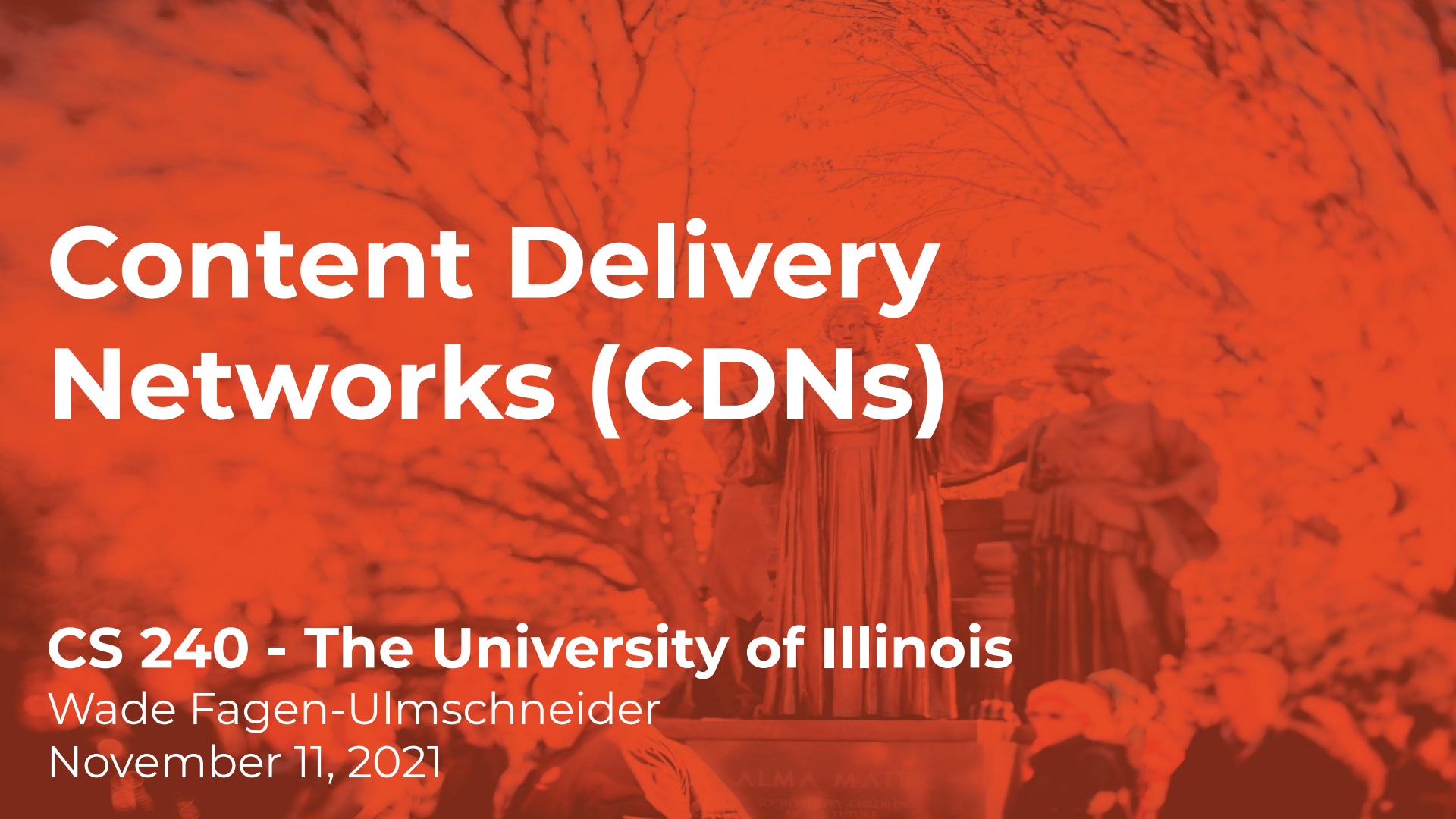


Content Delivery Networks (CDNs)

