "Look up your friends' friends", and "See a visualization of your social network". Below this is a note: "To get started, click below to register. If you have already registered, you can log in." At the bottom, there are links for "about", "contact", "faq", "terms", and "privacy", followed by the text "a Mark Zuckerberg production" and "Thefacebook © 2004".

[thefacebook]
login register about

Welcome to Thefacebook!

[Welcome to Thefacebook]

Thefacebook is an online directory that connects people through social networks at colleges.

We have opened up Thefacebook for popular consumption at **Harvard University**.

You can use Thefacebook to:

- Search for people at your school
- Find out who are in your classes
- Look up your friends' friends
- See a visualization of your social network

To get started, click below to register. If you have already registered, you can log in.

Register Login

about contact faq terms privacy
a Mark Zuckerberg production
Thefacebook © 2004

SURVEY

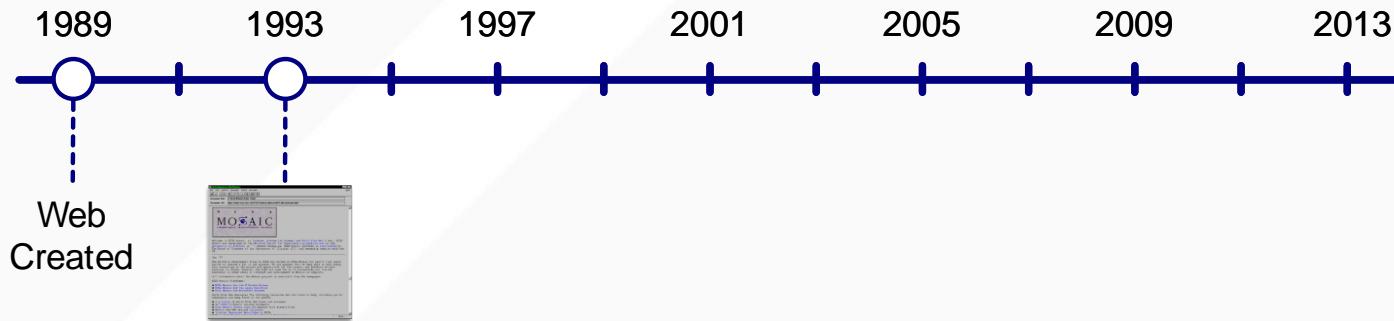
- When was the web protocol created? When was the first graphical web browser released?
 1. 1968 / 1972
 2. 1974 / 1976
 3. 1989 / 1993
 4. 2001 / 2002

THE DEPLOYMENT OF “THE WEB”

RISE OF THE WEB



RISE OF THE WEB

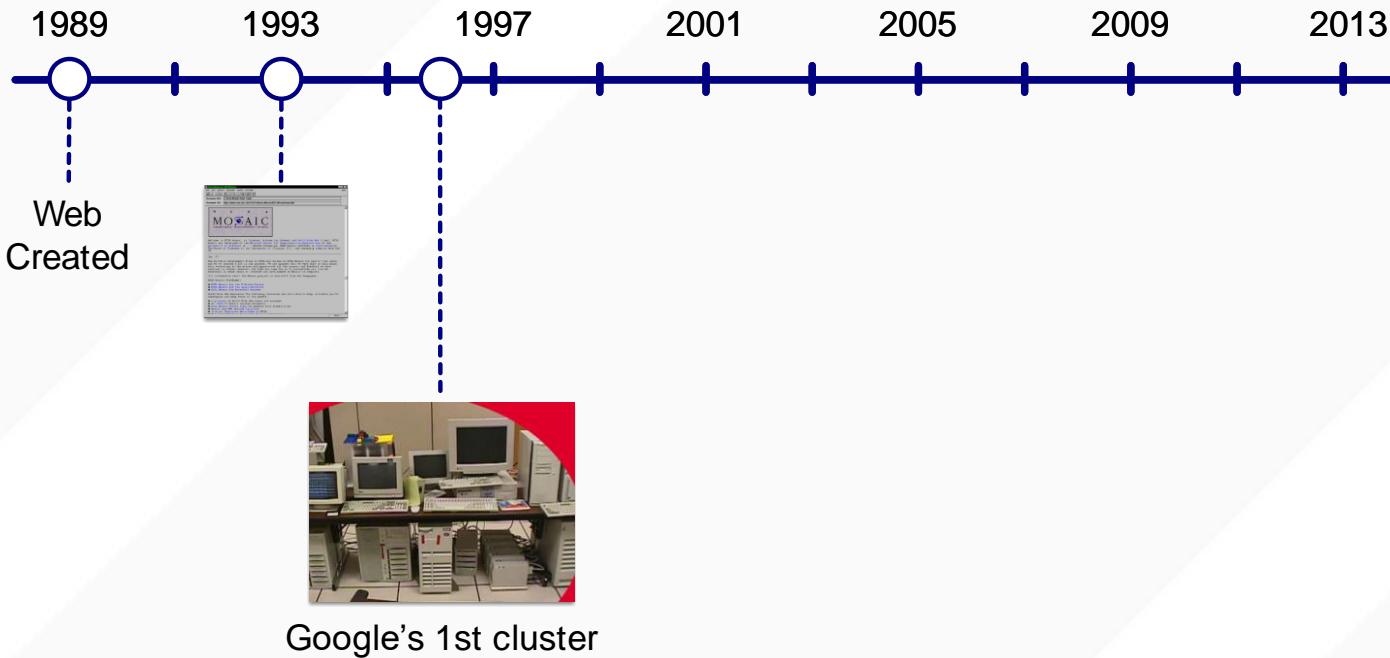


WHERE DO NETWORK SERVICES EXECUTE?

THE FIRST WEB SERVER (NEXT WORKSTATION, 1991)



THE RISE OF THE “DATACENTER” (AKA CLOUD COMPUTING)



DATACENTERS: THE HOME OF ALL THIS COMPUTING AND STORAGE



Microsoft



Google



Facebook

Google 2012





Microsoft

Google

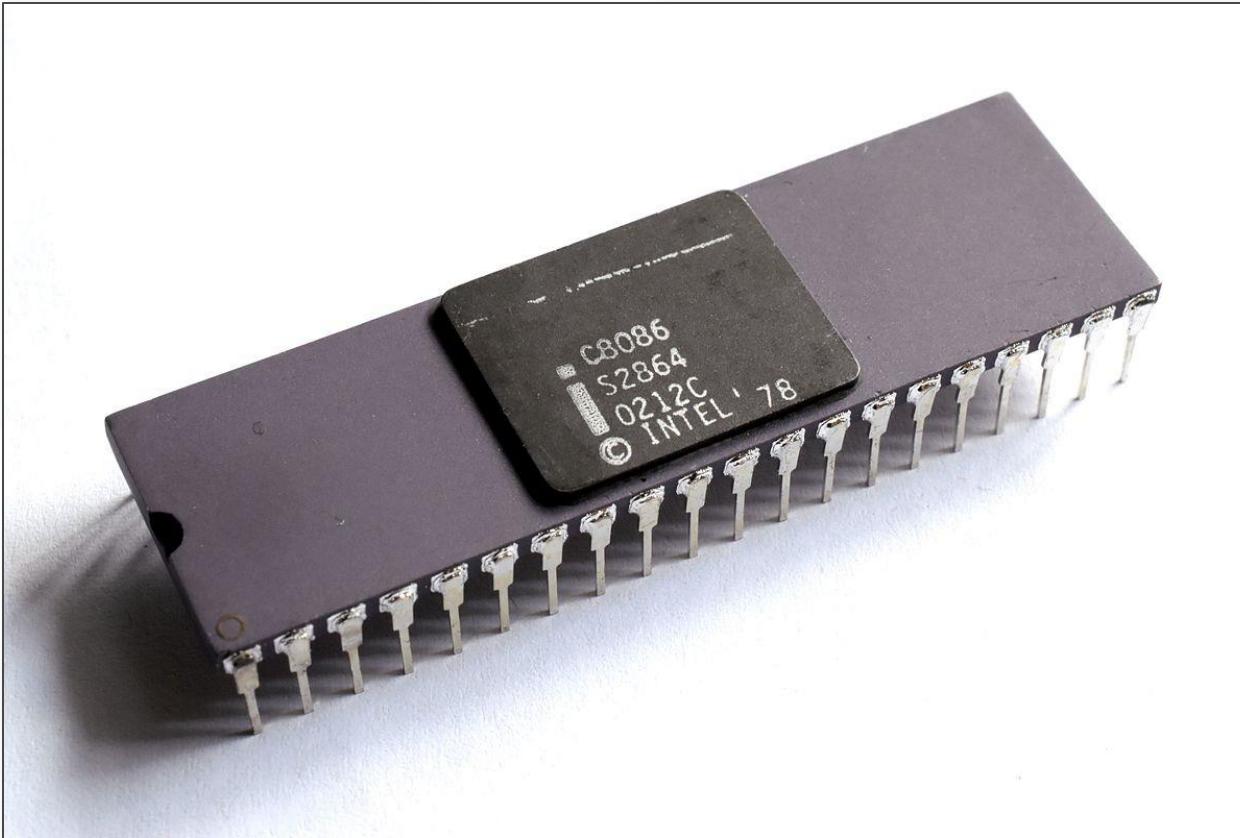




Facebook



HARDWARE HAS EVOLVED AS WELL. STARTING WITH CPUS...



