

@home in the Cloud

WPCampus Online 2018



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Senior Web Developer
USC ITS Web Services

#AtHomeInTheCloud
<http://bit.ly/2Fqe1QC>

Big Shout Out

None of this project was possible
without my colleague James Hong

What if...

There were tornadoes... with sharks!!



When sharks start raining on LA

We suddenly have...

- Over 50,000 people trying to access our Homepage
- Communications trying to post updates to two versions of CMS admins
- All while possibly fighting off sharks!

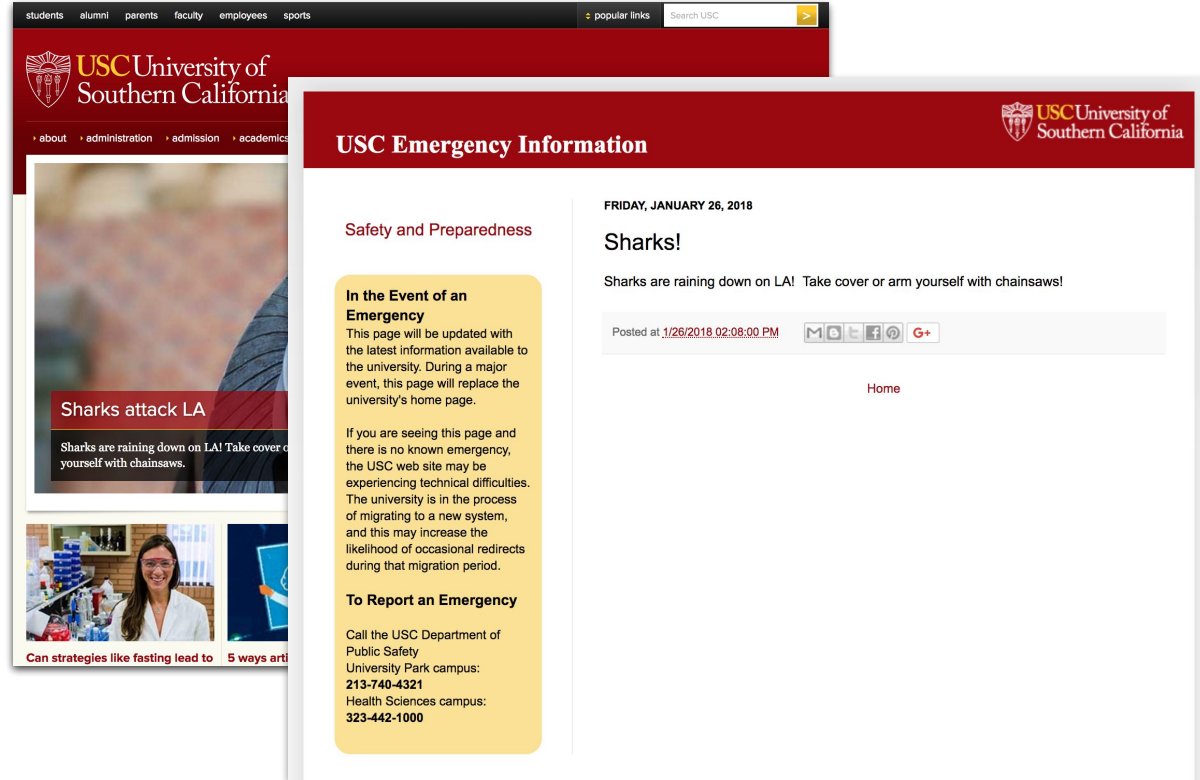
So why would we change anything?

In an emergency, we needed the following

1. Mitigation for huge traffic spikes in both emergency and non emergency cases
2. Ability to use emergency messaging and visual presentation of messaging
3. Technical stability

A Major Emergency


Our Emergency Blogger
page would take over the
Homepage.




A minor notice

A featured story or news story would announce the alert.

[students](#) [alumni](#) [parents](#) [faculty](#) [employees](#) [sports](#) [popular links](#)


 **USC** University of Southern California

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Sharks attack LA


Sharks are raining down on LA! Take cover or arm yourself with chainsaws.




