

CU-Boulder

Where we are,

where we are

going

Presented by



University of Colorado **Boulder**

Who am I?

- Matt Tucker
[@ultimateboy](https://twitter.com/ultimateboy)
- Lead Drupal Developer
University Communications



What we will cover

- Case study of our approach/challenges
- Infrastructure
- Drupal configuration
- Deployment and code base
- Lessons learned and outcomes
- Q/A





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Our challenges

- Outdated server environment
- Lack of central web development support
- Decentralized server hosting/support
- University website lacking
- A TON of legacy data/sites/content
- New campus branding standards



Our solution

- Modernize our campus web infrastructure
 - Enterprise class
 - Highly available/scalable
- Convert to a CMS environment
- New service for web development and hosting



Planning

- Invest in staffing/equipment
 - Update infrastructure
 - Improve campus services/support
- Provide a suite of services around a CMS
- Develop service for web application hosting
- Create a process to phase the migration of legacy content to new infrastructure



Research

- CMS software evaluation (Drupal!)
- Equipment and staffing needs
- Community/external expertise
 - Peer universities
 - Professional experts
 - Drupal community



Phased timeline

- Phase I: Infrastructure (new & legacy) & university website
- Phase II: Drupal CMS service
- Phase III: Web application hosting





Infrastructure Decisions

- Cloud vs Local
 - Data centers available
 - More complex networking in the cloud
 - More control
- F5s
- VMware ESXi
 - What is virtualized and what isn't
- Built sandbox/proof of concept