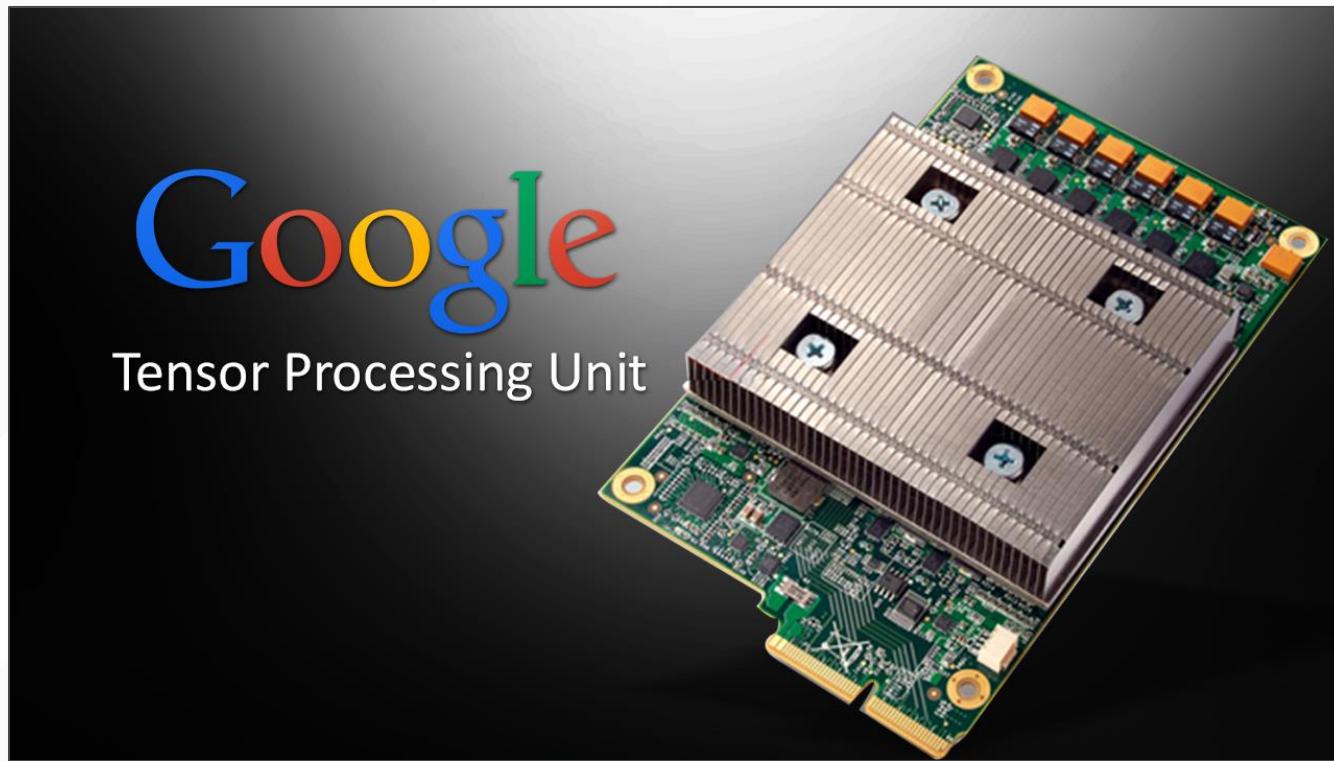
TO GPUS...



TO PROGRAMMABLE FPGAS...



TO CUSTOM DESIGNED CHIPS



CUSTOM VIDEO TRANSCODING CHIP

ars TECHNICA

BIZ & IT TECH SCIENCE POLICY CARS GAMING & CULTURE STORE

I WONDER IF NETFLIX WANTS TO BUY SOME —

YouTube is now building its own video-transcoding chips

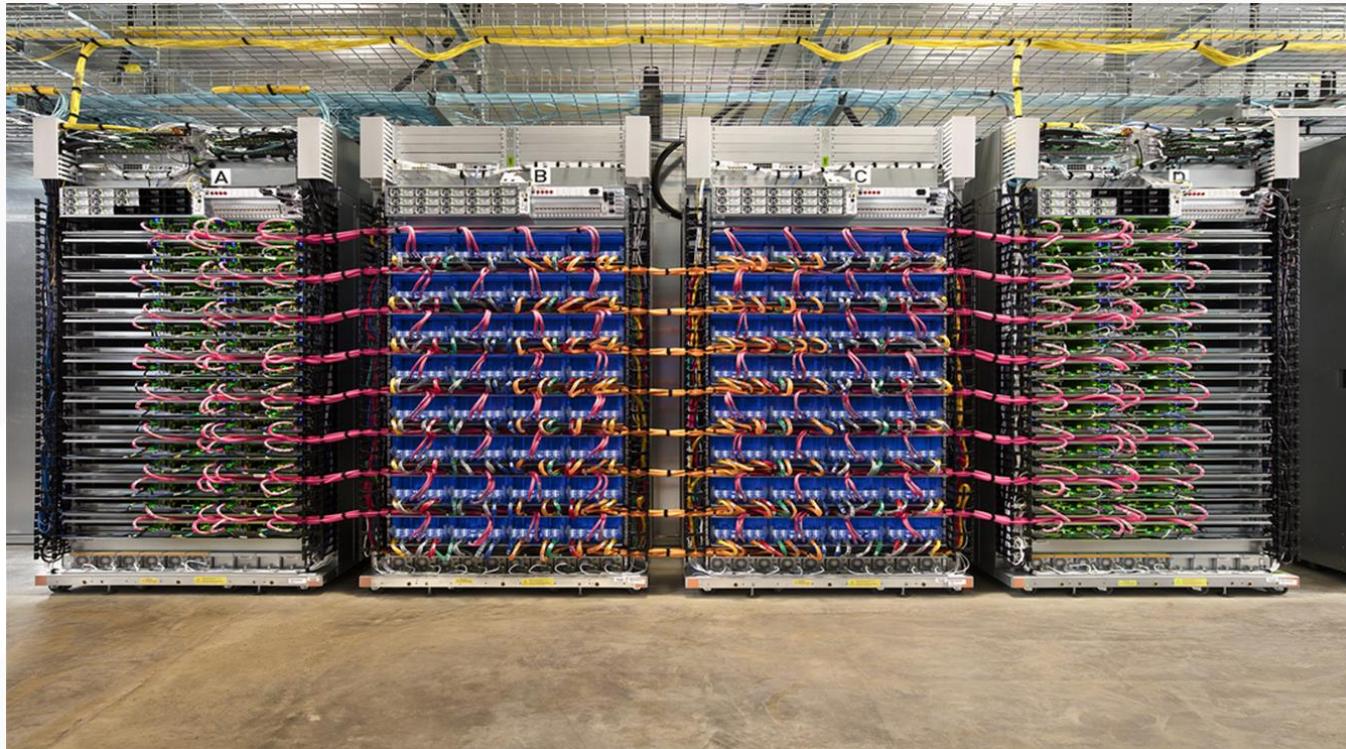
Google throws custom silicon at YouTube's massive video-transcoding workload.

