

Scaling WordPress for the world and on a (relatively small) budget

Alan Lok

WordCamp Ottawa - May 2014

Who is Alan?

- ✧ Presently:
 - ✧ Principal at WirelessLinx Inc.
 - ✧ Technical advisor for start-ups such as Kiinzel
 - ✧ Co-own a music school



Ryan M. Baillargeon

February 21, 2013 



PLEASE HELP!

I need an experience drupal guru / systems admin (installing and configuring drupal) to assist me over the next 5 days as helpdesk support while I get a site up and running. Will pay good \$\$\$.

Please forward to anyone you know with this expertise!

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It started like this...

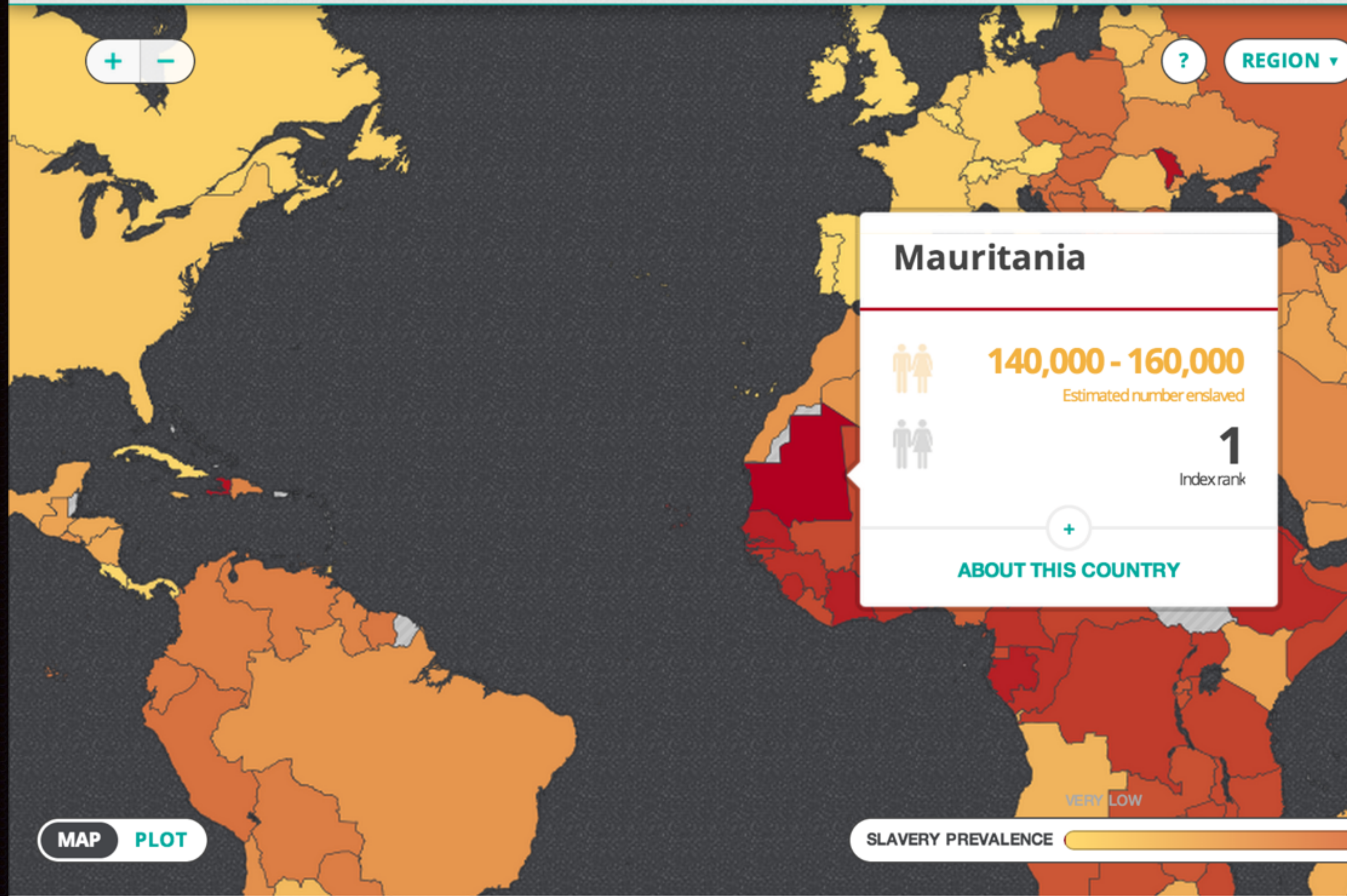
a plea from my good high school friend

The mandate

- ✦ GrassRiots called and needed to release a WordPress site in 2 days, and mentioned that it needed *scaling*
- ✦ Must be deployed in multiple continents while making it editable live
- ✦ The deadline is *firm*. GrassRiots' client already had PR lined up!