Web Traffic Manager

- Didn't have to move everything at once
 - Keeping legacy alive
 - Maintenance



<http://www/oit>

<http://www/housing>

<http://www/>

<https://www/user>

<http://www/econ>

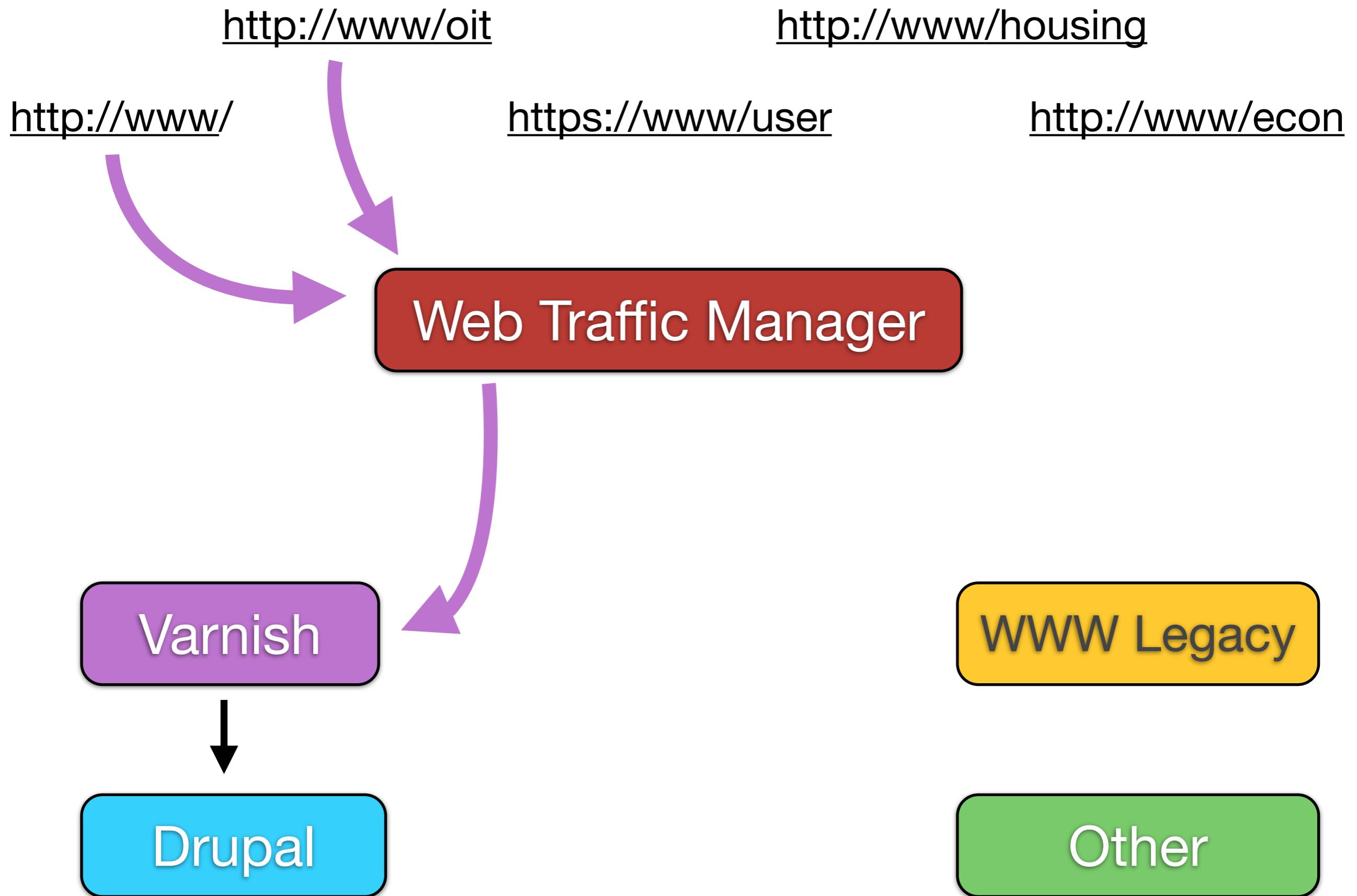
Web Traffic Manager

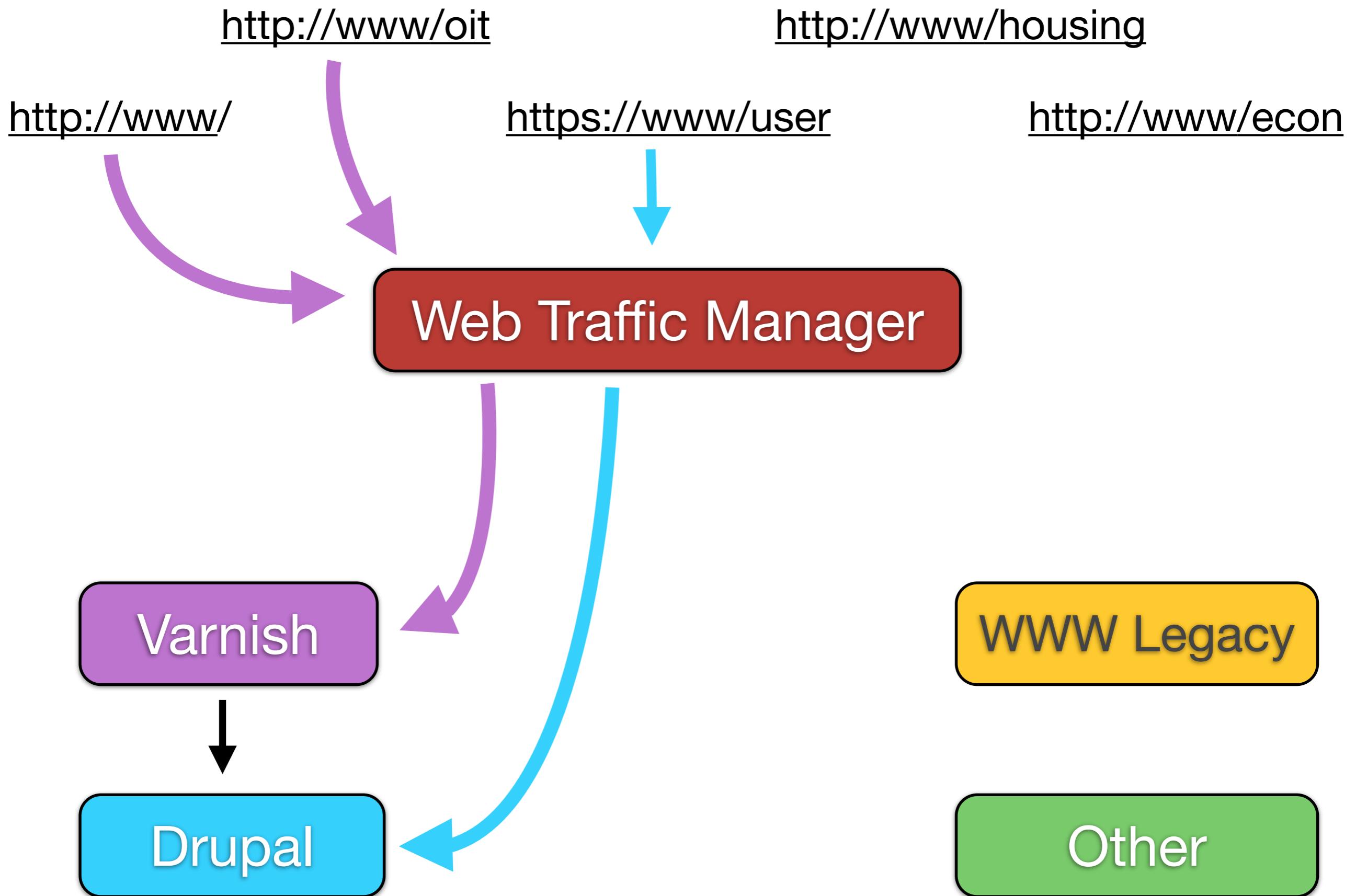
Varnish

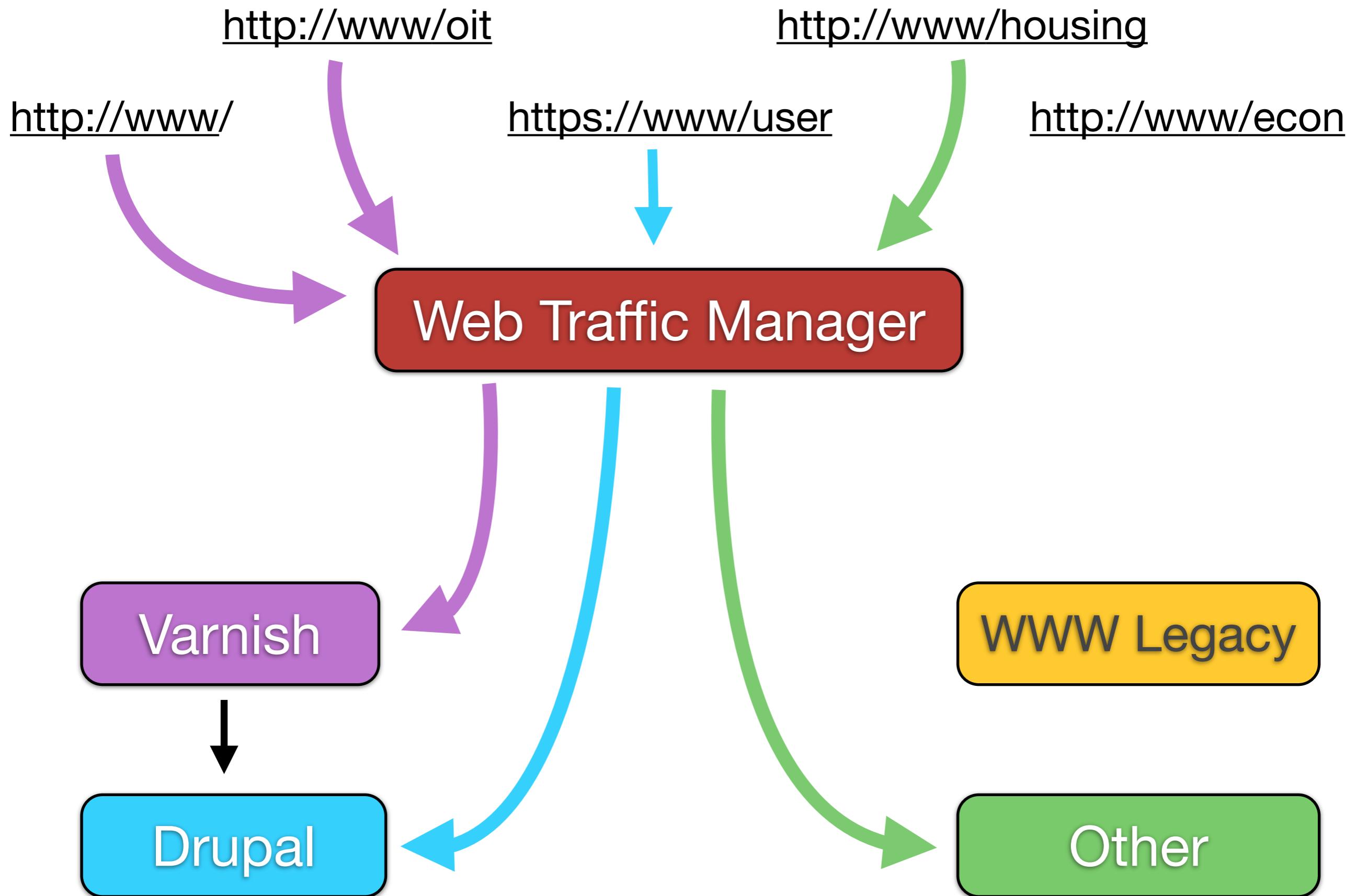
WWW Legacy

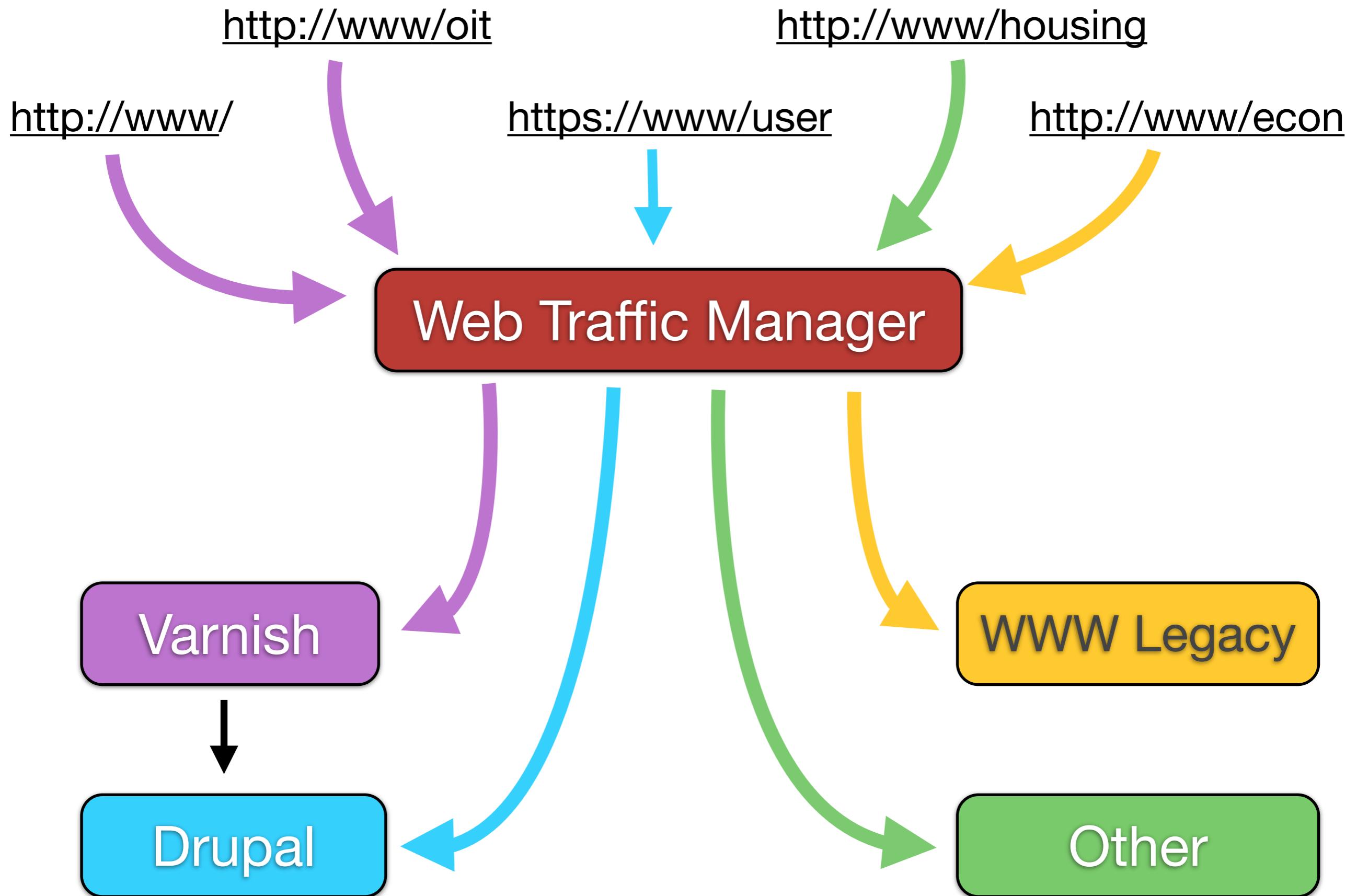
Drupal

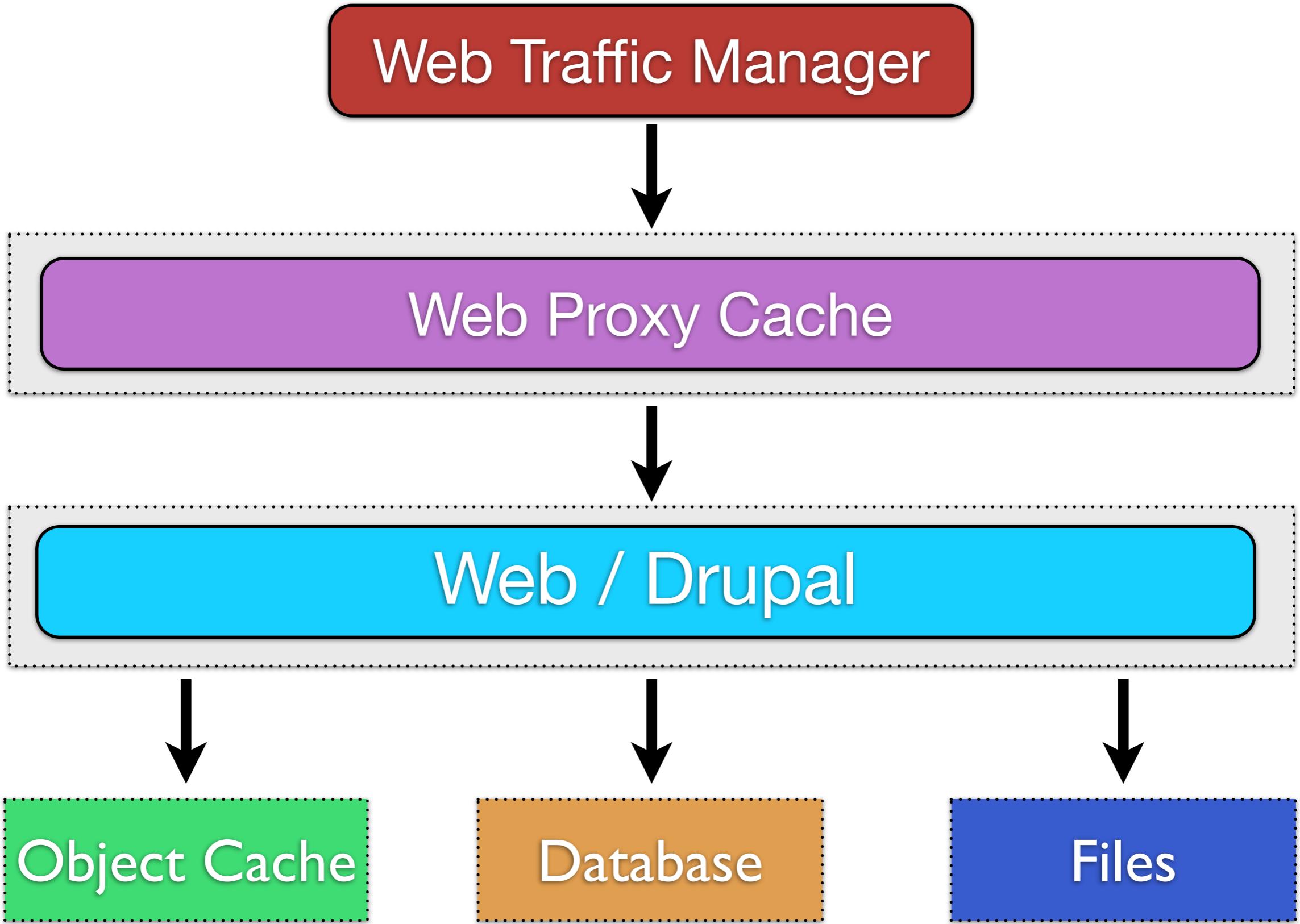
Other



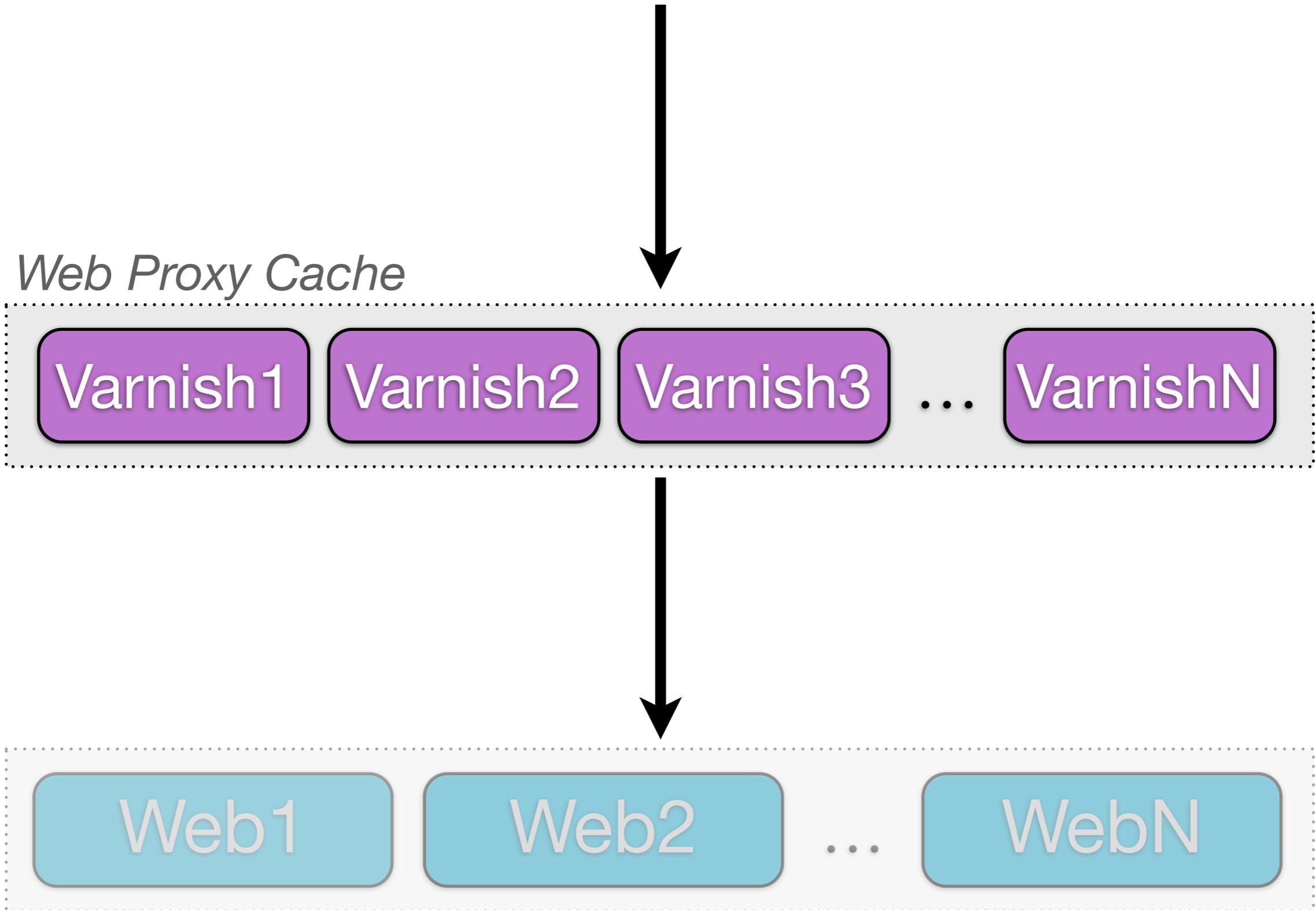


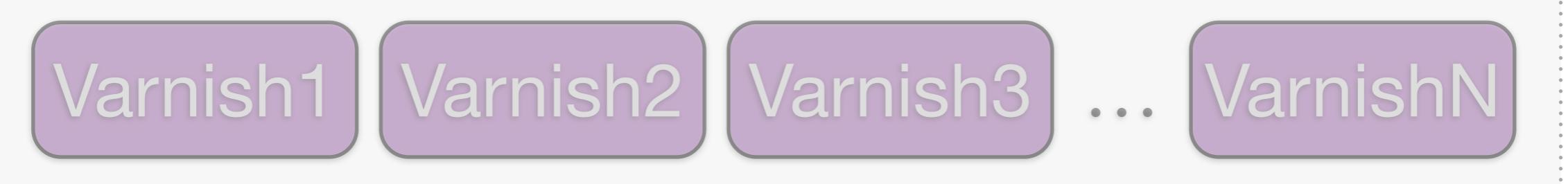




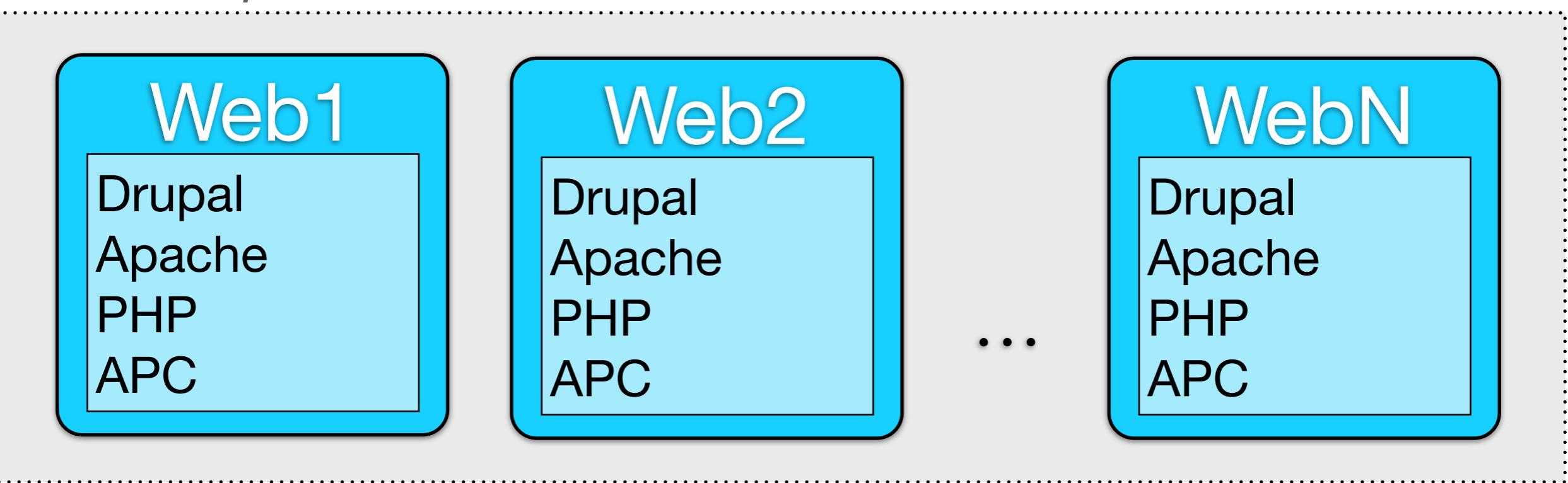


F5 Content Switch





Web / Drupal



Web1

Drupal
Apache
PHP
APC

Web2

Drupal
Apache
PHP
APC

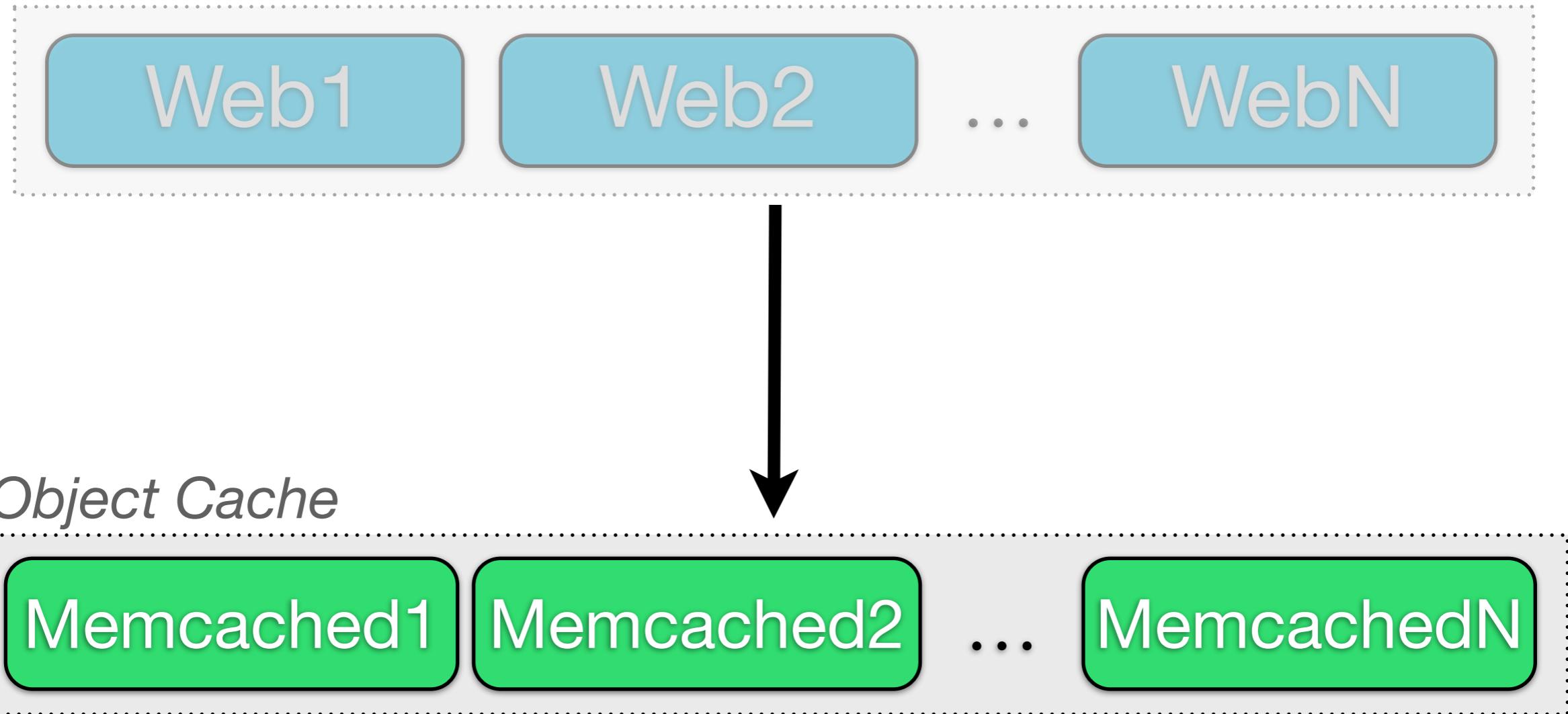
WebN

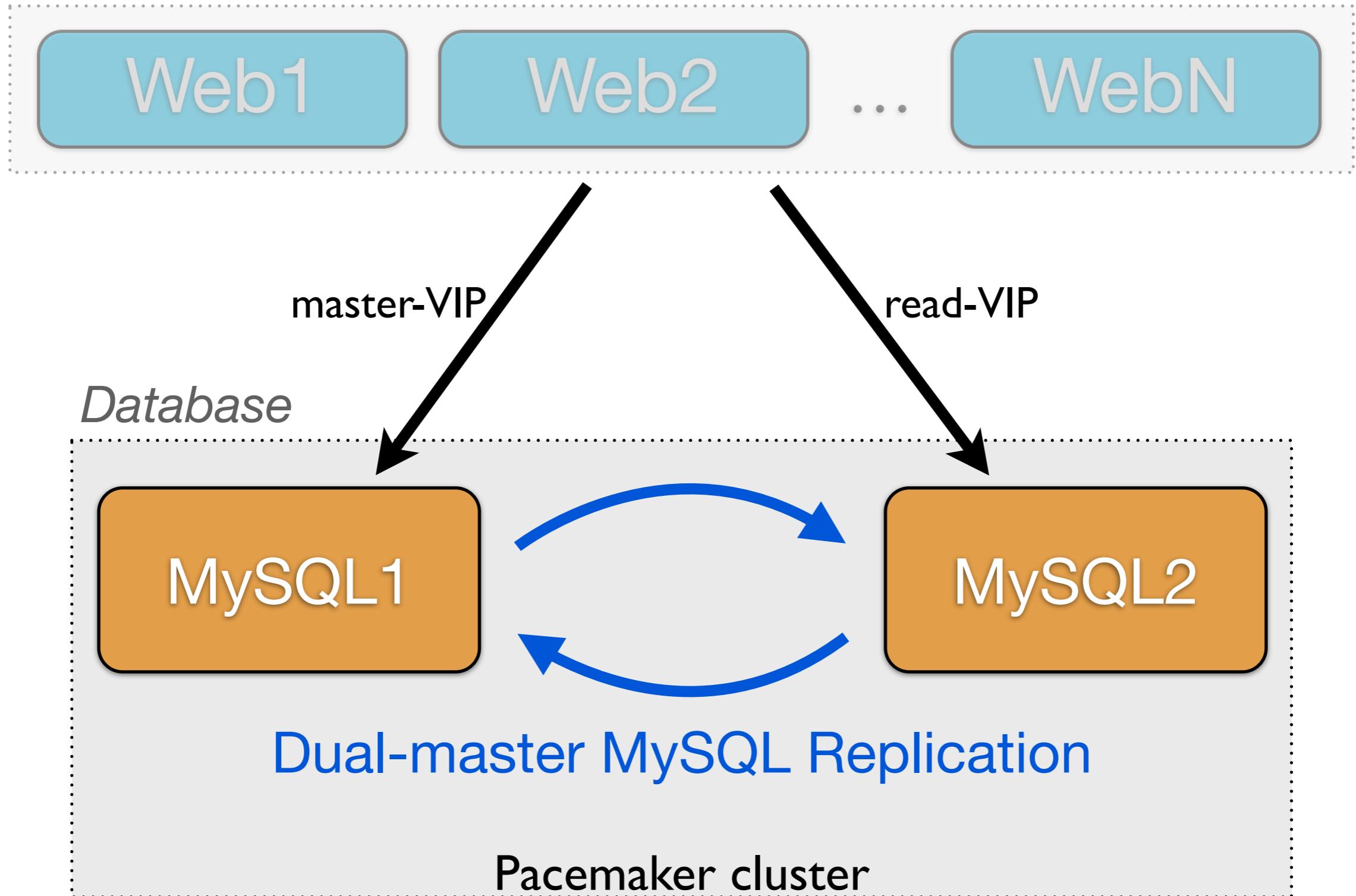