RON AMADEO - 4/22/2021, 11:24 AM



Google

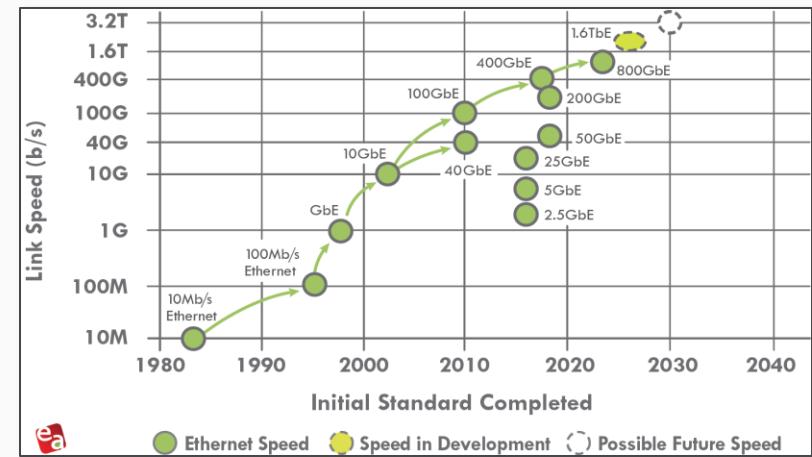
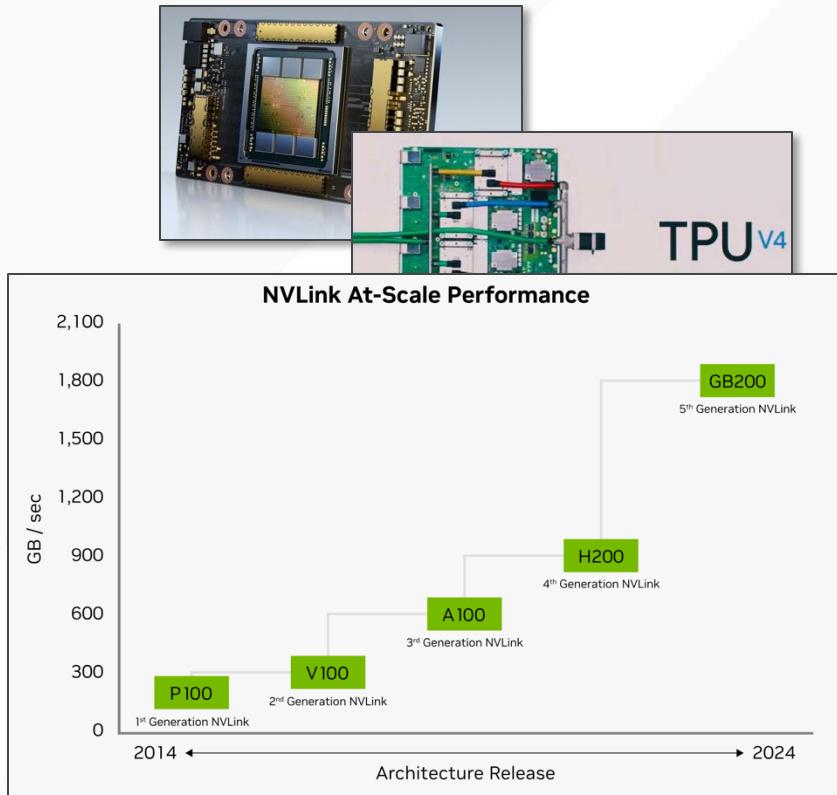
CLUSTERS OF CUSTOM ASICS FOR AI/MACHINE LEARNING



Source: google.com

CURRENT TRENDS IN DATACENTER NETWORKS

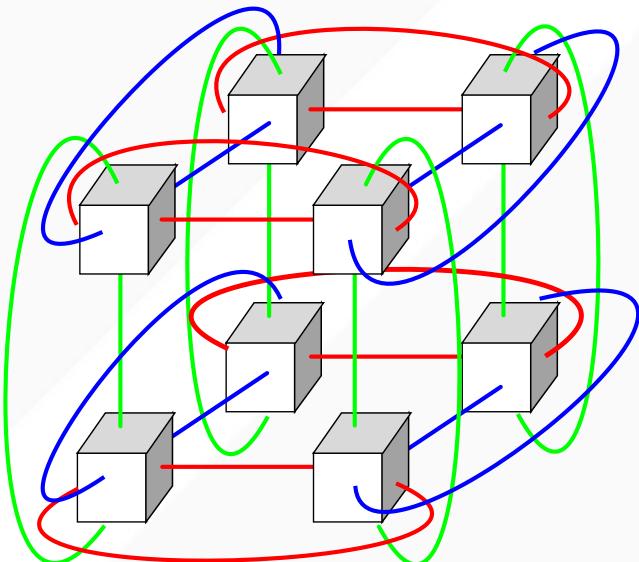
- 1. Higher bandwidth endpoints due to non-CPU “accelerators”