Can strategies like fasting lead to



5 ways artificial intelligence will



How exercise can boost the



Explore USC

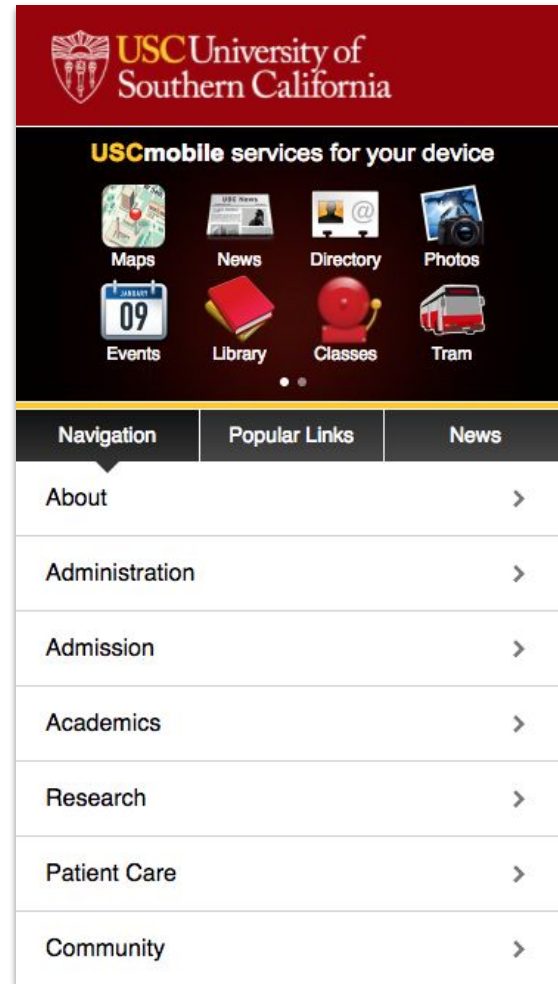
Everything works, right?

- The complete publishing environment was so complicated that only a few people knew how it fully worked
- Unless it was an Emergency site takeover, the updates blended into the content
- The primary editors used
 - WordPress for all other sites
 - Older CMS for the Homepage
 - Blogger for the Emergency site

And then there was mobile

There were no emergency notifications on mobile.

If you are running from a shark, you are probably not getting updates on a laptop.



We needed to get messages out faster

Sharks wait for no one

Primary Criteria

UX and Design

- Responsive Homepage
- Emergency notifications on Homepage
- Update the Emergency site branding

Administration and Usability

- Migrate to WordPress from older CMS

Security and Technical Considerations

- Resilient and scalable for traffic spikes
- Decrease load time
- Move application to the Cloud

Considerations

Security and Technical Considerations

- Moving our www to AWS
- 301 redirects (over 1,000)
- Authentication for admin users
- Traffic
 - Averaging just under 1MM views per month for our Homepage
- Scaling
 - How do we autoscale for planned and unplanned traffic spikes
- Are we exposing ourselves to security issues?

Implementation

- Do we have the resources?
 - Current projects
 - Maintenance
 - New initiatives
- Do we have the skill sets needed?
 - Do we develop this in WordPress?
 - Do we create a Single Page App (SPA)?

How did we choose *AWS*?

Vendor Decision

- Why not use a third party WordPress vendor?
- There are plenty of great choices available
- In fact, we submitted RFP's to several WordPress vendors

There was one deciding factor for AWS

“We just signed a contract with AWS and we should really use them”

OK, we have a vendor

Now what?

How do we do this?

- How are we going to set up WordPress in AWS?
- What about our security setup for the admin?
- What about the redirects, how will we handle those?
- Are we thinking of moving our DNS to Amazon?
- A lot of questions ensued...

Discovery

- What options do we have within AWS?
- You can host a traditional WordPress environment in AWS
- However, since we were moving www to the platform:
 - Redirects were going to ramp up costs quickly
 - We had to build all large instances of services to handle normal traffic and spikes

Phased Approach

We needed to break up our project into phases.