Drupal
Apache
PHP
APC

Memcached

MySQL

HA-NFS







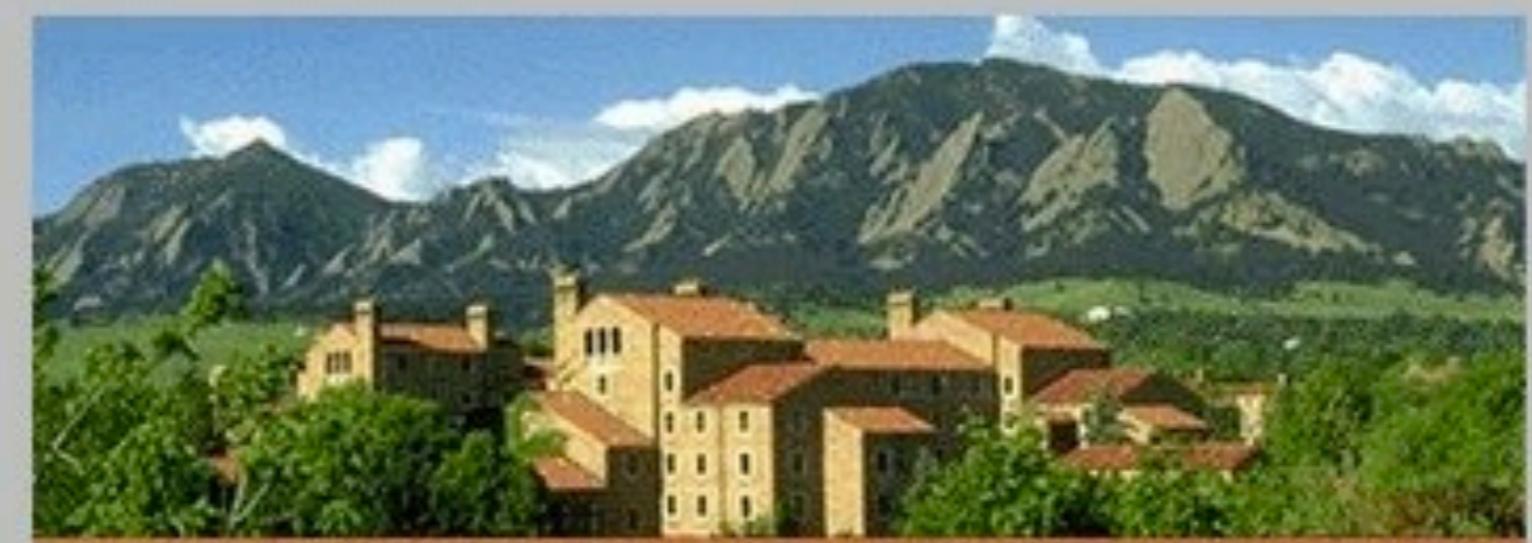
Files (sites/default/files)

NFS1

NFS2

NFS3

Pacemaker cluster

Location: <http://www.colorado.edu/>[What's New?](#) [What's Cool?](#) [Destinations](#) [Net Search](#) [People](#) [Software](#)

UNIVERSITY OF COLORADO AT BOULDER

[The University](#)

Administration, diversity, policies, and more

[Academic Life](#)

Admissions, colleges and schools, course availability, departments, faculty and research, and more

[Student Life](#)

Activities, advising, counseling, employment, financial aid, handbook, health, housing, on-line services ([PLUS](#)), recreation, and more

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Some new and noteworthy sites on the CU-Boulder Home Page

[Campus Resources](#)



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Computing, data/statistical information, facilities, faculty/staff support, libraries, publications, technology transfer, and more

[Directories](#)

Campus directories, department and office information, home pages indexes

[Family and Friends](#)

Alumni, volunteers, and more

[Beyond Campus](#)

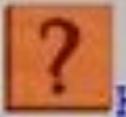
The city and state, off-campus information, weather, Internet resources, and more



[Home](#)



[Search](#)



[Help/Info](#)

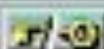


[Caminos Quick Ref](#)



[Ask Ralphie](#)

Send comments or questions to HomePage@Colorado.EDU





STOP THE
TECH'LOGY
MADNESS.