Ethernet packet switching speed roadmap

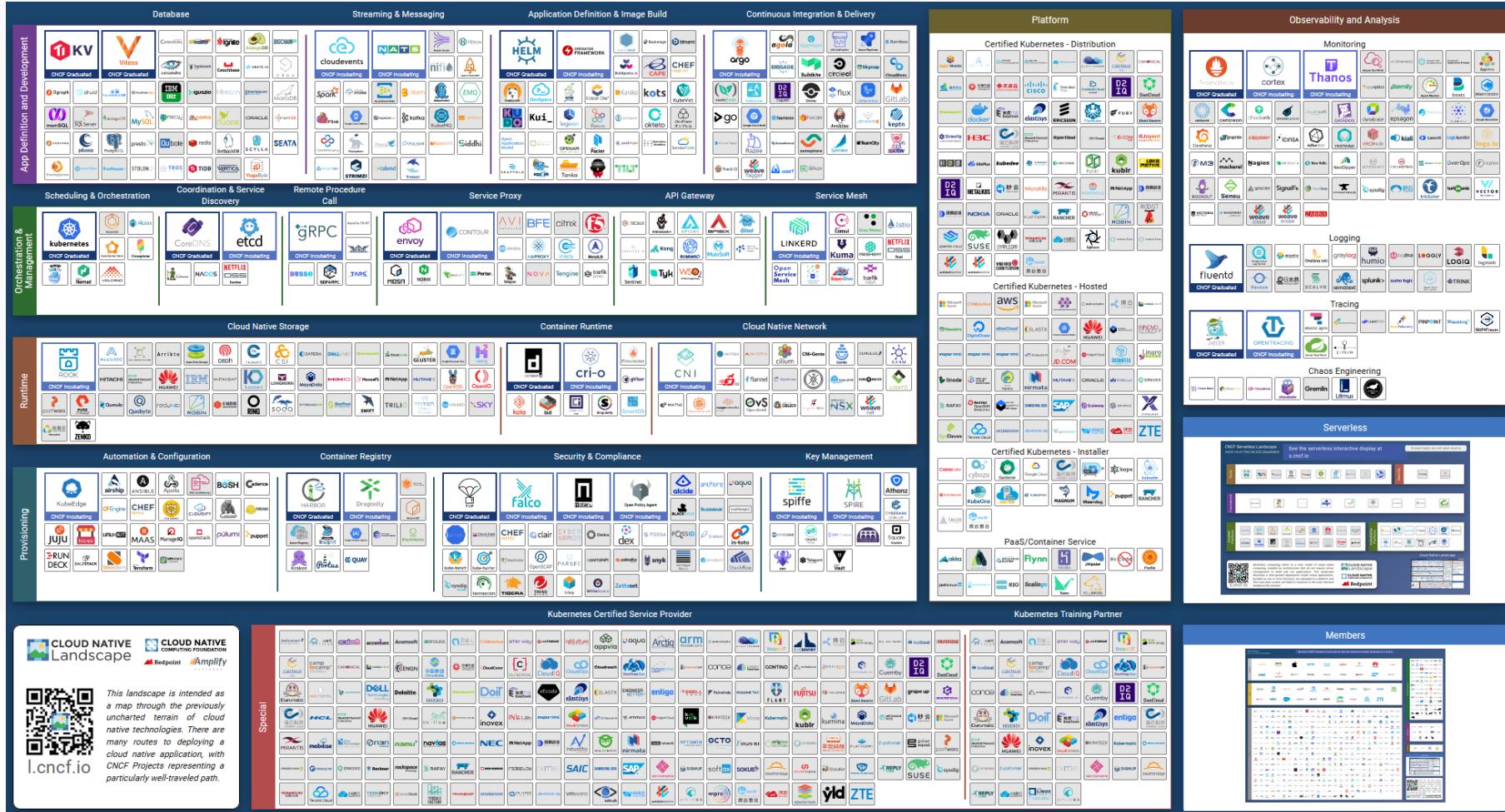
CURRENT TRENDS IN DATACENTER NETWORKS

- 2. Workload and topology specialization

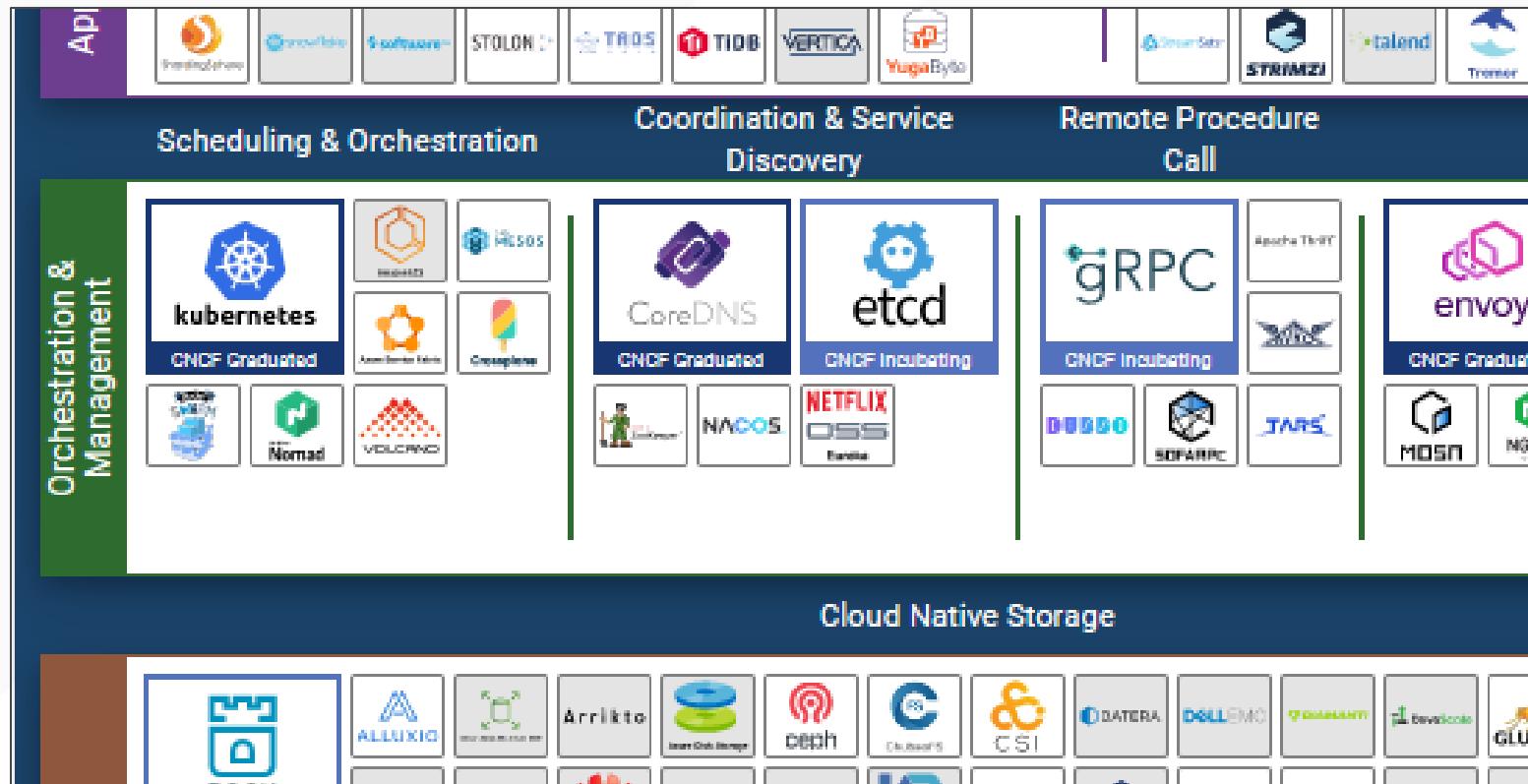


- Tailored topologies for collectives, such as Torus-based networks
- These collectives run billions of times to train large-scale models
- Big money involved (\$\$\$\$\$\$)

FULL CLOUD NATIVE LANDSCAPE



WE'LL COVER A LITTLE BIT OF THIS WORLD

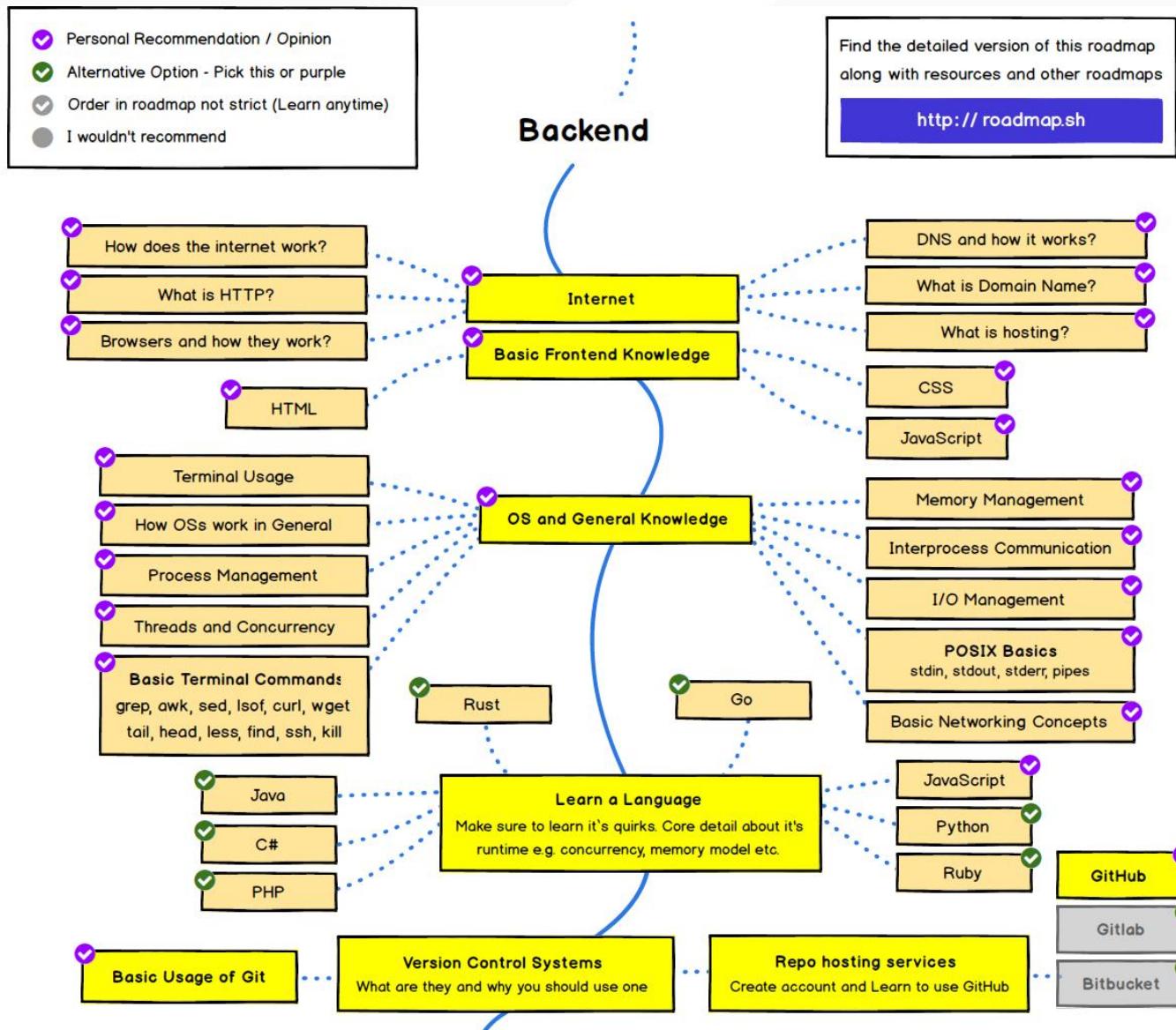


- But a useful little bit...

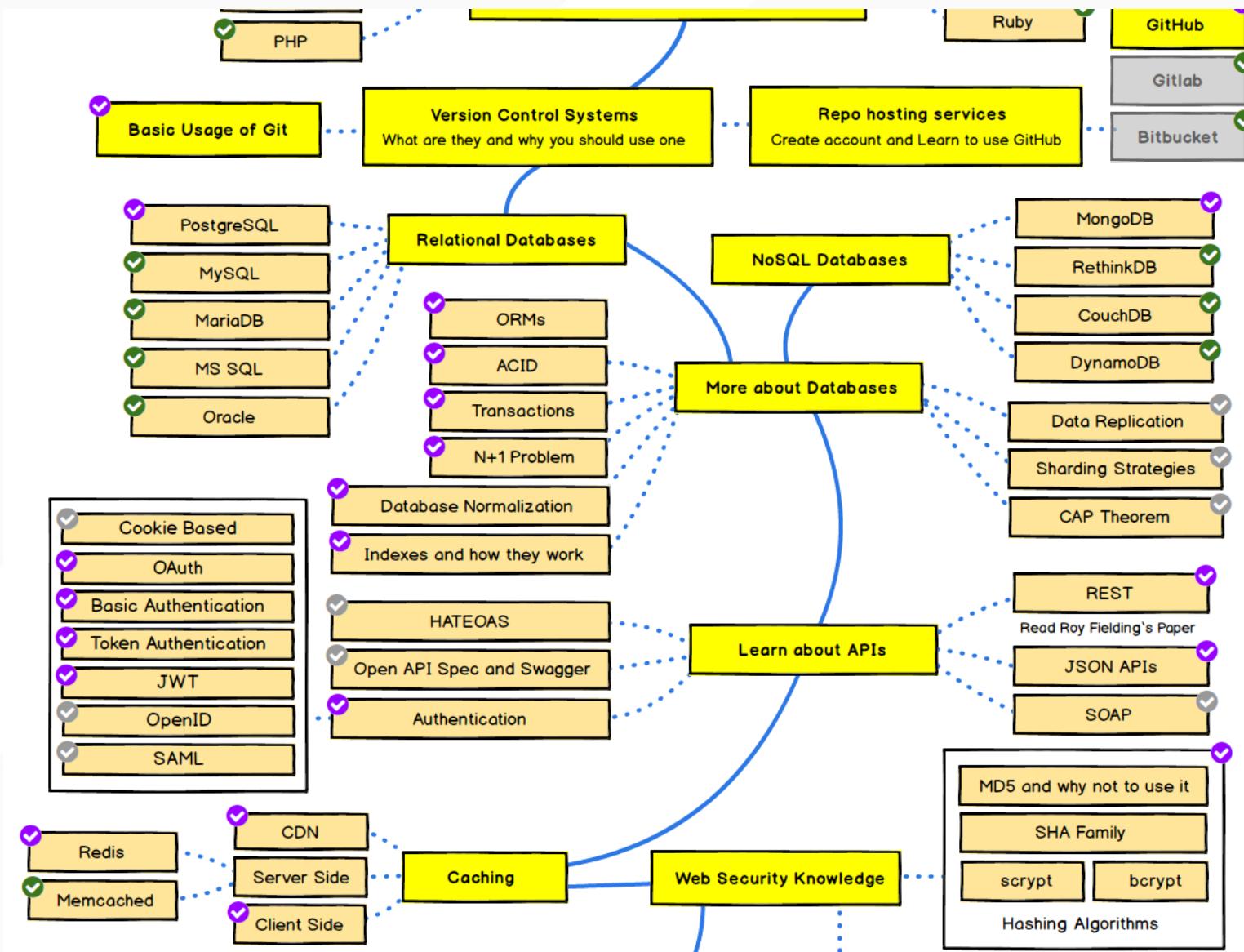
CLOUD NATIVE LANDSCAPE IN A 10-WEEK QUARTER