There were just too many other items running simultaneously:

- Client projects
- Maintenance
- Day-to-day operations
- Stocking shark repellent

Phase I

We had this idea

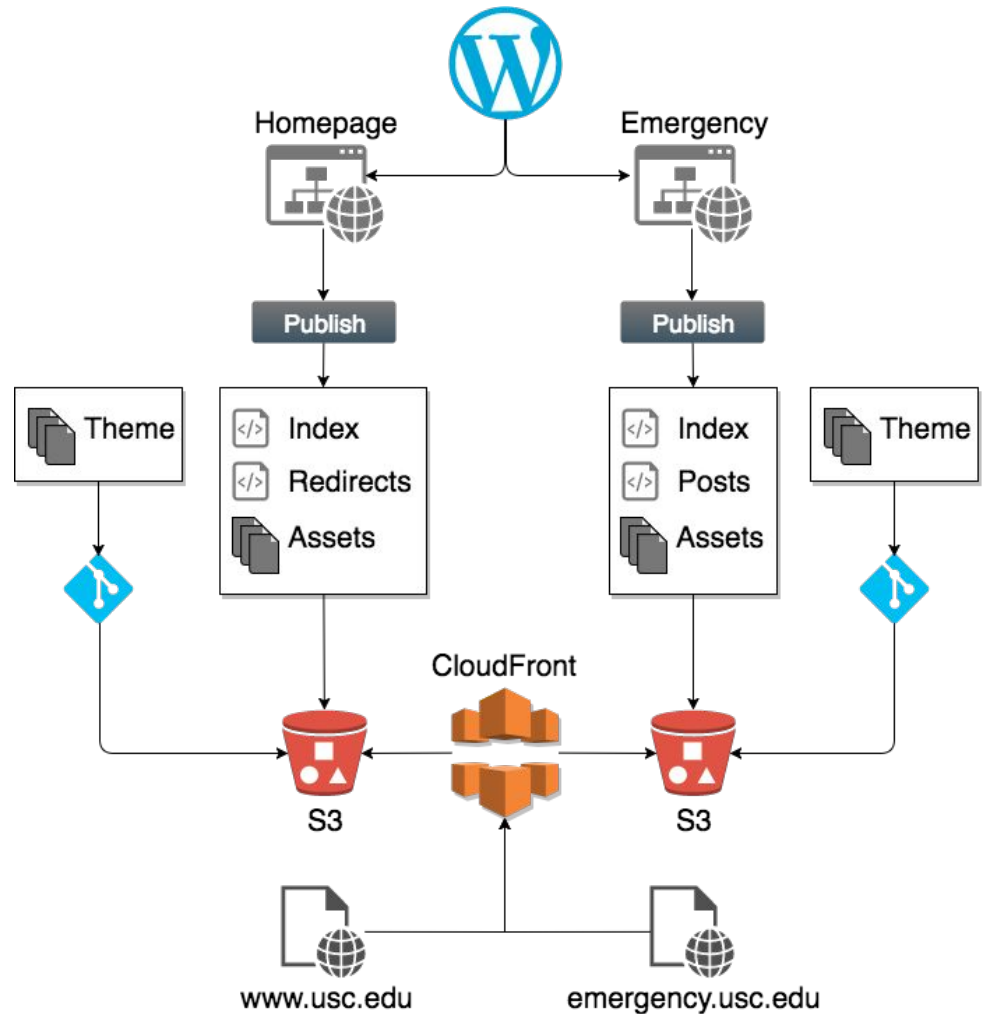
What if we made everything static in AWS S3?

- It's fast
- It doesn't expose the admin so it's secure
- It's available in multiple regions and zones

And that's what we did

Publishing Workflow

When ready, an admin publishes content to AWS S3 buckets.



It works!

We launched in May of 2017

But did it make a difference?

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USC University of Southern California

USCmobile services for your device

Maps
 News
 Directory
 Photos

Events
 Library
 Classes
 Tram

Navigation Popular Links News

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Administration >

Admission >

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Research >

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Sharks attack LA

Sharks are raining down on LA! Take cover or arm yourself with chainsaws.

Menus

Illustration/iStock; Diana Mollada

< Millennials and mortgages? >

They're moving less and **buying homes later** — if at all. When it comes to real estate, millennials are very different from the generations before them.

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USC Emergency Information



FRIDAY, JANUARY 26, 2018

Safety and Preparedness

In the Event of an Emergency

This page will be updated with the latest information available to the university. During a major event, this page will replace the university's home page.