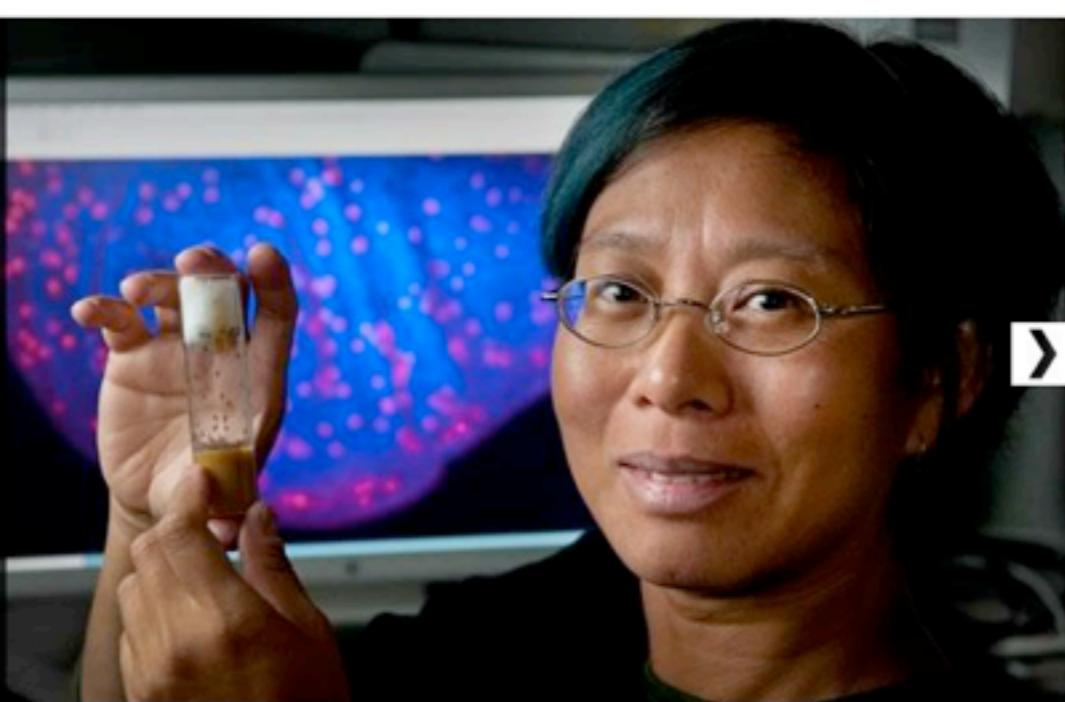


University of Colorado **Boulder**



Finding compounds that can help fight cancer

Using fruit flies, a CU-Boulder researcher is developing a screening technology to identify cancer therapies.

[Read more](#)

Creating Futures

With your involvement, we can renew the collegiate experience in ways that will create brighter futures in Colorado and around the world—one person, one discovery, and one community at a time.

[Learn More](#)

News Headlines

[CU team's efficient unmanned aircraft jetting toward commercialization](#)

[CU and NREL get 10 more Toyota hybrids to plug into smart grid study](#)

[CU-Boulder symposium explores digital media impact on politics, journalism and historical preservation](#)

[CU-Boulder student government facilities reach carbon neutrality](#)

[Two CU-Boulder faculty win National Science Foundation CAREER Awards](#)

[More News](#)

Campus Events

[Artist Series: Andras Schiff, piano](#)

7:30 • Monday 2/27

[Collage Concert](#)

7:30 • Friday 3/2

[Triage and Sense-making in an Urban Emergency Room](#)

5:00 • Monday 3/5

[Gov. Hickenlooper co-chairing Statewide Convening on LGBT Youth](#)

8:30 • Saturday 3/10

[CU Wizards](#)

9:30 • Saturday 3/10

[More Events](#)

The image shows three mobile devices (an iPhone and two iPads) displaying the University of Colorado Boulder website (colorado.edu) on different screen sizes. The top-left iPad shows a full news article about jetting toward commercial space. The top-right iPhone shows a news section about CU learning assistants. The bottom iPad shows the main homepage.

Top Left Device (Large Screen):

- AT&T 4G signal
- 10:30 AM
- 89% battery
- Address bar: colorado.edu/
- Google search bar
- University of Colorado Boulder logo
- Search Sites + People search bar
- CU: Home • A to Z • Campus Map
- Students Faculty + Staff Parents Alumni
- APPLY NEWS SECTIONS
- Image: A man in a purple shirt working at a desk.
- Text: "Jetting toward commercial"
- Section: Creating Futures
- Text: "With your involvement, we can renew the collegiate experience in ways that will create brighter futures in Colorado and around the world—one person, one discovery, and one community at a time."
- Image: Silhouette of a graduate.
- Text: "Learn More"
- Vertical sidebar menu: Ma Eng CU Stu Ult fro lice Co CU ima dev He CU the Mo

Top Right Device (Medium Screen):

- AT&T 4G signal
- 10:28 AM
- 96% battery
- Address bar: colorado.edu/
- University of Colorado Boulder logo
- Search Sites + People search bar
- APPLY NEWS SECTIONS
- Image: A man pointing at a whiteboard.
- Text: "CU learning assistants help transform science and math education"

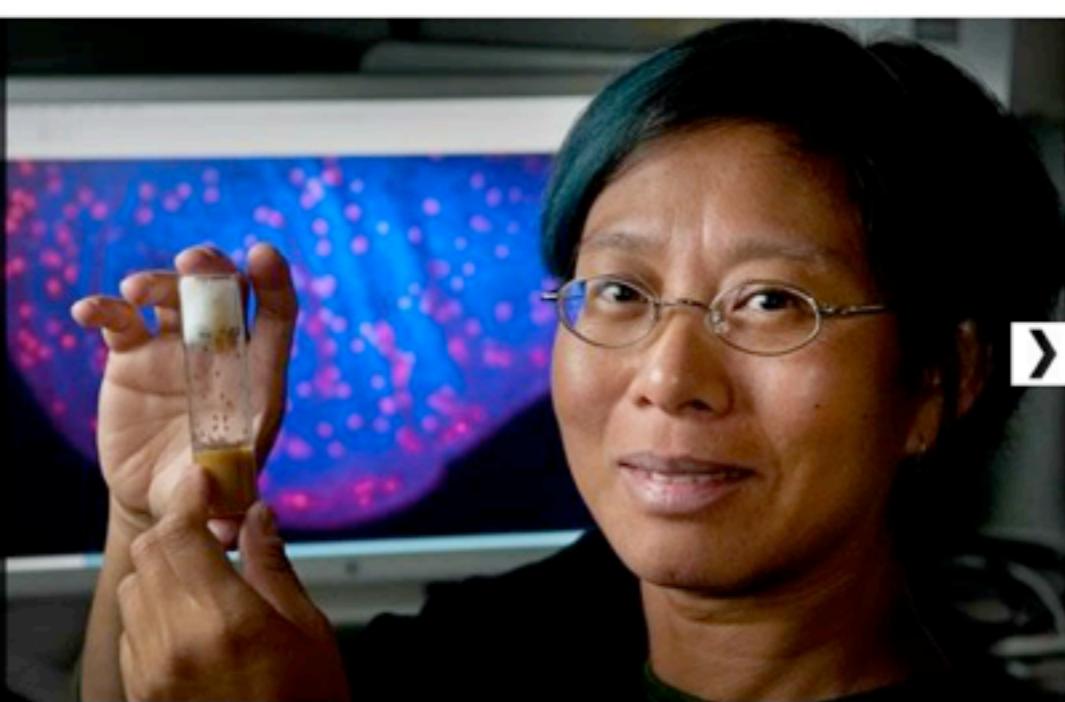
Bottom Device (Small Screen):

- AT&T 4G signal
- 10:32 AM
- Address bar: colorado.edu/
- University of Colorado Boulder logo
- Search Sites + People search bar
- CU: Home • A to Z • Campus Map
- Students Faculty + Staff Parents Alumni
- Home About Admissions Academics Research Outreach International Sustainability Athletics News
- Image: A man writing on a whiteboard.
- Text: "CU learning assistants help transform science and math education"
- Text: "A CU-Boulder science, technology, engineering and mathematics (STEM) education program is so successful, it's imitated nationally."
- Text: "Read more"



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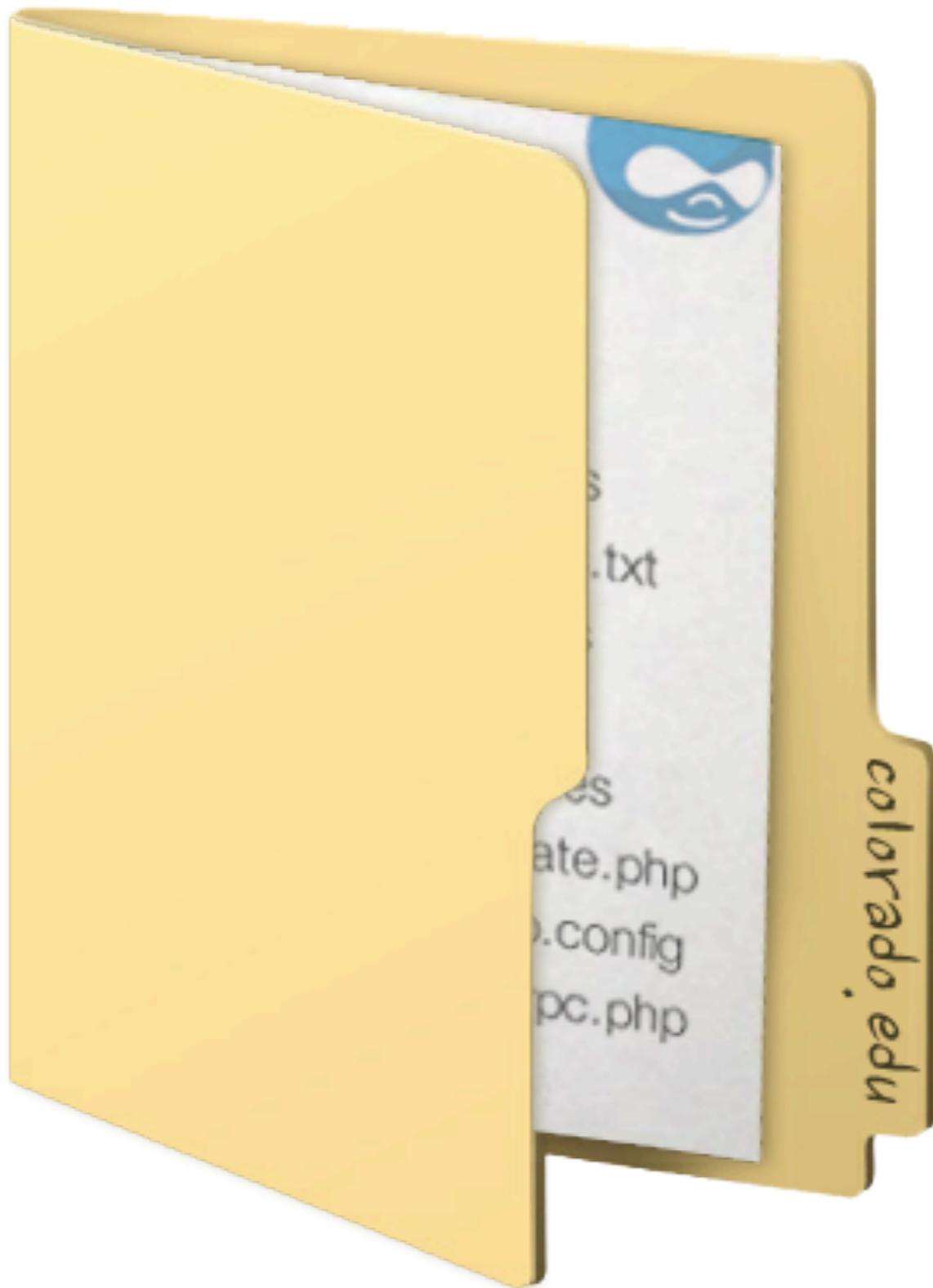
Backstretch module