CS 240 - The University of Illinois

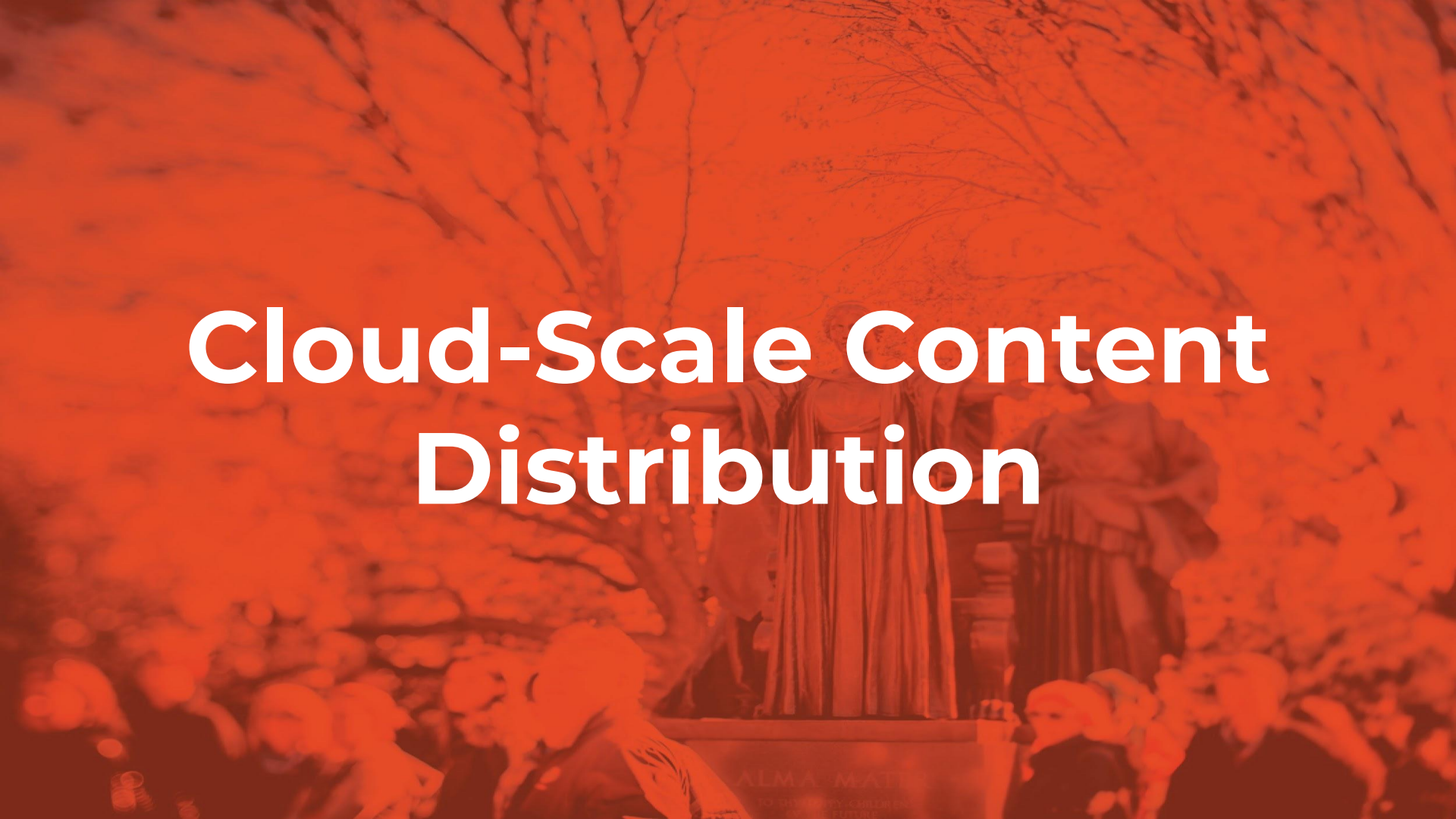
Wade Fagen-Ulmschneider

November 11, 2021

Project MIX

The final project for CS 240 this semester is a course-wide microservice called “Project MIX”.