If you are seeing this page and there is no known emergency, the USC web site may be experiencing technical difficulties. The university is in the process of migrating to a new system, and this may increase the likelihood of occasional redirects during that migration period.

To Report an Emergency

Call the USC Department of Public Safety
University Park campus: 213-740-4321
Health Sciences campus: 323-442-1000

Sharks!

Sharks are

Posted at



about administration admission academics research patient care community arts



Can strategies like fasting lead to... 5 ways artificial intelligence will... How exercise can boost...

Emergency Information



Shark tornadoes in LA!

USC is urging everyone to take shelter

Edit

TO REPORT AN EMERGENCY

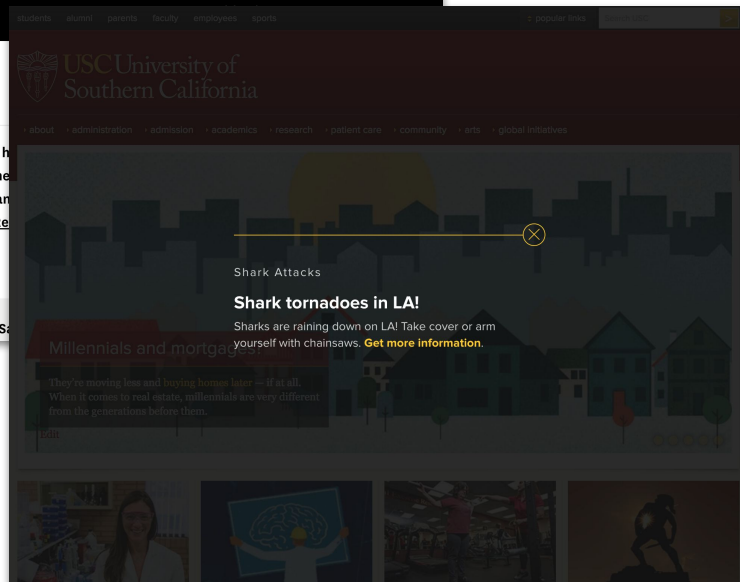
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Shark Avoidance

If you are near a tornado of sharks or sharks are h...
first step is to take shelter! Do not try to fight the...
you feel like you've had enough of these sharks an...
please band together and form posse's and try Re

Text Alerts

Mobile S



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FRIDAY, JANUARY 26, 2018

Sharks!

Sharks are raining down on LA! Take cover or arm yourself with chainsaws!

Posted at 1/26/2018 02:08:00 PM



[Home](#)

Emergency Information



! Shark tornadoes in LA!

USC is urging everyone to take shelter

[Edit](#)

TO REPORT AN EMERGENCY

Call the USC Department of Public Safety

University Park Campus: **213-740-4321**

Health Sciences Campus: **323-442-1000**

Shark Avoidance

If you are near a tornado of sharks or sharks are hunting you down. The first step is to take shelter! Do not try to fight the sharks on your own. If you feel like you've had enough of these sharks and want to fight back – please band together and form posse's and try [Read more](#)

POSTED: 2:41 PM
Friday, January 26

[Edit](#)

[Text Alerts](#)

[Mobile Safety App](#)

[Safety Tips](#)

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Administration and Usability

Migrate to WordPress from older CMS

Security and Technical Considerations

Resilient and scalable for traffic spikes
Decrease load time
Move application to the Cloud

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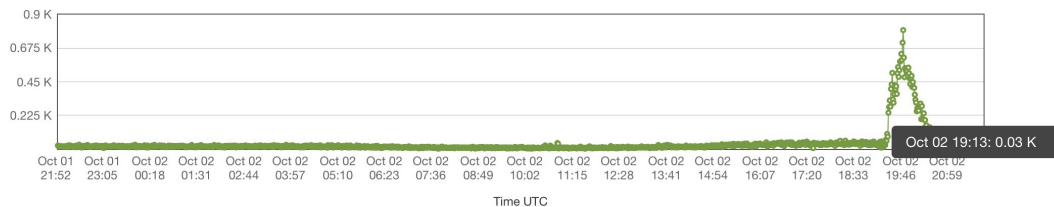
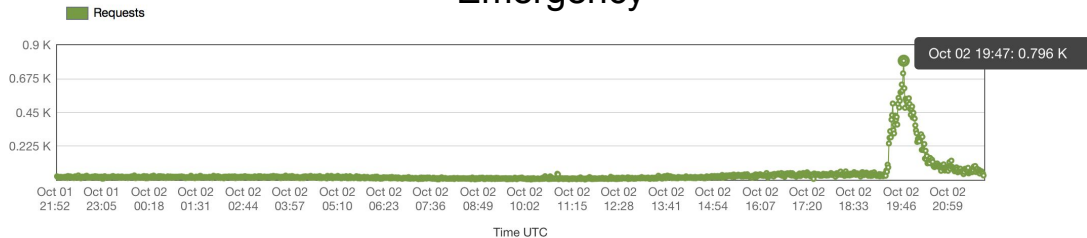
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Emergency Incident