drupal.org/project/backstretch

Provides the ability to display an image stretched across the background of your website regardless of the browser window size.



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.htaccess
authorize.php
cron.php
includes
index.php
install.php
misc
modules
profiles
robots.txt
scripts
sites
themes
update.php
web.config
xmlrpc.php

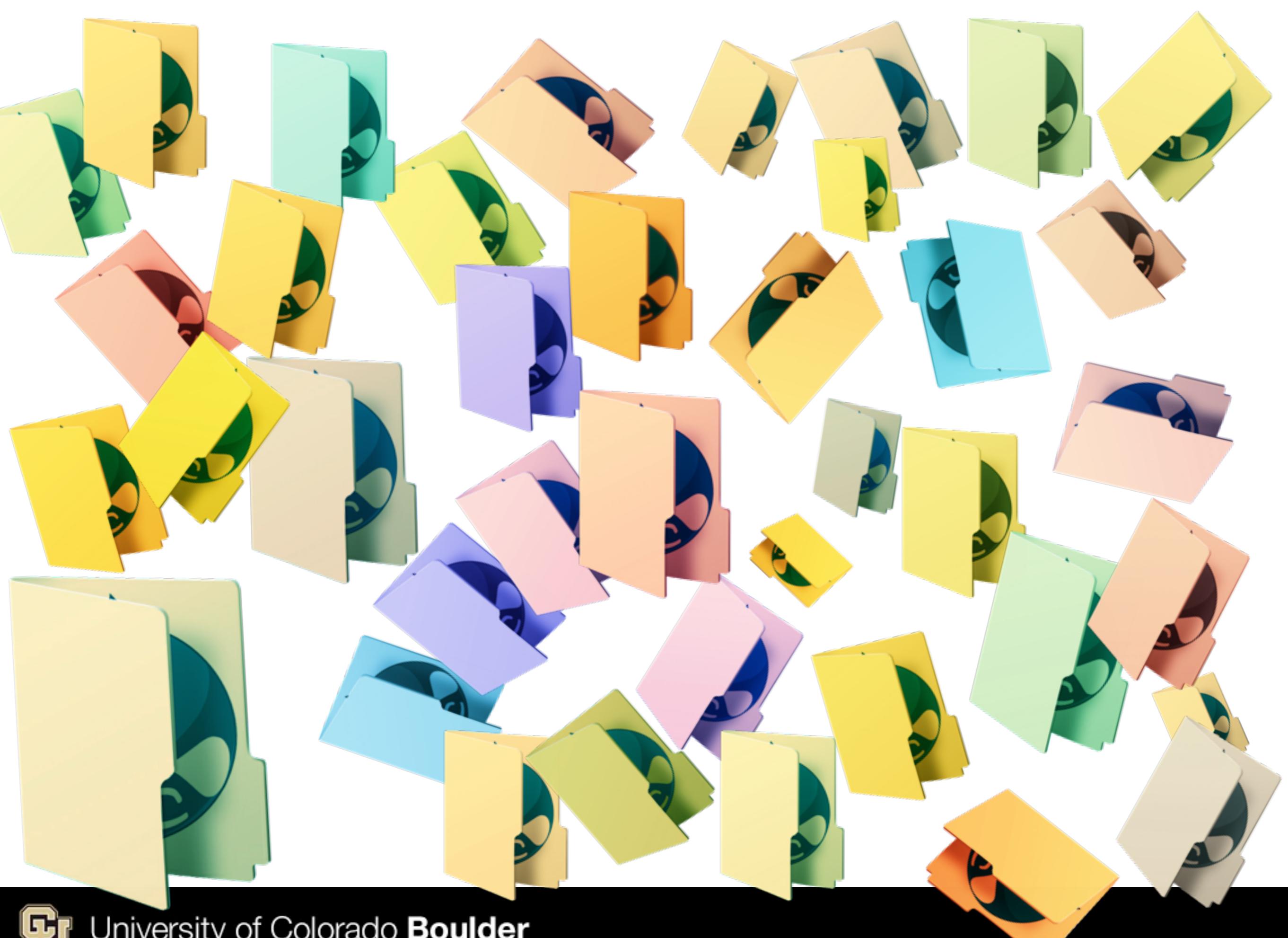




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Drupal Symlink Manager

drupal.org/project/dslm

A set of Drush command line tools
for managing symlinking Drupal
sites back to a central set of Drupal
cores and installation profiles.



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DSLM Base Directory

cores/

drupal-7.10

pressflow-6.22.105

profiles/

cu_fit-1.0

openatrium-1.2

openpublish-3.0-alpha6



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```
$ drush dslm-new my_site
```

Enter a number.

[0] : Cancel

[1] : pressflow-6.22.105

[2] : drupal-7.12

2

Your site has been linked in my_site [ok]



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```
$ drush dslm-new my_site
```

Enter a number.

- [0] : Cancel
- [1] : pressflow-6.22.105
- [2] : drupal-7.12

2

Your site has been linked in my_site [ok]

```
$ cd my_site
```



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.htaccess
authorize.php
cron.php
includes
index.php
install.php
misc
modules
profiles
robots.txt
scripts
sites
themes
update.php
web.config
xmlrpc.php

```
.htaccess
-> ../../dslm_base/cores/drupal-7.12/authorize.php
-> ../../dslm_base/cores/drupal-7.12/cron.php
-> ../../dslm_base/cores/drupal-7.12/includes
-> ../../dslm_base/cores/drupal-7.12/index.php
-> ../../dslm_base/cores/drupal-7.12/install.php
-> ../../dslm_base/cores/drupal-7.12/misc
-> ../../dslm_base/cores/drupal-7.12/modules
profiles
-> ../../dslm_base/cores/drupal-7.12/robots.txt
-> ../../dslm_base/cores/drupal-7.12/scripts
sites
-> ../../dslm_base/cores/drupal-7.12/themes
-> ../../dslm_base/cores/drupal-7.12/update.php
-> ../../dslm_base/cores/drupal-7.12/web.config
-> ../../dslm_base/cores/drupal-7.12/xmlrpc.php
```

```
.htaccess
-> ../../dslm_base/cores/drupal-7.12/authorize.php
-> ../../dslm_base/cores/drupal-7.12/cron.php
-> ../../dslm_base/cores/drupal-7.12/includes
-> ../../dslm_base/cores/drupal-7.12/index.php
-> ../../dslm_base/cores/drupal-7.12/install.php
-> ../../dslm_base/cores/drupal-7.12/misc
-> ../../dslm_base/cores/drupal-7.12/modules
profiles
-> ../../dslm_base/cores/drupal-7.12/robots.txt
-> ../../dslm_base/cores/drupal-7.12/scripts
sites
-> ../../dslm_base/cores/drupal-7.12/themes
-> ../../dslm_base/cores/drupal-7.12/update.php
-> ../../dslm_base/cores/drupal-7.12/web.config
-> ../../dslm_base/cores/drupal-7.12/xmlrpc.php
```

```
$ drush dslm-switch-core drupal-7.14
```

```
.htaccess  
-> ../../dnlm_base/cores/drupal-7.14/authorize.php  
-> ../../dnlm_base/cores/drupal-7.14/cron.php  
-> ../../dnlm_base/cores/drupal-7.14/includes  
-> ../../dnlm_base/cores/drupal-7.14/index.php  
-> ../../dnlm_base/cores/drupal-7.14/install.php  
-> ../../dnlm_base/cores/drupal-7.14/misc  
-> ../../dnlm_base/cores/drupal-7.14/modules  
profiles  
-> ../../dnlm_base/cores/drupal-7.14/robots.txt  
-> ../../dnlm_base/cores/drupal-7.14/scripts  
sites  
-> ../../dnlm_base/cores/drupal-7.14/themes  
-> ../../dnlm_base/cores/drupal-7.14/update.php  
-> ../../dnlm_base/cores/drupal-7.14/web.config  
-> ../../dnlm_base/cores/drupal-7.14/xmlrpc.php
```