Project MIX



Cloud-Scale Content Distribution

DNS Translation

As we deploy to a cloud-scale, there are three different types of content we need to deliver:

Static Content:

Universally Rendered Content:

Dynamic Content:

Example

The University of Illinois at Urban

reddit.com/r/UIUC/

reddit r/UIUC Search Reddit Free wadefagen 10.7k karma 1.1k

The University of Illinois at Urbana-Champaign

Joined

r/UIUC

Posts Wiki

Create Post

Hot New Top

109	Sticky	Reminder - the spam filter is a little too aggressive and flags a lot of posts that it shouldn't	Posted by u/Shifted-Paradigm . 8 months ago	1
Vote	Social	You've Got To Be Kidding!	i.redd.it/pwrvx7... Posted by u/TomatoSmoothy 1 hour ago	1
186	Other	Where is the DQ in the Altgeld	Posted by u/Dr_Wdnmd 17 hours ago	31
11	Social	FREE THANKSGIVING DINNER (OPEN TO ANYONE)	i.redd.it/z5amkv... Posted by u/Minorities4MutualAid 3 hours ago	1
78	Shitpost	nsfw	Posted by u/LeaveDismal4756 16 hours ago	13
69	Other	Nasty grainger	Posted by u/hbcharlie23 Not ECE 16 hours ago	8
67	Shitpost	Just took an exam in Altgeld	Posted by u/Ltothe4thpower trying my best 17 hours ago	9
234	Shitpost	Even though I never touched a book here rip ugl	i.redd.it/7tm94p... Posted by u/6prometheus7 CS+Philosophy'23 1 day ago	51
25	Shitpost	need help to scare my roommate into using our private gym in our building instead of him working out in his room	Posted by u/CountryPrestigious25 12 hours ago	5
36	Social	a little baking self promo (:	Posted by u/xtckai 15 hours ago	8
47	Shitpost	Be honest: who else failed no nut November?	Posted by u/pizzzaislove 17 hours ago	9

About Community

This subreddit is for anyone/anything related to UIUC. Students, Alumni, Faculty, and Townies are all welcome. Given the lack of a regional subreddit, it also covers most things in the Champaign-Urbana area. This subreddit is not sponsored or endorsed by the University of Illinois or any other on-campus group.

61.4k Illini

453 Online

Created Aug 7, 2008

Create Post

USER FLAIR PREVIEW

wadefagen waf

COMMUNITY OPTIONS

Filter by flair

Sticky Social Other Shitpost Academics Housing

Content Delivery Networks (CDNs)

Motivation

Does the user need to visit our server for content that is served to all users?

- If not, what service could we rent?

Motivation

- What advantages can we get by renting caches?

Content Delivery Networks (CDNs)

A Content Delivery Network (CDN) is a system of many servers physically located in geographically diverse locations.

- All CDNs must have a source for the content. This source is known as the _____.

- All CDNs have many caches called _____.

Content Delivery Networks (CDNs)

- Once the data from the origin is in the CDN cache, the CDN can serve this content. There are five key benefits!

1.

2.

3.