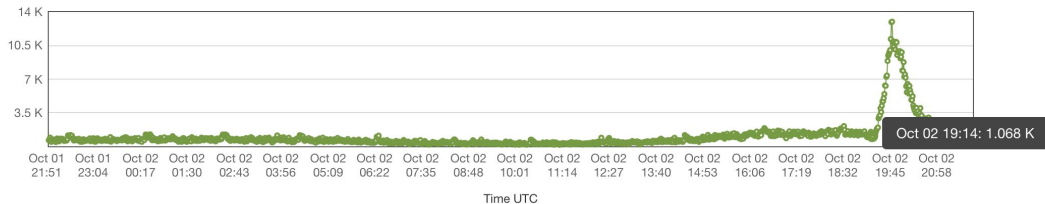
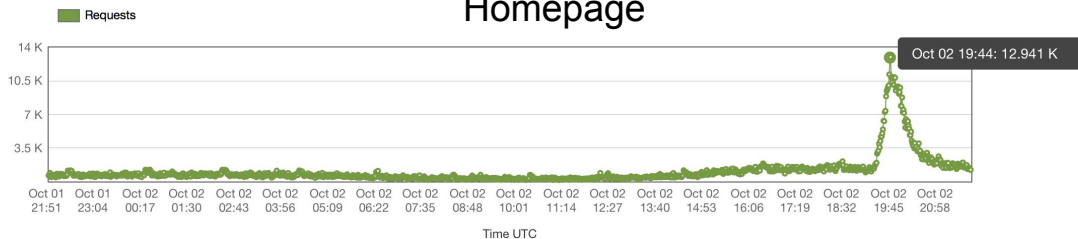
USC experienced an incident that turned out to be a false report (whew!).

During that period we experienced a traffic spike with no outage or reduction in speed of our pages.

Emergency



Homepage



1,000+%

Homepage Traffic Increase

2,500+%

Emergency Traffic Increase

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Security and Technical Considerations

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Speed Tests



** Additional requests were adding the Emergency feeds, additional features, scripts, and images in the footer.*

	Original	Refactored	AWS
Speed Index	2380	2200	1295
First Interactive Byte	> 3.276	> 2.498	>0.774
Fully Loaded	4.141	2.816	1.725
Requests	50	25	*41
Bytes	1470	852	846
First Byte Time	A	A	A
Keep-alive Enabled	A	A	A
Compress Transfer	F	F	A
Compress Images	F	F	A
Cache Static Content	F	F	B
Effective use of CDN	X	X	✓

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Administration and Usability

- ✓ Migrate to WordPress from older CMS

Security and Technical Considerations

- ✓ Resilient and scalable for traffic spikes
- ✓ Decrease load time
- Move application to the Cloud

Remember the Phased Approach...

- After research and prototyping, we knew that we couldn't do all of it
- We put WordPress on our internal VM's and used the instance to publish the content and assets to AWS
- Allowed us to get the public facing view on AWS much quicker

Primary Criteria

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Administration and Usability

