Drupal GovCon 2020

Dealing with unprecedented scale during Covid-19

Sean Hamlin :: September 2020

I/O amazee.io

About me



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Passionate about making awesome solutions to solve complex business problems. Based primarily in Wellington, and working with some of amazee.io's most strategic customers in region and globally.

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Thanks!





Agenda

- Overviews in 1 minute
- Covid-19 and what this meant
- Covid-19 by the numbers
- Horizontal scaling
- Database sizing, scaling and tuning
- In memory caching
- Minimising origin hits
- CDN tuning
- Why should you care

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Amazee.io in 1 minute



amazee.io is a fully-remote team of open source hosting experts, globally distributed to work 24/7 keeping our customers' websites and applications running smoothly at all times!



About amazee.io

Fully Managed Hosting based on Lagoon

- Host anything, anywhere in the world
- 24x7 chat-based support from Senior Systems Engineers
- Global team in all major time zones
- Everything open source; full stack visibility and configurability
- Committed to transparency
- Global enterprise clients including governments, healthcare, financial services, and education
- Trusted security, support, and partnership model



GovCMS in 1 minute



GovCMS



GovCMS in 1 minute

- Managed by the Dept of Finance Australia
- Drupal hosting for **Federal**, **State** and **Local Government** in Australia
- Salsa Digital and amazee.io as technology partners
- Running in production since January 2015
- **329** sites live as of today, all shapes and sizes
- SaaS (BYO theme only) and PaaS (BYO codebase) models
- Security accreditation done at a platform level and SaaS has application level as well
- See <u>Platforms, Platforms, Multisites, and Platforms</u> by John and Adam earlier today for a better overview on platforms and Drupal

Disclaimer





Disclaimer

Jargon buster

- I will mention Amazon Web Services (AWS)
- I will mention Kubernetes and containers

No pre-existing knowledge is required, I will explain core concepts using weird metaphors.



Covid-19 and what this meant





Covid-19 and what this meant for GovCMS

Several GovCMS sites impacted by Covid-19:

- **Health related sites** (e.g. <u>https://www.health.gov.au/</u> this is the authoritative source of all Covid-19 information in Australia)
- Travel related sites (e.g. <u>https://www.smartraveller.gov.au/</u>)
- **Government payments sites** (e.g. Job seeker payment on <u>https://www.servicesaustralia.gov.au/</u>)



187,000 concurrent visitors

in Google Analytics for GovCMS SaaS

100,000 pageviews

on the peak minute for GovCMS SaaS following a nationwide push notification

8.4 TB bandwidth

on the peak day

80x traffic March vs February

pageviews increase in Google Analytics for one site

Covid-19 by the numbers (Google Analytics pageviews by site by month)



Horizontal scaling





Horizontal scaling

Being able to increase application resources in response to traffic. Ideally this happens in an automated fashion

• In Kubernetes, this is done by an **Horizontal Pod Autoscaler** (HPA) and a **Cluster Autoscaler** (CA)

Horizontal Pod Autoscaler (HPA) explained with supermarket shopping

Checkout supervisor

Minimum number of checkouts open



Horizontal Pod Autoscaler (HPA) explained with supermarket shopping



Horizontal Pod Autoscaler (HPA) explained with supermarket shopping



Cluster Autoscaler (CA) explained with supermarket shopping





Horizontal scaling

- Development of a new "Covid HPA"
 - 4 pod minimum
 - **12 pod maximum**
 - Much faster scaling
- **Daily reviews** of the HPA for Covid impacted sites
- Reduce "pod flapping", and ensure there is headroom

HPA in real life



Database sizing, scaling and tuning





Database sizing, scaling and tuning

- So you scaled your application layer, for those that do not know,
 Drupal loves Database queries
- You can run a database in a pod, but this is often a poor life choice
- Sunil did another session today <u>Drupal Hosted on Kubernetes</u> which you should check out
- AWS' Relational Database Service (RDS) Aurora was used
 - Many features over regular MySQL, one of those features being faster failovers with no data loss

RDS upsize strategy



RDS upsize strategy - upsize reader first



RDS upsize strategy - failover writer



RDS upsize strategy - upsize new reader







Database sizing, scaling and tuning

- Able to fully upsize the RDS cluster in around 15 minutes end to end
- Minimal failed queried, typically < 50 in total in a 30 second period
- When ended up upsizing Services Australia **twice** (so 4 times as large) in 2 days
AWS performance insights (sad)

Database Load

Current Activity Measured in Average Active Sessions (AAS)



AWS performance insights (happy)

Database load

Current activity measured in average active sessions (AAS)

Show max vCPU



AWS performance insights (pro tip)

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AWS performance insights (1 hour)

Database load

Current activity measured in average active sessions (AAS)

Show max vCPU



AWS performance insights (5 minute)

Database load

Current activity measured in average active sessions (AAS)

Show max vCPU



In memory caching





In memory caching

• Drupal also **loves to cache things**, and the database does not make a great cache system at scale

Introducing Redis





In memory caching

- We have 2 options for Redis
 - Redis pod (not Highly Available, Single Point of Failure)
 - AWS Elasticache (Highly Available, replicated across many Availability Zones)
- When is it time to not use a pod
 - You require High Availability
 - 60 MB/sec traffic
- Ensure you configure a redis timeout

Minimising origin hits





Minimising origin hits

- Even better when it comes to scaling is to never have to generate the pageview on origin and rely on the CDN instead
- Elasticsearch and Kibana
- Site health dashboard
- Example dashboard
- Sum origin responses by PHP time
- Example screenshot

• HTTP status codes



- HTTP status codes
- Top 404s by path



• HTTP status codes

• Top 404s by path

• Pod scaling



• HTTP status codes

• Top 404s by path

- Pod scaling
- Top requests by path and method



- HTTP status codes
- Top 404s by path
- Pod scaling
- Top requests by path and method
- Top requests by path and method, sort by PHP time aggregate

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CDN tuning





CDN tuning

- Critical to the success of the program. You need a major player.
- DDoS protection
- WAF and bot management
- Serve while stale (e.g. 500s)
- Negative caching (e.g. 404s)
- Background refresh
- Drupal 8 and Cache tag invalidation
- Next best alternative (static fallback)

Building a culture of continuous improvement (Kaizen)





Kaizen

Build Measure Learn **1/0**



Building a culture of continuous improvement

- How high can you get the Cache Hit Rate?
- What requests are using your backend resources you can avoid?
- When was the last time you reviewed your slow query log?
- What are the top 404s on the site, and can they be avoided?
- What version of PHP are you running, can you move to PHP 7.4?
- Are you using cache tag purging?
- When was the last time you reviewed which cache tags are in the block list?
- You should encourage your team to find ways to improve the platform
- You are never done, just on the journey

Building a culture of continuous improvement

1.01³⁶⁵ = 37.8

just 1% better every day adds up over time

Why should you care



Quote from Services Australia

It meant we were able to supply information to the public during a pandemic with no outages. This supported real people and their ability to care for themselves and their families."

Susie Smith, General Manager, Communications Division, Services Australia.





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