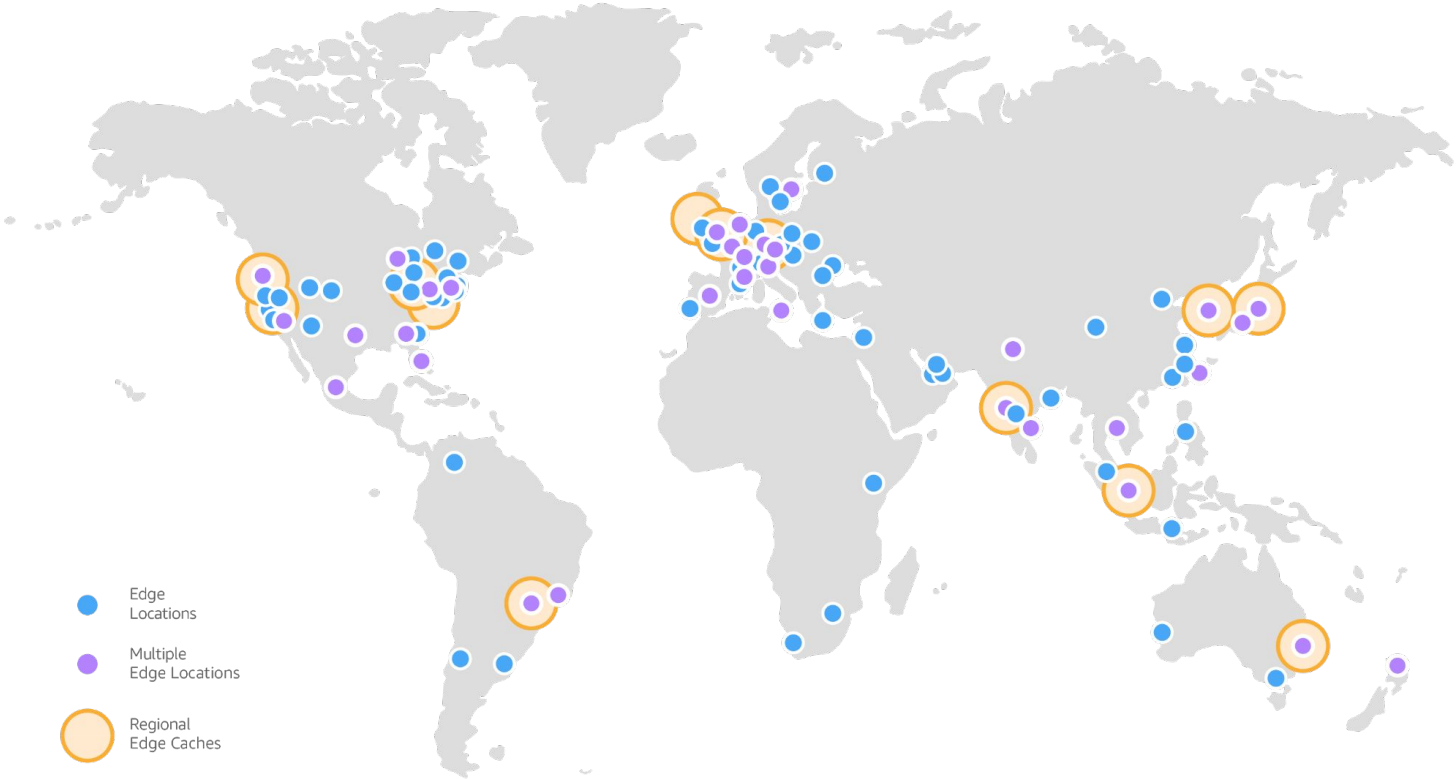
4.

5.

Geographical Locations of Edge Servers

https://www.cloudflare.com/network/

Geographical Locations of Edge Servers



https://aws.amazon.com/cloudfront/features/

Technical Details of CDNs within DNS

DNS lookup for **cs.illinois.edu** (complete cache miss):

(1): Ask the **root name server** for the NS records for “edu.”

⇒ IP address for the **TLD name servers** for “edu.” returned.

DNS lookup for **cs.illinois.edu** (complete cache miss):

(1): Ask the **root name server** for the NS records for “edu.”

⇒ IP address for the **TLD name servers** for “edu.” returned.

(2): Ask a **“edu” TLD name server** for the NS records for “illinois.edu.”

⇒ IP address for the **SLD name servers** for “illinois.edu.” returned.

DNS lookup for **cs.illinois.edu** (complete cache miss):

(1): Ask the **root name server** for the NS records for “edu.”

⇒ IP address for the **TLD name servers** for “edu.” returned.

(2): Ask a **“edu” TLD name server** for the NS records for “illinois.edu.”

⇒ IP address for the **SLD name servers** for “illinois.edu.” returned.

(3): Ask a **“illinois.edu” SLD name server** for the NS records for “cs.illinois.edu.”

⇒ IP address for the **sub-domain name servers** for “cs.illinois.edu.” returned.

DNS lookup for **cs.illinois.edu** (complete cache miss):

(1): Ask the **root name server** for the NS records for “edu.”

⇒ IP address for the **TLD name servers** for “edu.” returned.

(2): Ask a **“edu” TLD name server** for the NS records for “illinois.edu.”

⇒ IP address for the **SLD name servers** for “illinois.edu.” returned.

(3): Ask a **“illinois.edu” SLD name server** for the NS records for “cs.illinois.edu.”

⇒ IP address for the **sub-domain name servers** for “cs.illinois.edu.” returned.

(4): Ask a **“cs.illinois.edu” sub-domain name server** for the A (or AAAA) records for “cs.illinois.edu.”

⇒ **IP address for web server** for cs.illinois.edu returned.

Q: Could we program a specific DNS server that was geographically aware to return different data?

...what should the TTL of these A records be?