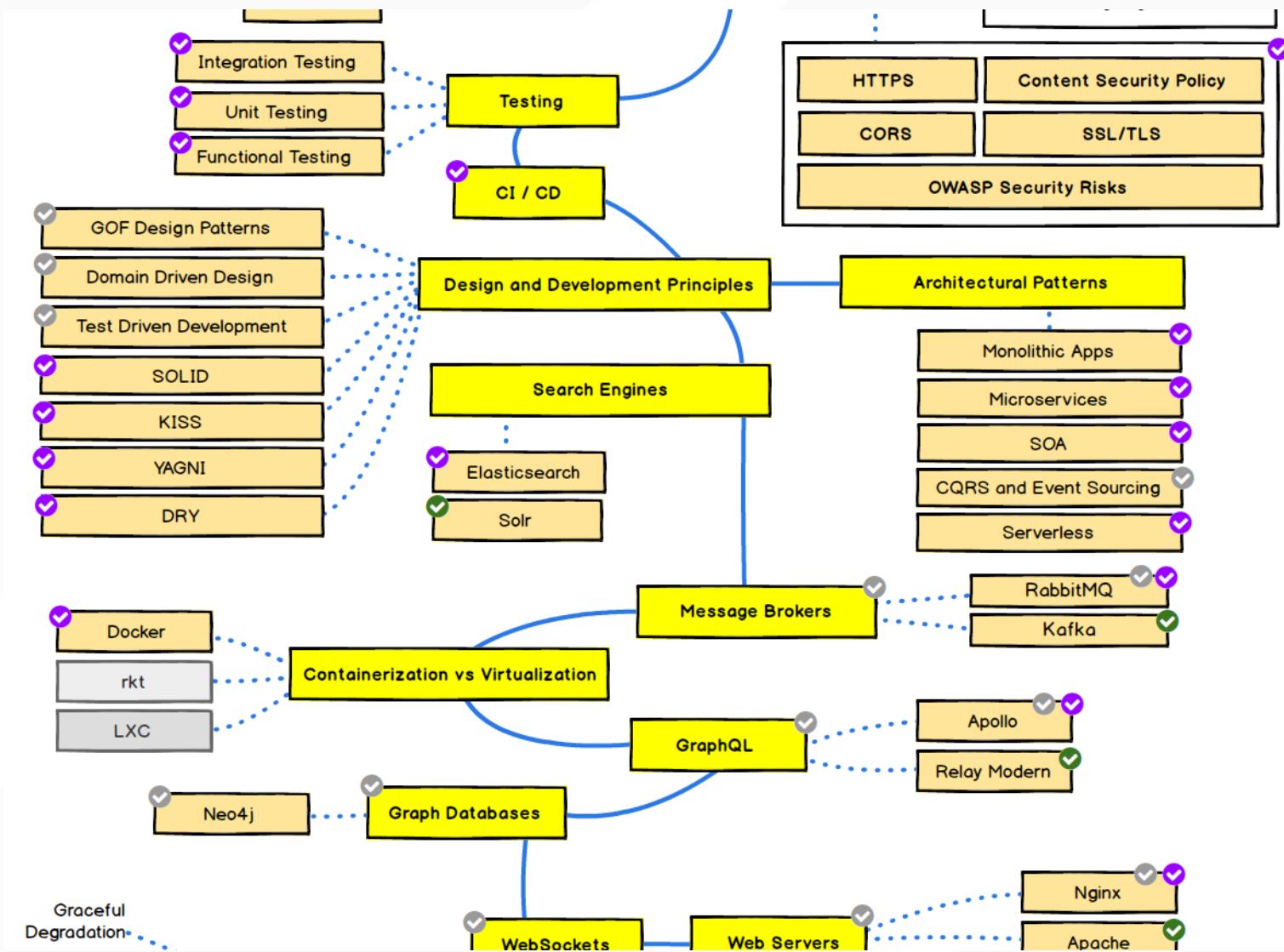
BACKEND DEVELOPMENT ROADMAP



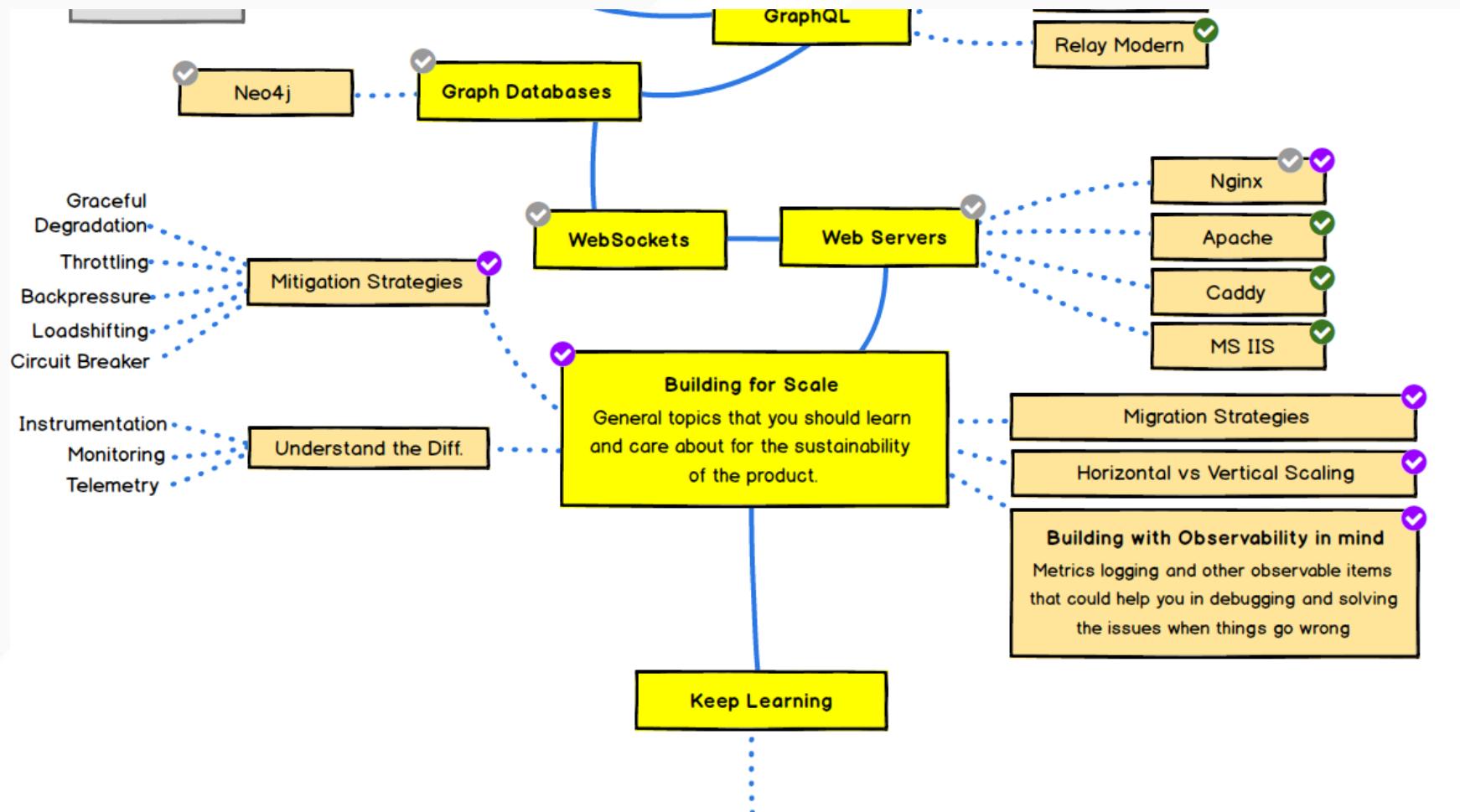
BACKEND DEVELOPMENT ROADMAP



BACKEND DEVELOPMENT ROADMAP



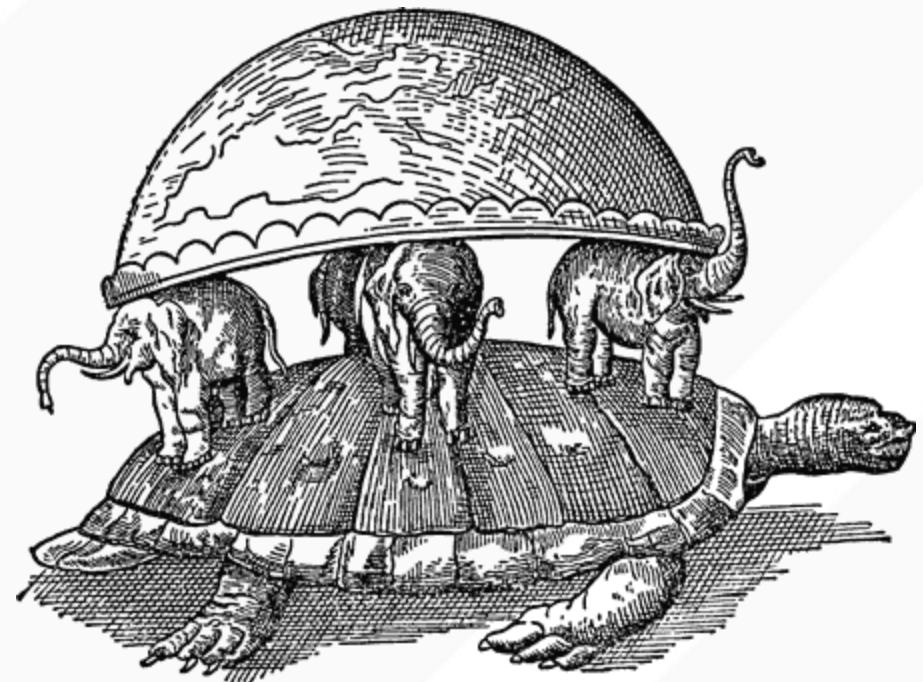
BACKEND DEVELOPMENT ROADMAP



SCALING ACROSS TECHNOLOGY IMPROVEMENTS

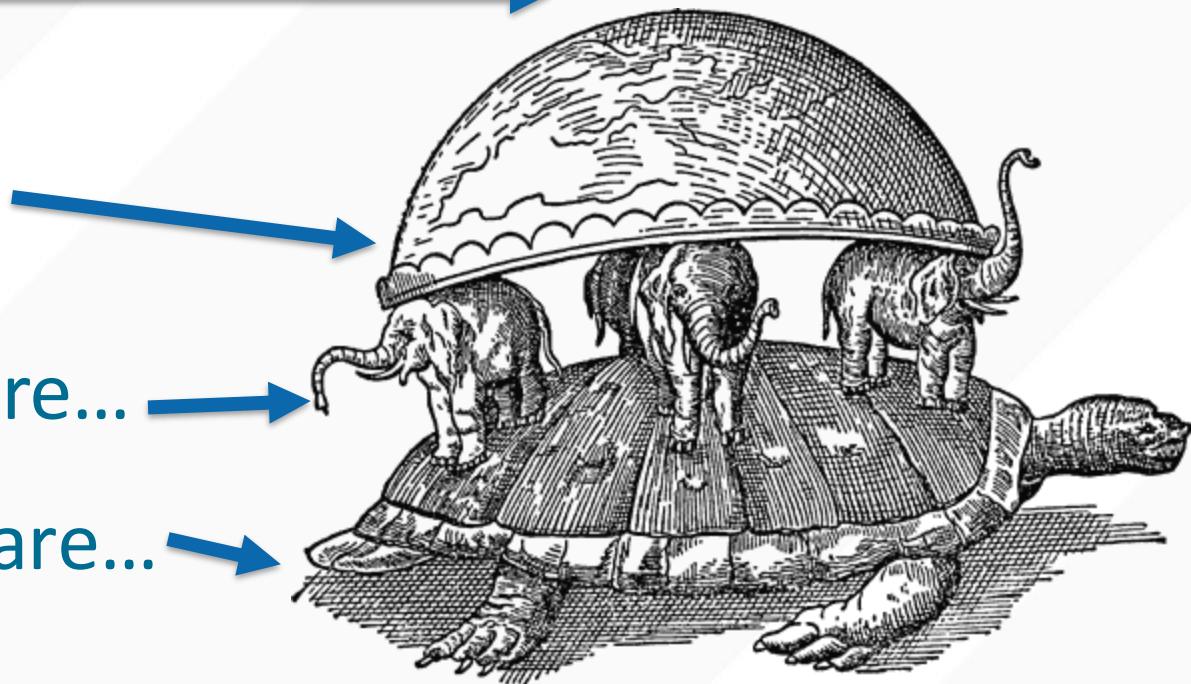
- Network primitives are designed to scale
- Techniques we learn are directly applicable to global-scale services like Google, Facebook, ...