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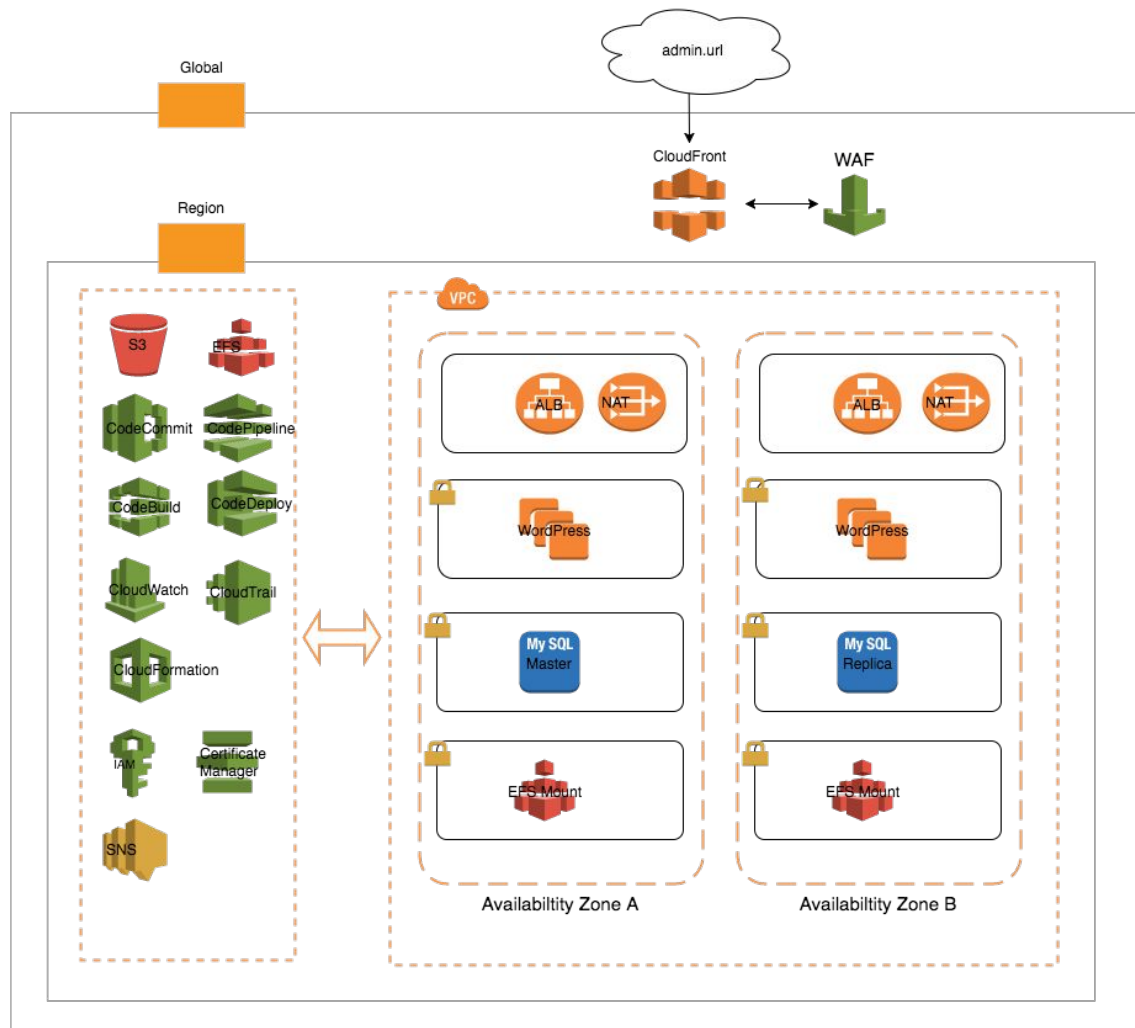
Security and Technical Considerations

- ✓ Resilient and scalable for traffic spikes
- ✓ Decrease load time
- ✗/✓ Move application to the Cloud

Phase II

In Progress

WordPress in AWS



We are nearly there!