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```
$ drush dslm-add-profile
```

Enter a number.

- [0] : Cancel
- [1] : cu_fit
- [2] : openatrium
- [3] : openpublish

1

The profile 'cu_fit' has been added [ok]



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```
$ ls -al profiles
```

```
-> ././dslm_base/cores/drupal-7.14/profiles/minimal  
-> ././dslm_base/cores/drupal-7.14/profiles/standard  
-> ././dslm_base/cores/drupal-7.14/profiles/testing  
-> ././dslm_base/profiles/cu_fit-1.0
```



```
$ ls -al profiles  
-> ././dslm_base/cores/drupal-7.14/profiles/minimal  
-> ././dslm_base/cores/drupal-7.14/profiles/standard  
-> ././dslm_base/cores/drupal-7.14/profiles/testing  
-> ././dslm_base/profiles/cu_fit-1.0
```

```
$ drush site-install cu_fit
```



Deployment

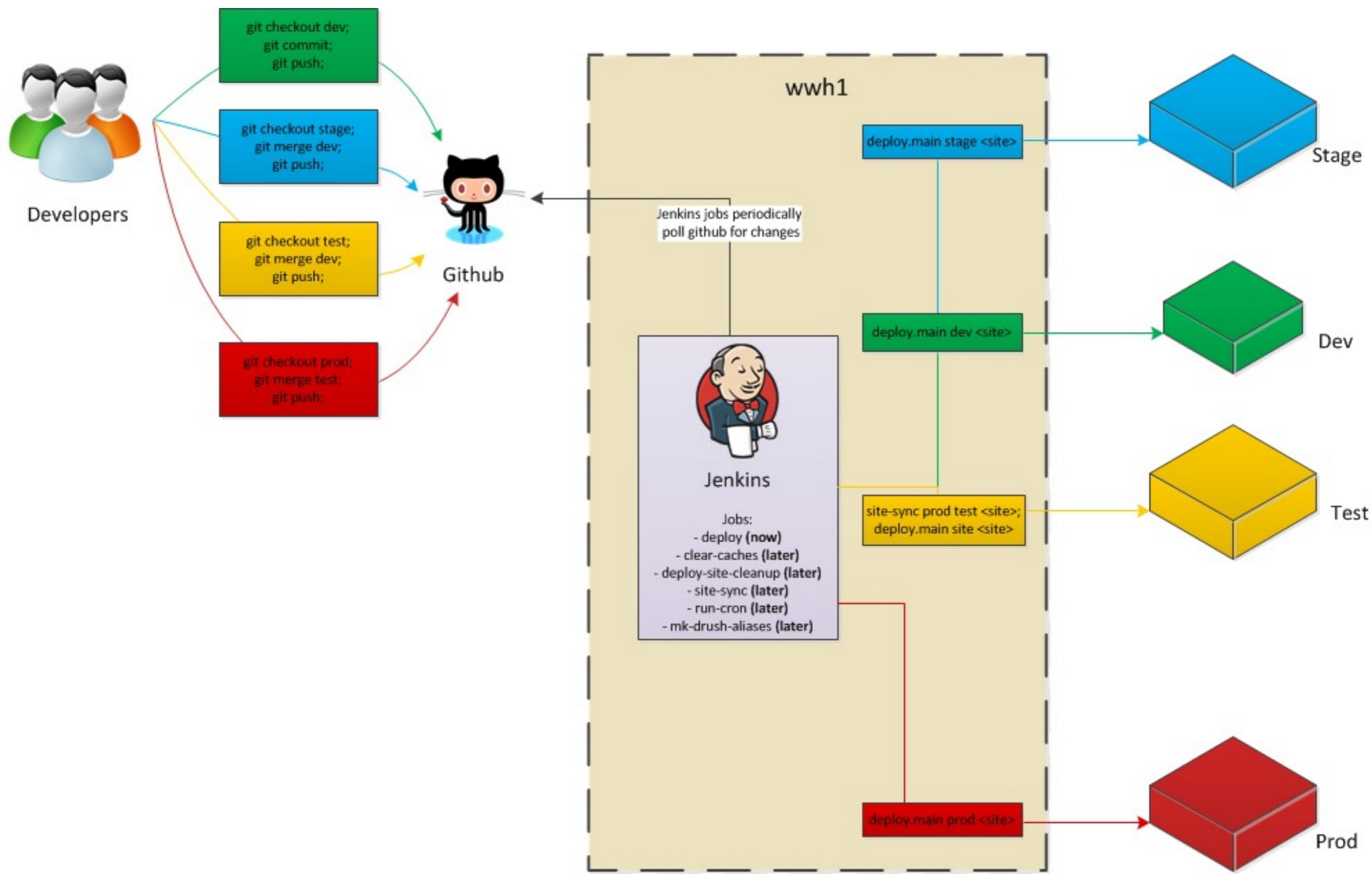
- “Workhorse”
- deploy.main [environment] [site] [sha1]
- git (submodules)
- Jenkins



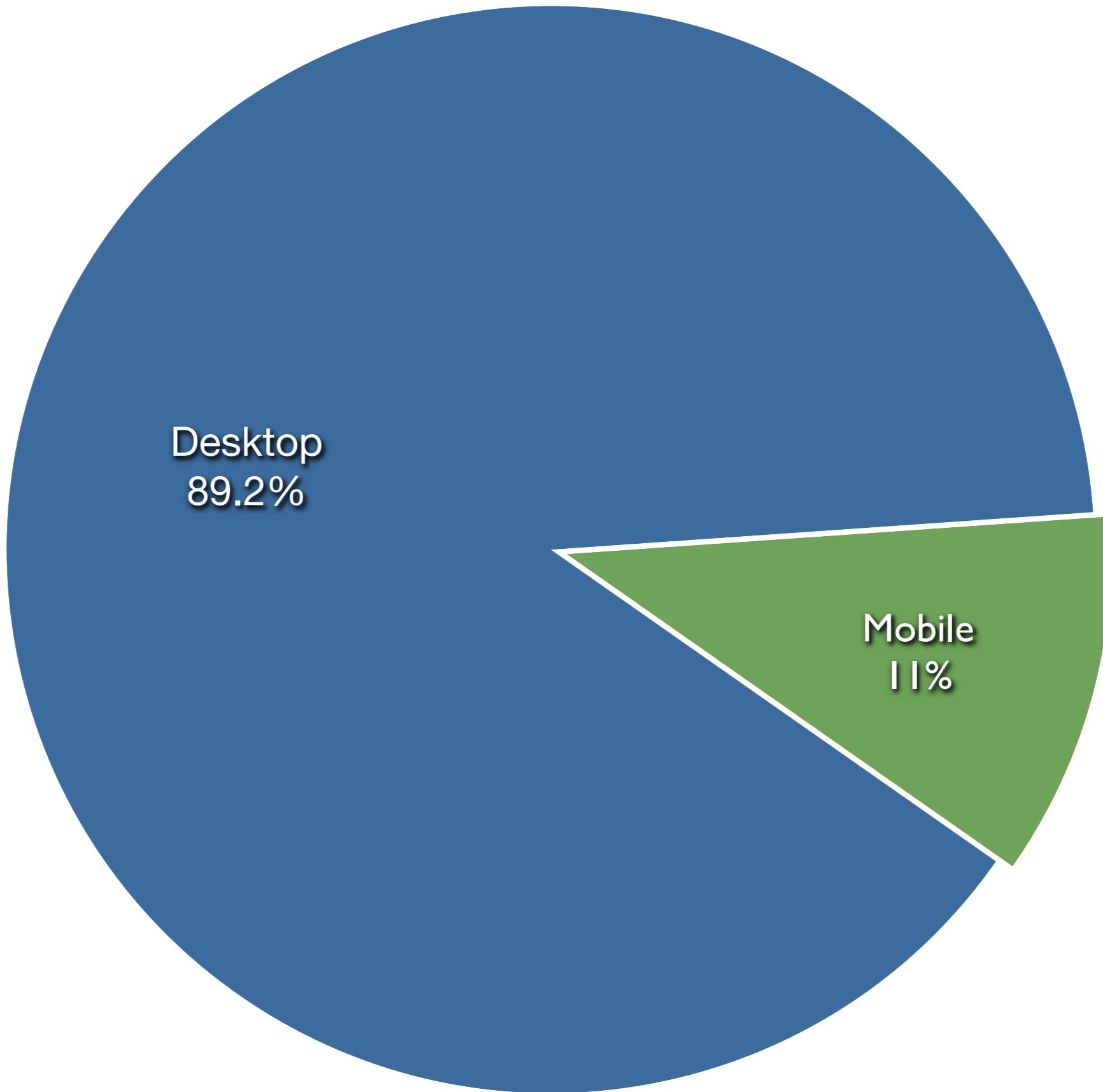
Deployment script

- git clone
- git checkout [sha1]
- copy settings.local.php
- symlink sites/default/files from hanfs mount
- backup database
- symlink change
- drush updatedb
- cache clears