THE GLOBAL SLAVERY INDEX 2013

EXPLORE ABOUT FINDINGS



WATCH THE VIDEO

PLAY THE GAME

TAKE ACTION

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SLAVERY IS NOT A GAME

430,558 have emailed Nintendo asking them to take credible steps to ensure slave-mined minerals are not in their gaming consoles -- and Nintendo has not responded with action.



ENGLISH ESPAÑOL BAHASA INDONESIA PORTUGUÊS WIKANG TAGALOG

ABOUT LEARN MULTIMEDIA CONTACT

WALK FREE IS A MOVEMENT OF **5,537,737** PEOPLE EVERYWHERE, FIGHTING TO END ONE OF THE WORLD'S GREATEST EVILS: MODERN SLAVERY.

WalkFree.org will protect your [privacy](#) and keep you up to date on this and other campaigns.

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HOME SECRETARY: HELP END CHILD TRAFFICKING IN THE UK





ACT NOW >




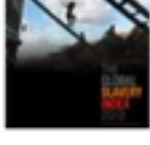
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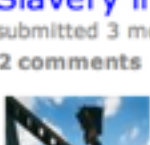
reddit GLOBALSLAVERYINDEX.ORG hot new rising controversial top


1 4  **TIL That the USA still has between 57,000 - 63,000 estimated number of enslaved people today.** (globalslaveryindex.org)
submitted 14 days ago by NiagaElRei to todayIlearned
12 comments share


2 6  **Global Slavery Index, a website designed to inform you about human trafficking (U.S. has 57-63K slaves currently)** (globalslaveryindex.org)
submitted 1 month ago by tylerkansas to socialwork
2 comments share

3 5  **Global Slavery Index 2013 - Findings (published October 17th)** (globalslaveryindex.org)
submitted 3 months ago by Beriah to worldpolitics
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4 2  **Global Slavery Index 2013 - Findings (published October 17th)** (globalslaveryindex.org)
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5 7  **Slavery in the Philippines** (globalslaveryindex.org)
submitted 3 months ago by EdGG to Philippines
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6 45  **Global Slavery Index** (globalslaveryindex.org)
submitted 3 months ago by OutThisLife to InternetIsBeautiful
4 comments share

7 12  **Global Slavery Index 2013 [Walk Free Foundation]** (globalslaveryindex.org)
submitted 3 months ago by ADavidJohnson to dataisbeautiful
1 comment share

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▲ New global index exposes 'modern slavery' worldwide (bbc.co.uk)
29 points by xan92 95 days ago | comments


▲ rurounijones 95 days ago | link
I looked at their FAQ but even with their answer to "How did the researchers define modern slavery when they were estimating prevalence country by country?" I cannot parse if they should count people in US Prisons that are forced to work on things like license plates and cleaning beaches of oil spills (among other things.)(1)
I wonder what the US ranking would be then.
[1] <http://www.globalresearch.ca/the-prison-industry-in-the-unit...> Any linguistic-types care to have a shot?
(Sorry if this is construed as an anti-US post. It was just something that stood out to me since I read that article recently)

▲ vacri 95 days ago | link
"Slavery" refers to the condition of treating another person as if they were property – something to be bought, sold, traded or even destroyed.
Prisoners in the US aren't treated as property. Not to say they aren't mistreated, but they're generally not considered to be a commodity.

▲ rurounijones 95 days ago | link
I am not entirely sure.
Some of the quotes like: "there won't be any transportation costs; we're offering you competitive prison labor (here)."
Private prisons and opening of new prisons in counties so that they can get prisoners assigned to them and a "share of the profits" undermines that stance somewhat in my mind.
It is tricky because there are aspects of their situations which match the list of "slavery" factors but are because they are convicted criminals serving their sentences so should be discounted.
It is the splitting of punishment for crime vs coerced labour which is difficult.

▲ hawleyal 95 days ago | link
Split a few hairs there.

▲ binarymax 95 days ago | link
I came to say this as well, and I don't consider it anti-us...it is simply fact. But what percentage of the 2 million incarcerated adults are...

 Oct 17, 2013 - A **Global Slavery Index** has been released which shows the number of ... Nick Grono told the French news agency Agence France-Presse.

[BBC News - New global index exposes 'modern slavery' worldwide
www.bbc.co.uk/news/world-24560937](http://www.bbc.co.uk/news/world-24560937) ▼

Oct 17, 2013 - Nearly 30 million people around the world are living as **slaves**, according to a new **index** by the Walk Free Foundation, ranking 162 countries.

[Thirty million people are slaves, half in India: survey - Yahoo News
news.yahoo.com/thirty-million-people-slaves-half-india-survey-2317108...](http://news.yahoo.com/thirty-million-people-slaves-half-india-survey-2317108...) ▼

Oct 16, 2013 - From Yahoo **News**: By Timothy Large LONDON, Oct 17 (Thomson ... The **Global Slavery Index** 2013 defines slavery as the possession or ...