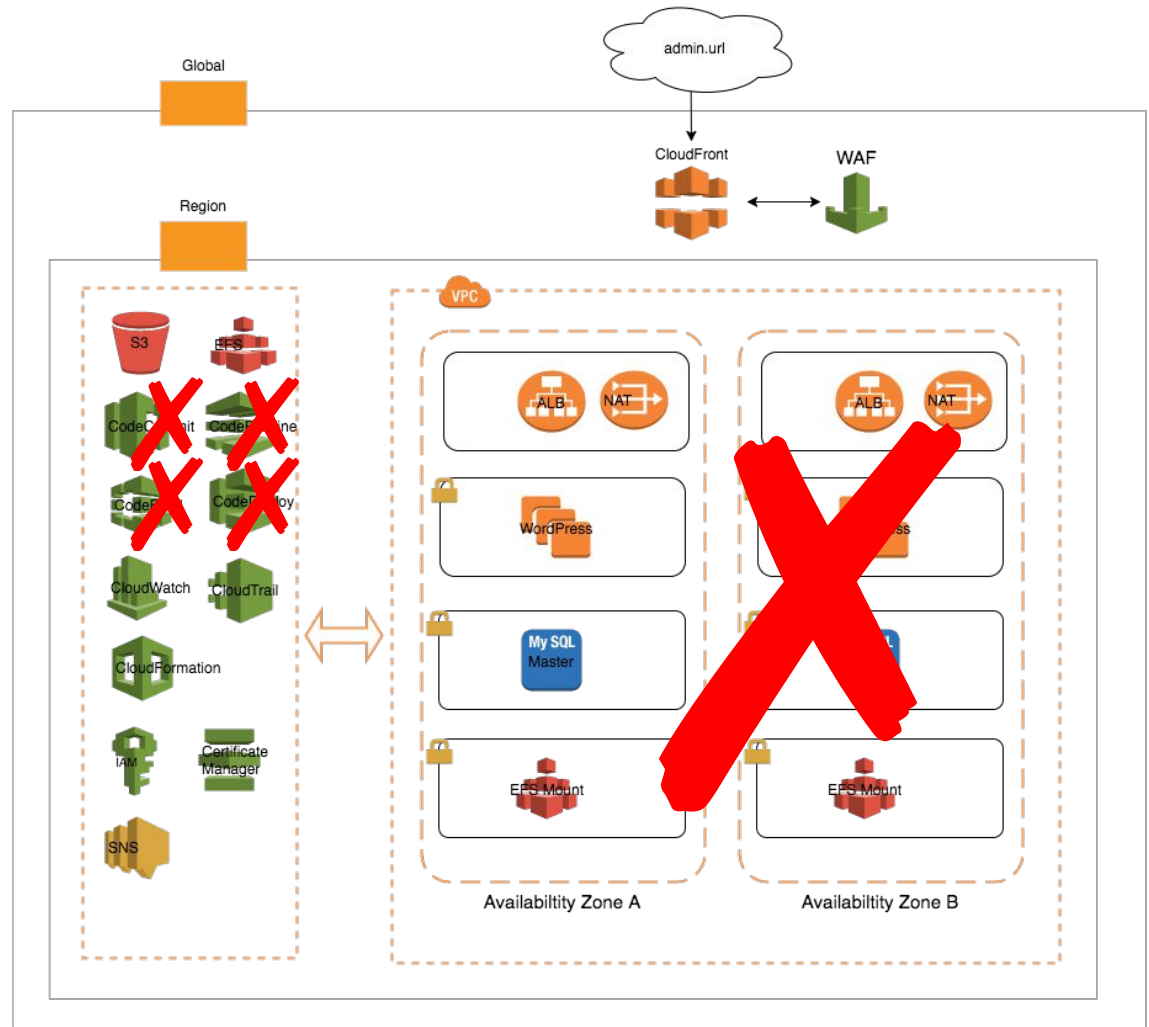
But then...

*“Departmental
decision to
standardize
development by
using Docker for
projects”*

This was just a different approach

- Amazon Machine Images (AMI) are like VM's in AWS
- They are optimized to run in AWS
- They also have their issues with maintenance and bug creep
- Docker segments the build into individual containers
- This may be a good thing