- Your projects will be tested in small scale
 - Yet could scale immensely with minimal to no modifications

HOW TO BUILD SUCH LARGE SYSTEMS?



HOW TO BUILD SUCH LARGE SYSTEMS?

- Systems... →
- Built on top of abstractions... →
- Built on software... →
- Built on hardware... →



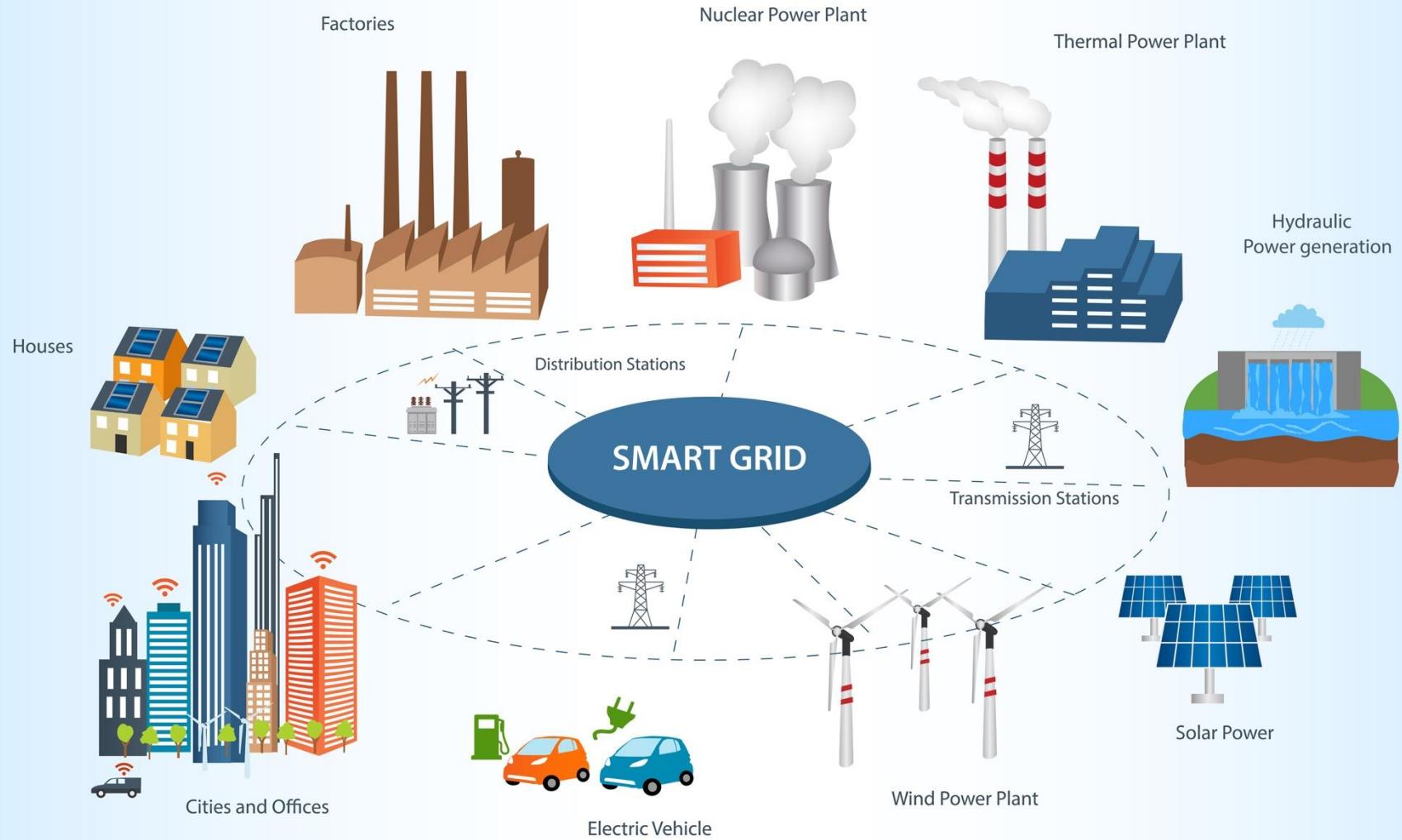
We will cover the software abstractions to enable you to write networked software