[Map: Global Slavery Index finds 29.8M people locked in forced ...
www.cbc.ca/news2/interactives/global-slavery-index/](http://www.cbc.ca/news2/interactives/global-slavery-index/) ▼

Global Slavery Index: 29.8M people locked in forced labour. Haiti, Pakistan have highest prevalence of slavery. **CBC News**. Oct. 18, 2013. Nearly 30 million ...

[Millions in modern-day slavery, half in India: Survey - The Hindu
www.thehindu.com/news/international/...slavery.../article5243964.ece](http://www.thehindu.com/news/international/...slavery.../article5243964.ece) ▼

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Haiti, Pakistan among countries with highest amount of modern slavery, global index finds

NP ASSOCIATED PRESS | October 17, 2013 | Last Updated: Oct 17 8:54 AM ET
[More from Associated Press](#)



A group of rescued workers stand outside a police station after they were saved from a brick kiln in Linfen, northern China's Shanxi province 27 May 2007. Police said 14 June that they had rescued more than 200 people, including 29 children, who were working as "slaves" in brick kilns, in a shocking revelation of labour practices in booming China. (STR/AFP/Getty Images)

National Post

Global Slavery Index finds millions caught in modern-day slavery

This story was published: 3 MONTHS AGO | OCTOBER 17, 2013 2:46PM

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Andrew Forrest and his wife Nicola established the Walk Free Foundation last year. Source: News Limited

AN estimated 30 million people worldwide are living in modern-day slavery, according to the inaugural Global Slavery Index.

The index was published on Thursday and compiled by the [Walk Free Foundation](#), founded by West Australian mining magnate Andrew Forrest and his wife Nicola.

News.com.au

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The inaugural Global Slavery Index was published Thursday. AFP

estimated 30 million people worldwide are living in modern-day slavery, according to the new Global Slavery Index published Thursday.

The index, compiled by the Walk Free Foundation, said that while India by far has the highest number of people, the problem was most prevalent in the west African nation of Nigeria, where 10 per cent of the population was deemed to be held in slavery.

The WFF hopes the annual index will help governments to monitor and tackle modern slavery. "A lot of governments won't like hearing what we have to say," chief executive John Hume told AFP.

"If governments that want to engage with us, we will be very open to engaging with them. We can better measure the issue of modern slavery."

Founded in May last year, the WFF is a 20-strong team based in Perth on the south coast of Australia, led by philanthropists Andrew Forrest — the chairman of Fortescue Metals

17 October 2013 Last updated at 00:43 ET

8.5K Share

New global index exposes 'modern slavery' worldwide

COMMENTS (444)



The index included victims of human trafficking and forced labour

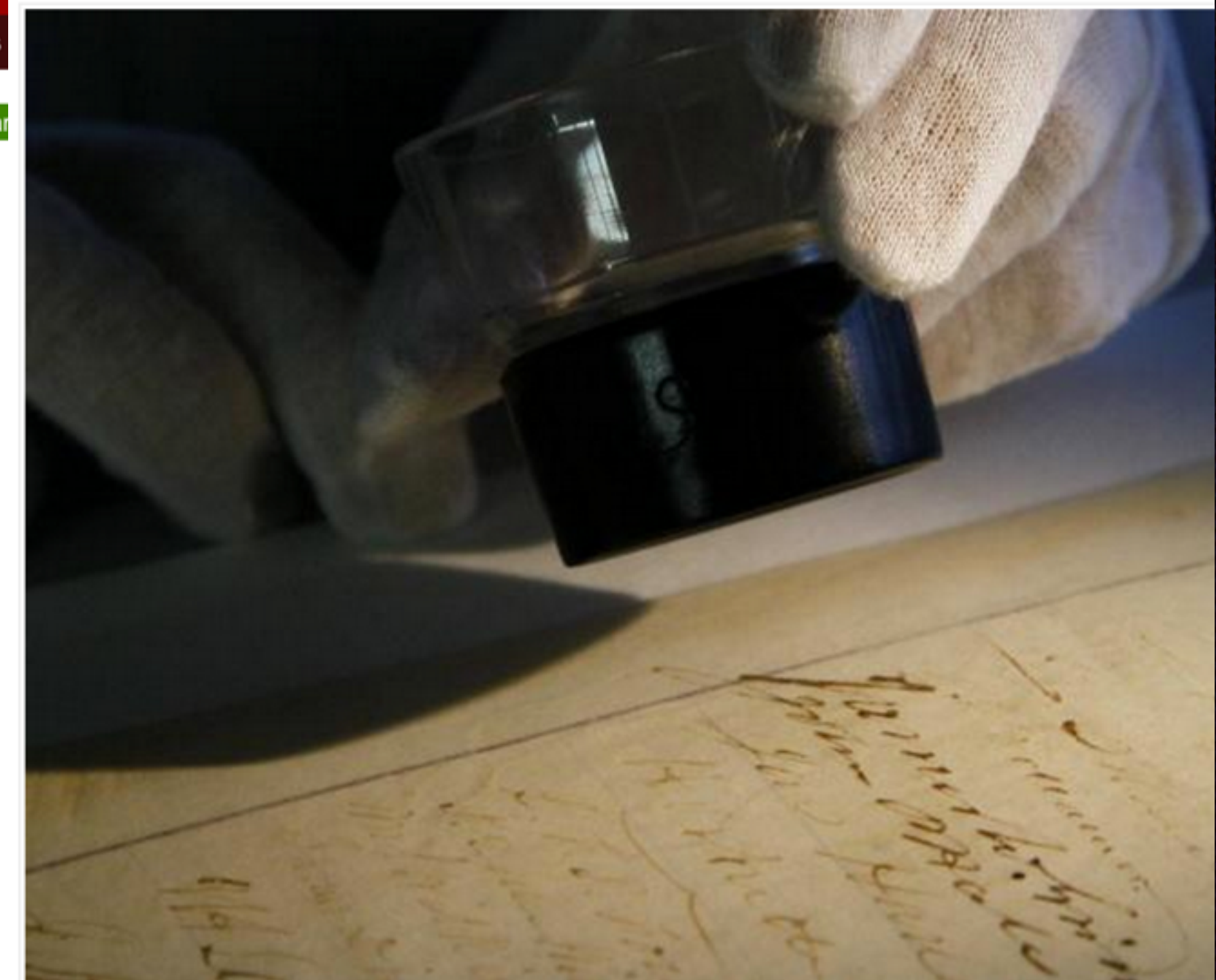
Nearly 30 million people around the world are living as slaves, according to a new index ranking 162 countries.