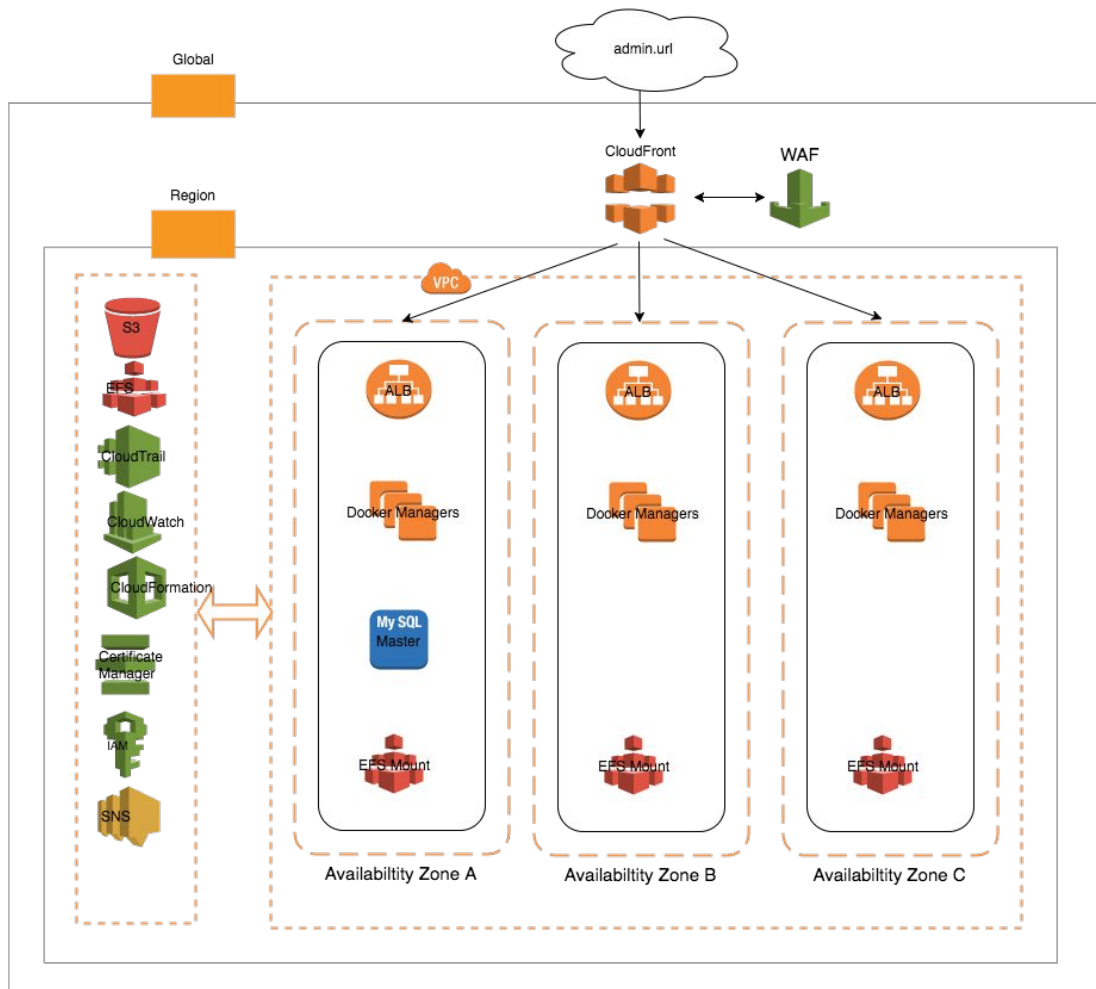
WordPress in AWS



WordPress in AWS

*Now with
Docker!*

*Continuous Integration and Continuous
Delivery/Deployment in prototyping
phase*



What did we learn?

AWS Discoveries

- AWS isn't a one size fits all approach
- Your traffic matters for your AWS setup if implementing a traditional stack
 - Provisioning EC2 instances
 - Provisioning database instances
- There are restrictions to putting your site in S3
 - URL endpoints are not dynamic
 - /dynamic-category-name/post-name becomes
 - /posts/post-name

Takeaways

- Determine what you want from AWS
 - Full stack?
 - SPA?
- A phased approach allowed us to release updates more quickly
- Your project shouldn't have an end but an enhancement delivery program
- Having a CI/CD architecture allows you to iterate and address issues and requests

Disclaimers

- We are not affiliated with AWS
- We are not perfect
 - If you see this and think “there’s a better way” - great! Please let us know!

One final note

Not all sharks are bad

COME IN AND PLAY



THE WATER IS BEAUTIFUL

Thank you

@troutacular



Jason Cauwels

@troutacular

#AtHomeInTheCloud

<http://bit.ly/2Fqe1QC>