**IT'S NOT JUST WEBSITES AND SOCIAL MEDIA
THOUGH!**

SELF-DRIVING CARS AND SMART CITIES



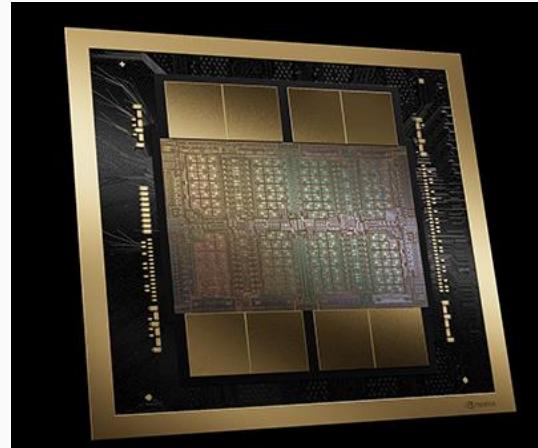
SMART CITIES AND SMART GRIDS



AI AND LLMS



NVIDIA.[®]



Blackwell GPUs include 18 fifth-generation NVLink links to provide 1.8 TB/sec total bandwidth, 900 GB/sec in each direction. 1.8TB/s of bidirectional throughput per GPU is over 14X the bandwidth of PCIe Gen5, ensuring high-speed communication for today's most complex large models. That's nearly seven petabytes of data transfer in an hour from one GPU, or [more data than 18 years of streaming 4K movies](#), or the [entire Internet bandwidth](#) processed by just 11 Blackwell GPUs.

<https://resources.nvidia.com/en-us-blackwell-architecture?ncid=no-ncid>

CSE 124 AND CSE 224 ARE CO-TAUGHT

124

- Undergraduate upper-division elective

224

- Graduate-level systems elective
- MS and non-systems Ph.D. students

OVERVIEW OF CSE 123 VS CSE 124

CSE 123

How the internet works

Routing protocols,
congestion control
theory, switching,
forwarding

Up to layer 4

CSE 124

How to add networking
support to your
software

Sockets programming,
RPC, DNS, protocol
design and
implementation,
replication, scale-out
design...

“Layer 7”

CSE 224 VS {221,222A,223B}

- 224: Graduate Networked Systems
 - How to program networked software
 - Designed as a *broad survey* of networked systems concepts
 - Learn through hands-on, programming-based projects
- 224 Target audience:
 - MS “comps” students and BS/MS students
 - Non-systems MS “thesis” and non-systems Ph.D. students
- Cannot receive credit for both 124 and 224
- 221/222A/223B sequence
 - Target audience: Systems “MS” thesis option students and Systems Ph.D. students
 - 221: Operating Systems research
 - 222A: Networking research
 - 223B: Distributed systems theory
 - Deep dives into peer-reviewed literature
 - Learn through close readings and in-class discussion of 1 or 2 research papers per class

THE CHALLENGE OF NETWORKING

- CS undergraduate curricula includes:
 - Algorithms
 - Programming languages
 - Architecture
 - Data structures
 - Etc...
- How does the network change each of these areas?

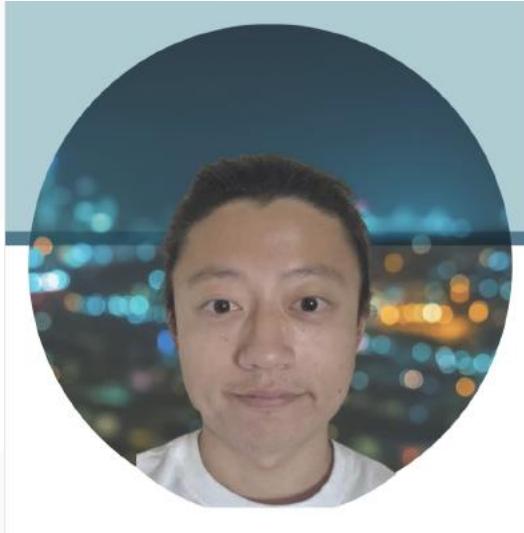
RESOURCES

- Website
 - <https://canvas.ucsd.edu/courses/66236>
 - Gradebook, links to assignments + deadlines, lecture slides, in-class demos and exercises
- Piazza discussion board (linked off Canvas)
- Github (for managing your projects)
- Gradescope (for exam grading)
- Various online reference materials
- TA discussion section (1x week)

COURSE STAFF



Ethan Lee



Fucheng Shang



James Zhang

COURSE STAFF



Rukshani Athapathu



Rohit Pai



Amanda Tomlinson

COURSE STAFF

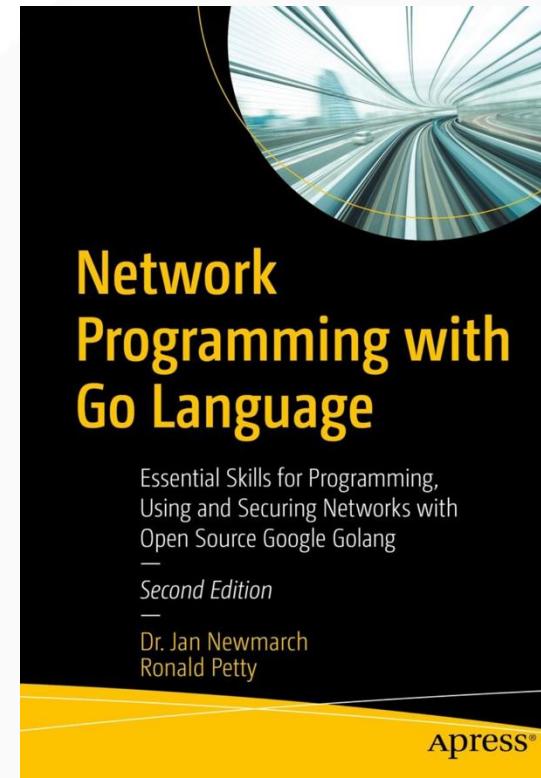
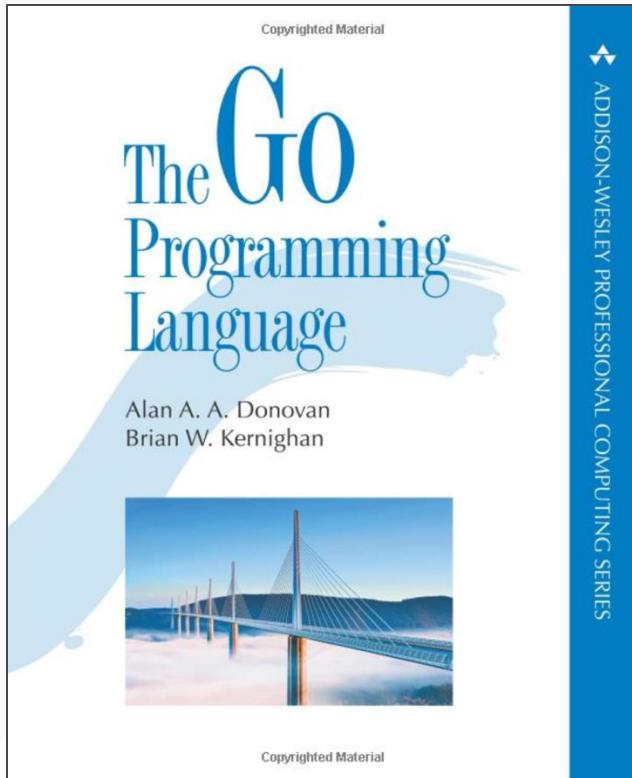


Yibo Wei



Po-Chun Wu

BOOKS (OPTIONAL)



Free if accessed through the
UCSD library

Free if accessed through the
UCSD library

PROGRAMMING SKILLS FOR THIS CLASS

- We'll be using the "Go" language
 - golang.org
 - Designed at Google in 2007
 - Goals: improve programming productivity in an era of multicore, networked machines, and large codebases
 - Kernighan (of 'C' fame) co-created
- Why?
 - Simple, readable, no mem allocation (similar to Python)
 - High-performance networking
 - Concurrency/parallelism
 - Static typing and efficient runtime
 - Industry-quality and deployed at massive scale