The **Global Slavery Index 2013** says India has the highest number of people living in conditions of slavery at 14 million.

Millions in modern-day slavery, half in India: Survey

DPA

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In this Nov. 29, 2011 photo, in Chicago, Sharon Paschke, conservator at Graphic Conservation Co., looks over a rare, restored copy of the 13th Amendment that ended slavery.

Related TOPICS

social issue

US rev
slaver

Almost 30 million people around the world live as slaves and nearly half are in India, a global index on modern slavery released on Thursday.

The Global Slavery Index 2013 said India had 14 million people living in conditions of slavery, the highest number worldwide. West Africa's Nigeria had the highest prevalence, with 4.2 per cent of its population enslaved.

Africa Review

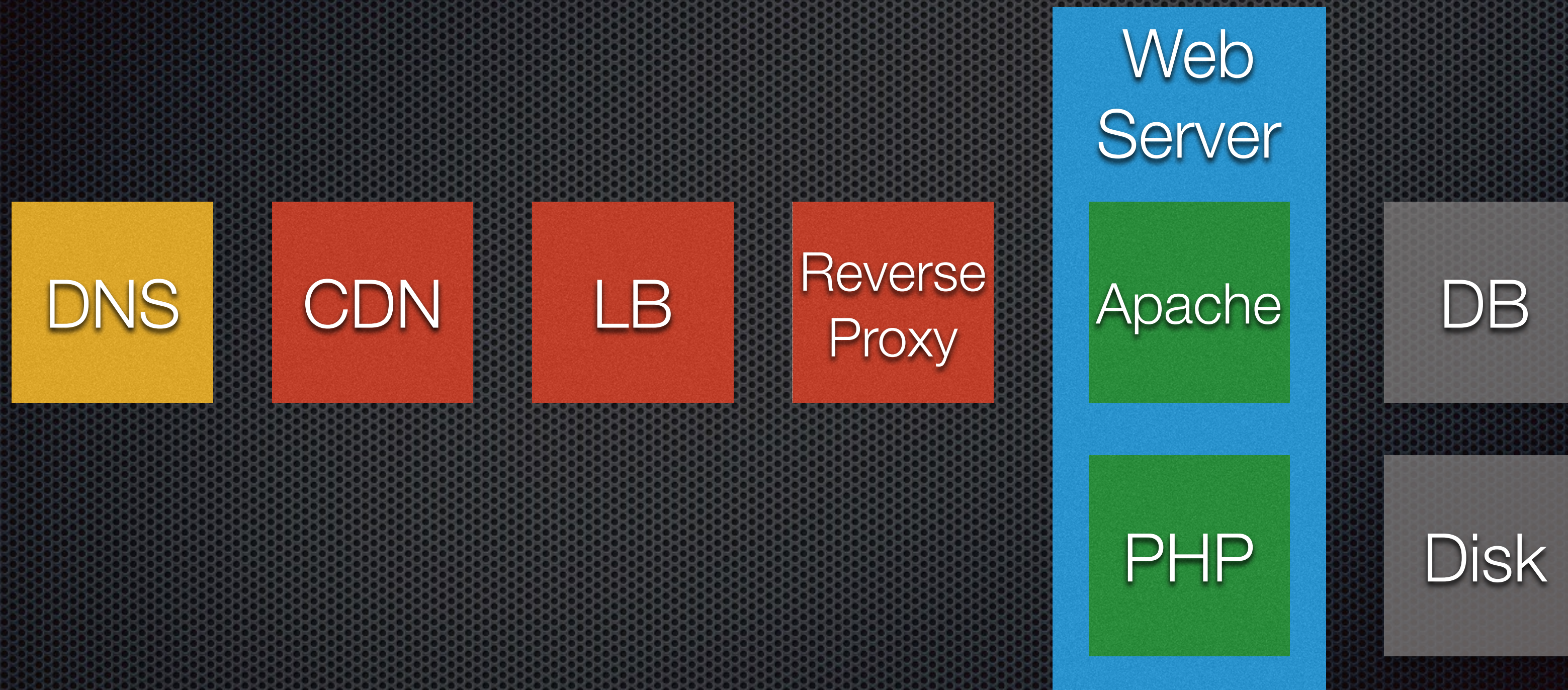
BBC

The Hindu

What makes a good scalable site?

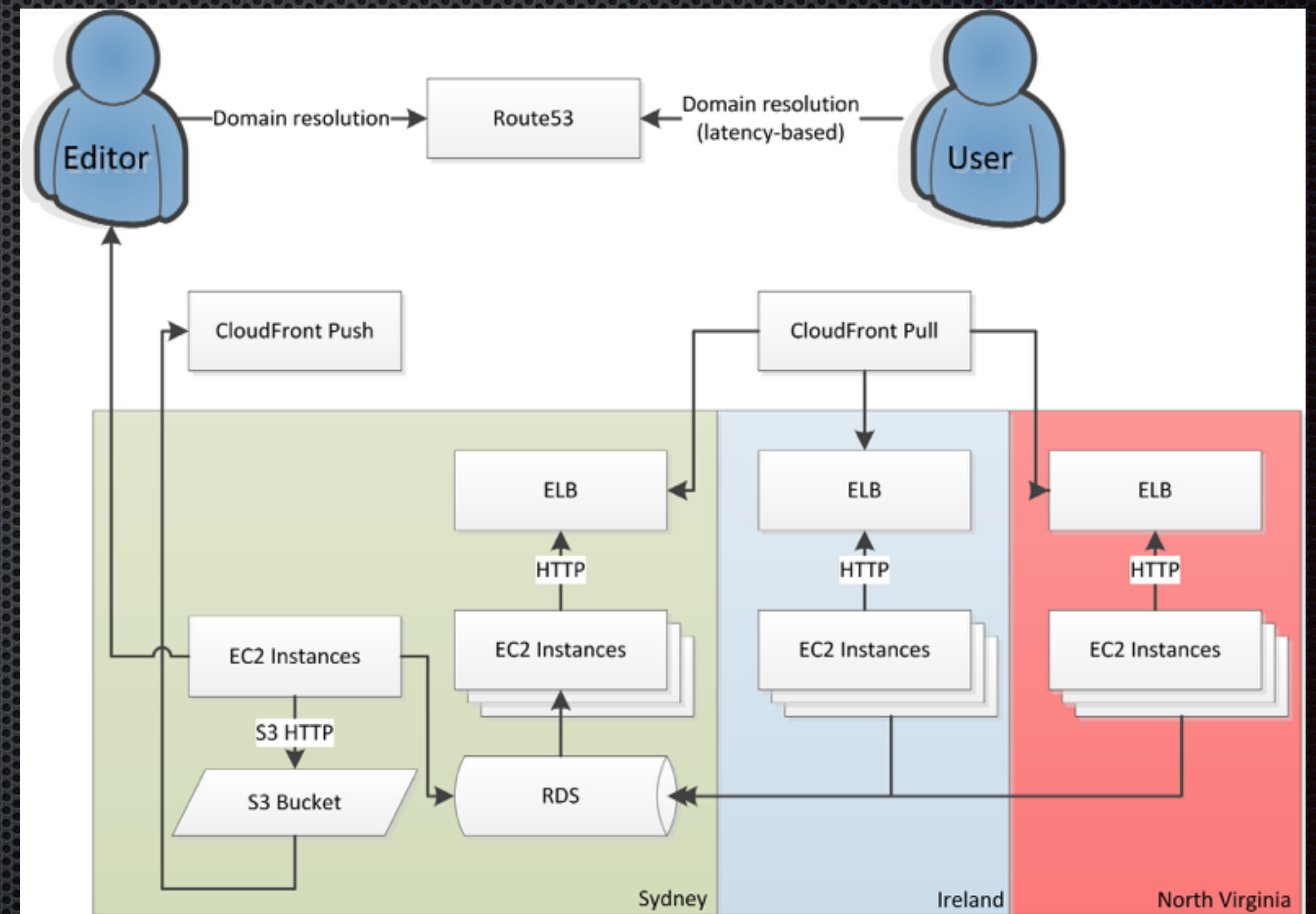
- ✦ Eliminate single point of failure
- ✦ Elastic site or over-provisioning
- ✦ Monitor traffic
- ✦ Plan of attack to recover

LAMP Stack Pressure Points



We (had no choice but to) embrace Amazon AWS

- ✦ EC2 c2.medium instances (x9) across 3 continents
- ✦ High-AZ c2.medium RDS in Sydney
- ✦ CloudFront / S3 for WordPress assets
- ✦ ELB for load balancing
- ✦ Route53 for GLB
- ✦ SES for email



Application Stack

- Webserver: Linux (Apache, PHP 5, APC, mysql_nd)
- External services: CartoDB, Scribd
- WordPress:
 - TotalCache (APC page cache, CloudFront JS/CSS rewrite)
 - S3 Upload (Allowed editors to upload media that is accessible globally)
 - HTTPS Plugin (Rewritten host/routing for editors to a dedicated instance)

Varnish

Apache

PHP 5 (mod_php)

WordPress (with
CartoDB/Scribd)

Some sound precautions for scaling WordPress

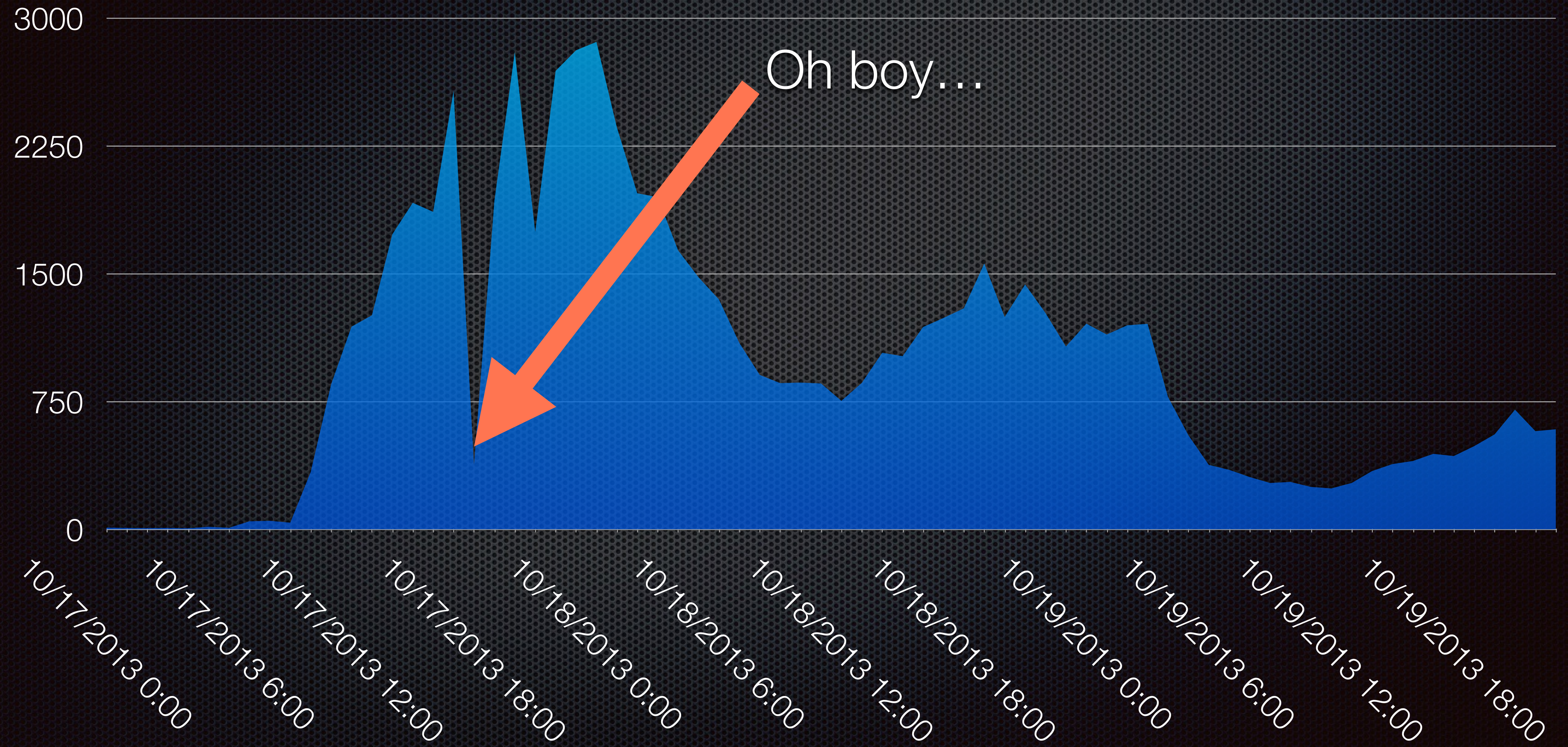
- ✦ Admin and end-user instance separation
- ✦ S3 storage for media assets
- ✦ CDN and caching (such as CloudFront and Varnish) to protect your website from getting totally hammered