LAB/PROGRAMMING ASSIGNMENTS

Lab #	Lab "nickname"	Due date	Days out	Points	Summary
0	Welcome Lab	4/4/2025	3	0	Basic "get to know you" survey, Github username, #FinAid survey
1	Local varsort	4/8/2025	7	5	Introduction to Go by sorting data
2	IP address analyzer	4/15/2025	7	5	Writing a small utility to manipulate, analyze, and organize IP addresses and DNS names
3	Calculator protocol	4/22/2025	7	5	Introduction to sockets programming
4	Rate-limited file transfer	4/29/2025	7	5	Simple file transfer protocol implementation supporting rate limiting
5	Network varsort	5/6/2025	7	10	A variable-length distributed networked sort
6	RPC-based GlobeSort	5/13/2025	7	5	Introduction to gRPC and AWS by building a distributed sort that spans multiple AWS regions
7	TritonTube	5/23/2025	10	10	A service that stores videos (like Youtube) and serves them out via HTTP
8	Scalable TritonTube	5/30/2025	7	10	A scalable version of the video server project based on consistent hashing
9	Fault-tolerant TritonTube	6/6/2025	7	5	A fault-tolerant version of the video server project that stores metadata in a RAFT-enabled etcd cluster
				60	

This term we have pretty frequent, but shorter, labs, rather than a few big projects

COURSE GRADING BREAKDOWN

- Lab assignments: 60 points
- Midterm: 30 points
- Final exam: 60 points
- **Total: 150 points**
- *For labs, if you submit about 48+ hours early we will give you a preview of your grade on the coding part of the lab (details depend on the lab)*

Letter Grade	Range
A+	100% to 97%
A	< 97% to 94%
A-	< 94% to 90%
B+	< 90% to 87%
B	< 87% to 84%
B-	< 84% to 80%
C+	< 80% to 77%
C	< 77% to 74%
C-	< 74% to 70%
D	< 70% to 60%
F	< 60% to 0%

COURSE AT A GLANCE

Tue April 1: Intro, motivation, and logistics

Thu April 3: Go Programming Fundamentals

1. Introduction and Go basics
2. Reading and Writing Files in Go (Basic I/O)
3. Managing Structured Data with Custom Structs
4. Moving Data Between Memory and Disk
5. Passing Functions to Other Functions (Higher-order functions)
6. Summary and Q&A

Tue April 8: Fundamentals of Networking and Go's Net package

1. Protocols and layering
2. Addressing
3. Go's net Package Overview (IPs, Netmasks, and DNS)
4. Demo: Working with IPs, Netmasks, and DNS
5. Wrap-up/Q&A

Thu April 10: Establishing TCP Connections and Simple Client-Server Examples

1. TCP basics and connection lifecycle
2. Programming a TCP client in Go (Echo protocol)
3. Under the hood: OS system calls
4. Programming a TCP server in Go (Echo protocol)
5. Wrap-up/Q&A

Tue April 15: Sending and Receiving Data, Error Handling, and Practical Considerations

1. Data Transmission over TCP
2. Framing and Parsing
3. Advanced Concepts: Timeouts and error handling
4. Demo: Building a "Turing Award" protocol service
5. Wrap-up/Q&A

Thu April 17: Network performance metrics

1. Introduction to Network Performance
2. Deep Dive into Key Metrics
3. Measuring Performance Metrics with Go
4. Analyzing Performance Data: Statistics and Percentiles
5. Practical Considerations & Pitfalls
6. Wrap-up/Q&A

COURSE AT A GLANCE

Tue April 22: Introduction to RPC and gRPC Fundamentals

- 1. Introduction to RPC
- 2. gRPC Introduction
- 3. Working with Protocol Buffers (Protobuf)
- 4. Creating a Basic gRPC Server and Client in Go
- 5. Wrap-up and Q&A

Thu April 24: gRPC Concepts and Practical Usage in Go

- 1. gRPC Advanced Features (15 mins)
- 2. In-depth Streaming RPC Examples
- 3. Practical gRPC Server Design and Middleware
- 4. Integrating File/Data Handling with gRPC
- 5. Wrap-up/Q&A

Tue April 29: The HTTP protocol

- 1. Introduction to HTTP
- 2. HTTP Requests & Responses
- 3. Statelessness and Sessions
- 4. HTTP Tools & Inspection (Demo)
- 5. Wrap-up and Q&A

Thu May 6: Building Web Servers Using Go

- 1. Introduction to Web Servers in Go
- 2. Basic HTTP Server in Go (Demo)
- 3. Basic Web Server and Request Handling
- 4. Handling Requests and Responses
- 5. Handling Multipart File Uploads
- 6. Wrap-up and Q&A

Thu May 8: HTTP-Based Video Streaming with MPEG-DASH

- 1. Introduction to HTTP Video Streaming
- 2. Fundamentals of MPEG-DASH
- 3. Understanding DASH Manifests and Segments
- 4. Adaptive Bitrate (ABR) Streaming
- 5. Implementing Basic HTTP-based Streaming in Go
- 6. Wrap-up/Q&A

COURSE AT A GLANCE

Tue May 13: Introduction to SQLite and Go

1. Introduction to Databases & SQLite
2. Basics of SQL for Beginners
3. Using SQLite with Go
4. Practical Tips and Patterns
4. Wrap-up/Q&A

Thu May 15: Scaling Networked Services

1. Introduction to Scaling (Horizontal vs. Vertical)
2. Factors affecting scalability, metrics, and bottlenecks
3. Techniques for Scaling Networked Services
4. Practical Examples: Scaling Network Services with Go
5. Real-world Considerations and Challenges
6. Wrap-up/Q&A

Tue May 20: Locating and Scaling Data with Consistent Hashing

1. Introduction to finding "flat names"
2. Peer-to-peer (P2P) networks
3. Understanding Consistent Hashing (vs static hashing)
4. Practical Implementation: Consistent Hashing in Go (20 mins)
5. Wrap-up/Q&A

Thu May 22: Content Distribution Networks (CDNs) featuring Akamai

Tue May 27: Fault-tolerance

Thu May 29: Fault-tolerance (con't)

Tue June 3: Guest Lecture

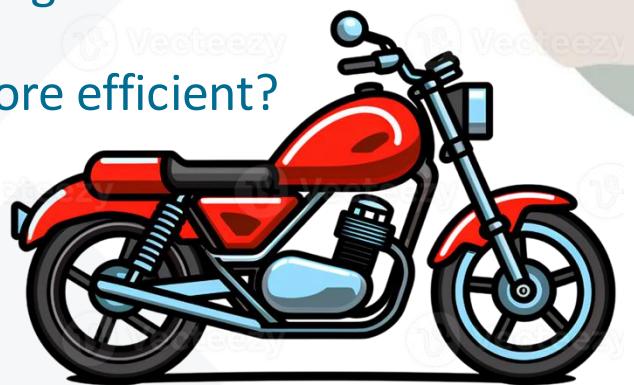
Thu June 6: Wrap-up and conclusions

THE ROLE OF AI/LLMS AND THIS CLASS

- Some material will only be covered in lecture, but most of what you'll learn will come from carefully working through the labs
- Really understanding the labs is the best way to study for a big chunk of the exams

A small analogy... running a marathon

- 26.2 mile run
- How to prepare?
 - Short runs, medium-length runs, longer runs
 - Lots and lots of running!
- But time consuming...
 - Why not be more efficient?



Efficiency!



- A motorcycle is just a tool
- It's used in industry a lot
 - E.g. for delivery drivers
- Can complete the task of traveling 26.2 miles in half an hour, not multiple hours like in running
- Leaves you extra time to do other things
- Work smarter, not harder
 - Right???

WHY THE DIFFERENCE?



The goal of the assignments is **not to produce some output/product**, but to **rewire your brain** with **new synapses** so that you've learned something new.

- If you outsource the thinking to AI/LLMs, you won't achieve that result!

THE ROLE OF AI/LLMS AND THIS CLASS

- You don't need to use AI/LLMs in this class
 - If you do, asking it for examples/APIs/usage of Golang or the Net package is probably OK
 - Having it generate code that you submit is not OK (and can lead to the “other” type of AI – academic integrity, so don't submit code you didn't write)
 - “Go for a walk rule”: If you ask it questions, take a break, go for a walk (or do the dishes, etc) before typing up your solution
 - Duplicate code generated from the same trained model is considered AIO
- You will need to be able to understand, manipulate, change, and modify Golang code similar to the labs during the exams, and you won't have AI or any electronic devices, so make sure you understand what you're submitting

COMPUTING RESOURCES

- You can use the lab computers in the building, or the “ieng6” servers that can be accessed via ssh
- ssh <username>@ieng6.ucsd.edu
- You will receive an Amazon AWS cloud account you will need to use for at least one of the projects (but can use it for all the projects)
 - \$10/term/student
 - No credit card needed—sign up via UCSD (If you are asked for a credit card, STOP, and ask for help)

TODO

1. Go to Canvas and do lab 0 “Welcome survey”
2. Start Lab 1

UC San Diego