What can go
wrong?

Answer: Everything



Our visits by the hour



The oh-crap moment...

- ✦ RDS is highly available, but *not* globally available
 - ✦ This is by far the most costly mistake - we cannot use HyperDB. Page returned in 5 seconds in Europe and 250ms in Sydney.
- ✦ Relied solely on Pingdom for external monitoring
 - ✦ Pingdom didn't tell you enough about what's wrong, just that something isn't right
- ✦ Went on the cheap and deployed instances too small
 - ✦ Sheer HTTP traffic crushed Apache due to no disk swap and CPU-bound

**WHAT CAN WE DO
BETTER?**

MORE POWER!

What we really needed....

- ✦ Cross-region replicas with RDS (Dec 2013) or Home-brew MySQL M/S
 - ✦ Read slaves to all geographical regions (DB write is NOT a priority)
 - ✦ Install HyperDB on WordPress and disable W3TC DB Cache
- ✦ Smarter EC2 Instances
- ✦ Tune Apache

Smarter EC2 Instances

- ✦ Compute power vs memory vs money:
 - ✦ Decide between m1.small, c2.medium and m1.medium
- ✦ 64-bit instance
 - ✦ Ease of moving up to a bigger instance outweighs the wasted RAM
- ✦ Provision ephemeral space, even if you may not use it beyond swap

Some tuning tips

- ✦ Find the right Apache engine (prefork, worker+fpm, event+fpm)
 - ✦ Tune to not exceed free RAM and avoid swapping (if you have a tmpfs...)
- ✦ Install and use APC
- ✦ Tune down / remove un-needed modules

Prefork - use when in a rush

- ✦ Use prefork when you have no chance to test and need reliability (and have money to spend)
 - ✦ No threading issues or app isolation problems (each connection = process)
 - ✦ Oldest, most tested spawning model
- ✦ Configure your prefork settings to avoid swapping
 - ✦ assuming 100MB/HTTP instance with 1.5GB RAM free:
ServerLimit/MaxClients = 15

Apache 2.4 + php_fpm + event

- ✦ If you have time to test your app, or if your WordPress stack is single-tenant, this model is the best
- ✦ On Amazon Linux: httpd24, php54 and php54-fpm packages
- ✦ Make sure to review `/etc/php-fpm.d/www.conf` and configure your tmp directory

Apache modules you can omit:

- ✦ Authentication: ldap_module, authnz_ldap_module
- ✦ Proxy/Cache: proxy_balancer_module, proxy_ftp_module, proxy_ajp_module, proxy_connect_module, cache_module, disk_cache_module
- ✦ Others: dav_module, dav_fs_module, speling_module, substitute_module, cgi_module, suexec_module, userdir_module

You can omit as many or as few modules to ensure your site runs!

Simple Apache security measures

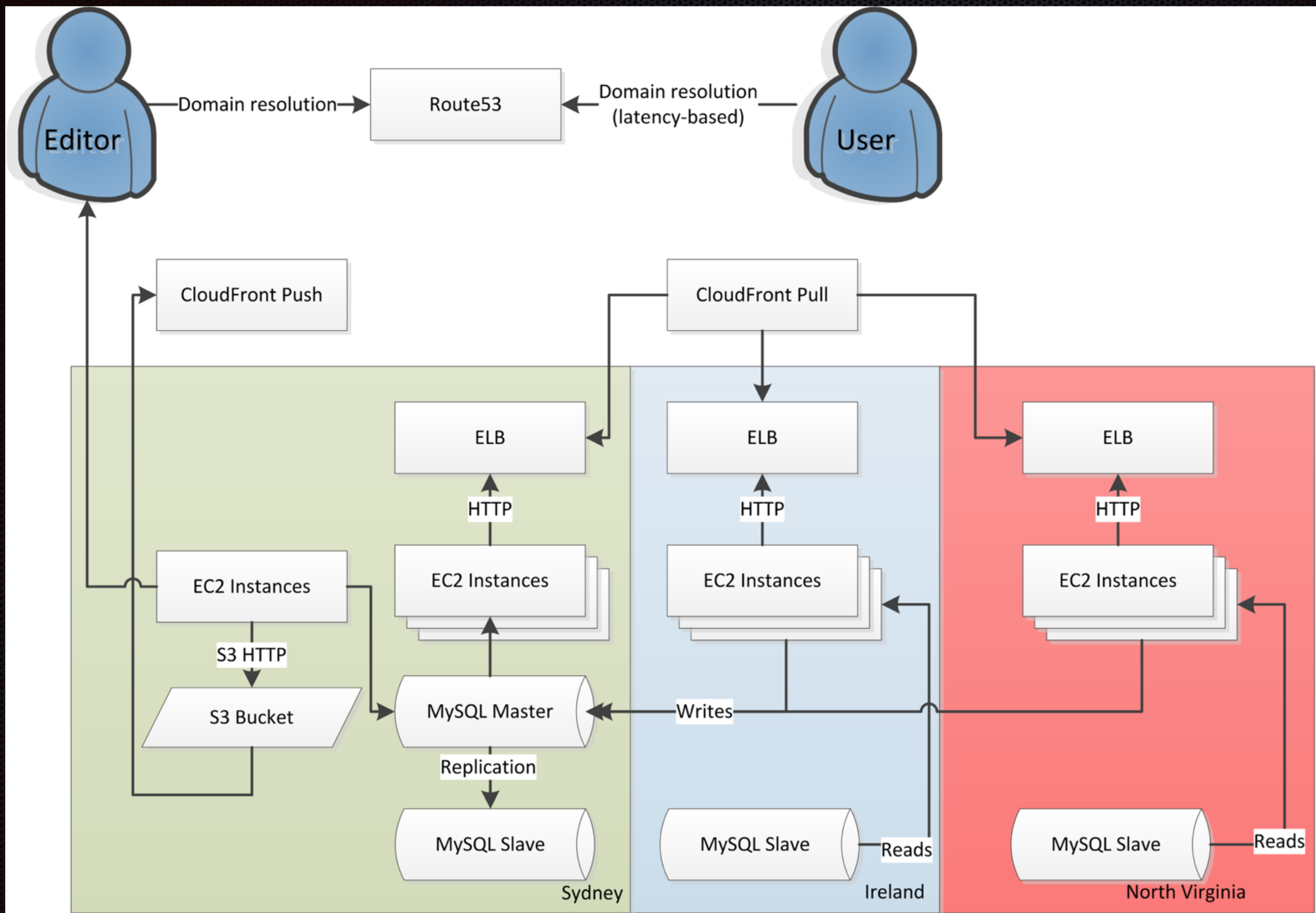
- ✦ Remove methods to avoid vectors of attack, and not let people know of your site
- ✦ Does **not** replace proper security audit and better code practices!

```
ServerSignature Off  
ServerTokens Prod  
TraceEnable Off
```

```
<Directory />  
  <LimitExcept POST GET HEAD>  
    Order deny,allow  
    Deny from all  
  </LimitExcept>  
</Directory>
```


Other (silly) things to check

- ✦ Run your site against site checkers such as Google PageSpeed and YSlow!
- ✦ 404 Errors and PHP - Do you have a WordPress script showing a fancy 404 error? Ensure no assets are 404-ing.
- ✦ # Apache or PHP instances in all servers = # max connections in MySQL



Try 2 - WalkFree.org re-launch

- Grassriots converted walkfree.org from Drupal to WordPress, and in December 18, the site was released
- We've improved our software stack and deployment practices
 - Scripted software push
 - Varnish/APC cache
 - m1.small with a decent swap space
 - Optimized DB location
 - fuse-s3fs for shared media uploads
- (almost)* perfect cutover

A new year, a new experiment

- ✦ WirelessLinx helped GrassRiots launch another high profile site: gfn2020.org
- ✦ Further stack optimization include:
 - ✦ Apache 2.4 + event + php_fpm
 - ✦ shared memcached for W3TC object cache
- ✦ Some takeaways
 - ✦ HyperDB, session and cross-region replication



Make a list and check it twice!

- ✦ Checklist is really needed with Amazon AWS-based deployment, as there are too many knobs to adjust. The defaults don't always make sense...
 - ✦ S3 and CORS header
 - ✦ CloudFront "Forward Query String"
 - ✦ ELB instance registration
 - ✦ CloudWatch's inaccurate ELB reporting

Does it have to be AWS?

- ✦ Most multi-AZ cloud with Linux can handle this, including Google App Engine, Microsoft Azure or Linode.
- ✦ Single vendor in this case make deployment much faster, but multi-vendor deployment can *potentially* decrease failure risks

About the various initiatives



Non-profit group to abolish slavery around the world and educate the public



Network of religious faiths and non-profit groups to abolish modern slavery

Thank you!

Alan Lok • @alan_lok