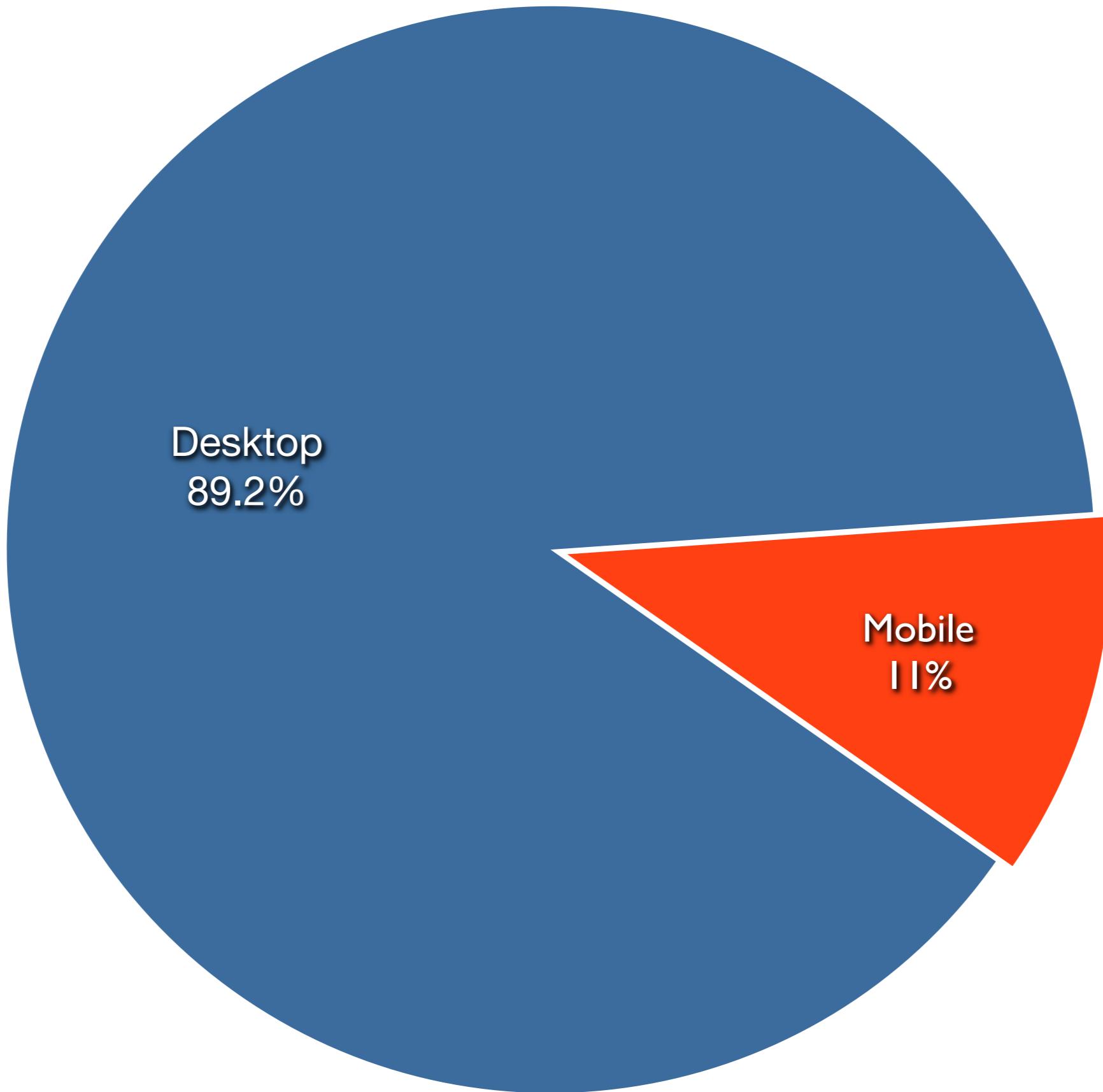




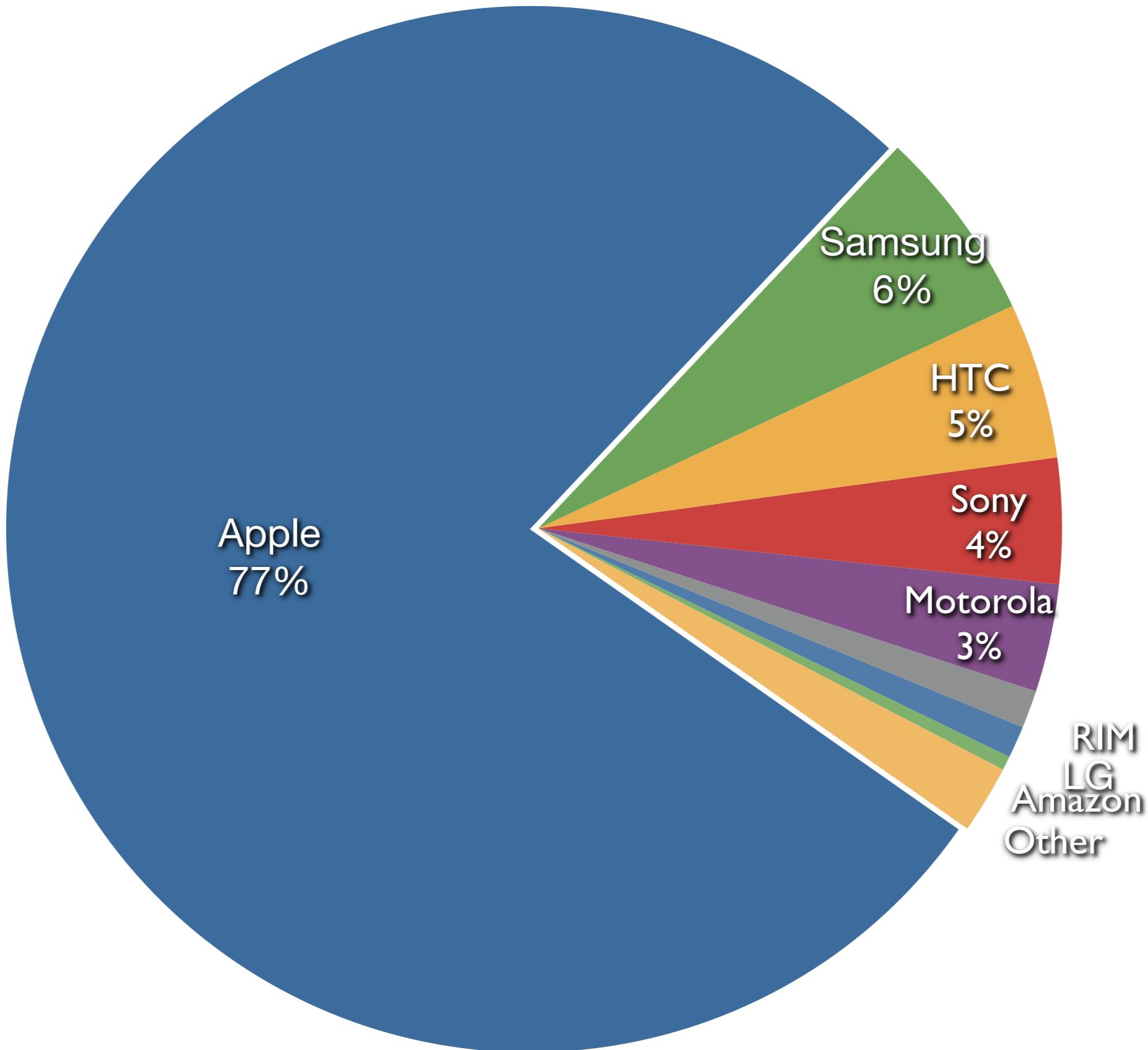
Who are our visitors?



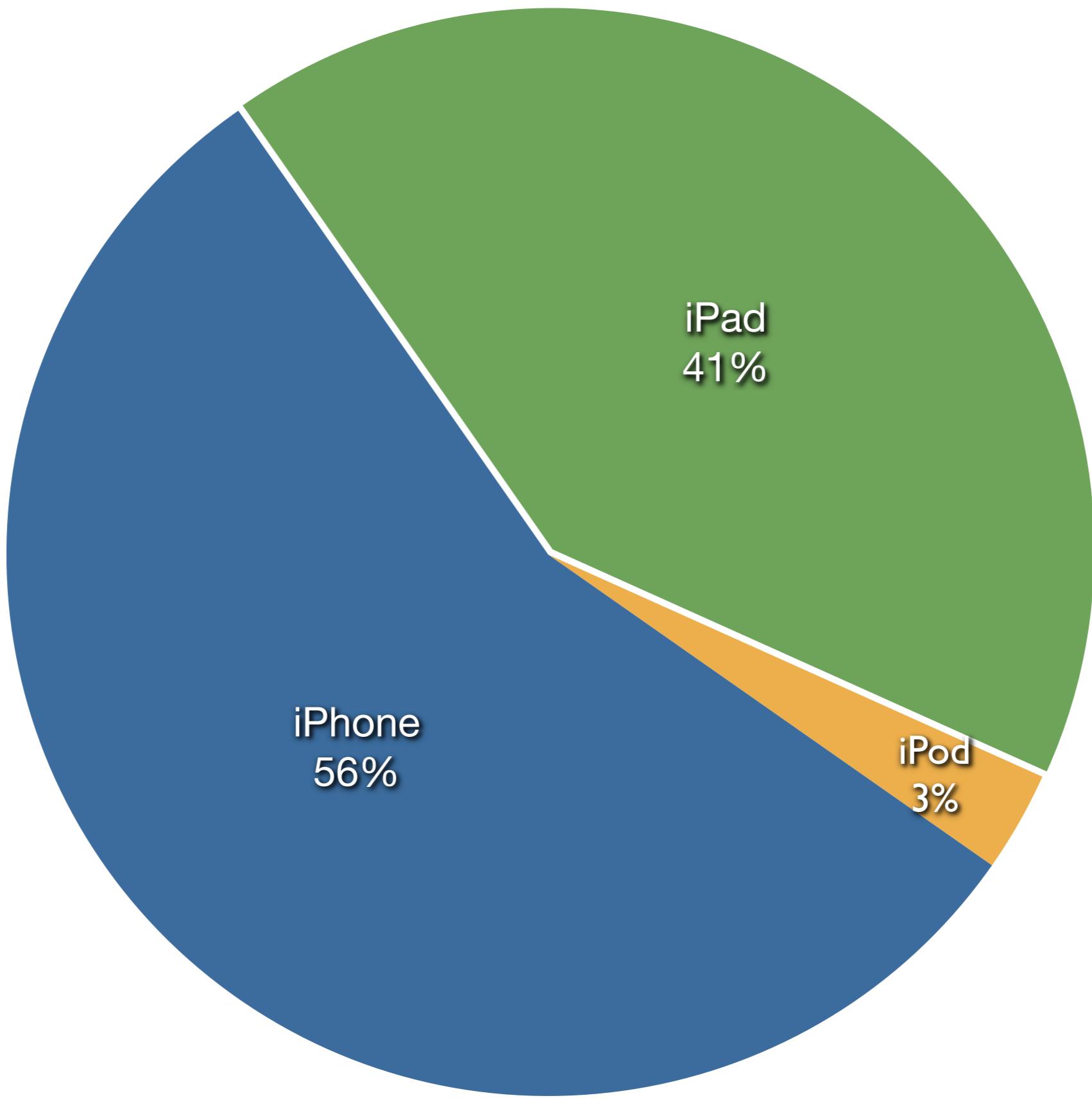
World Wide Visitors by Device Type



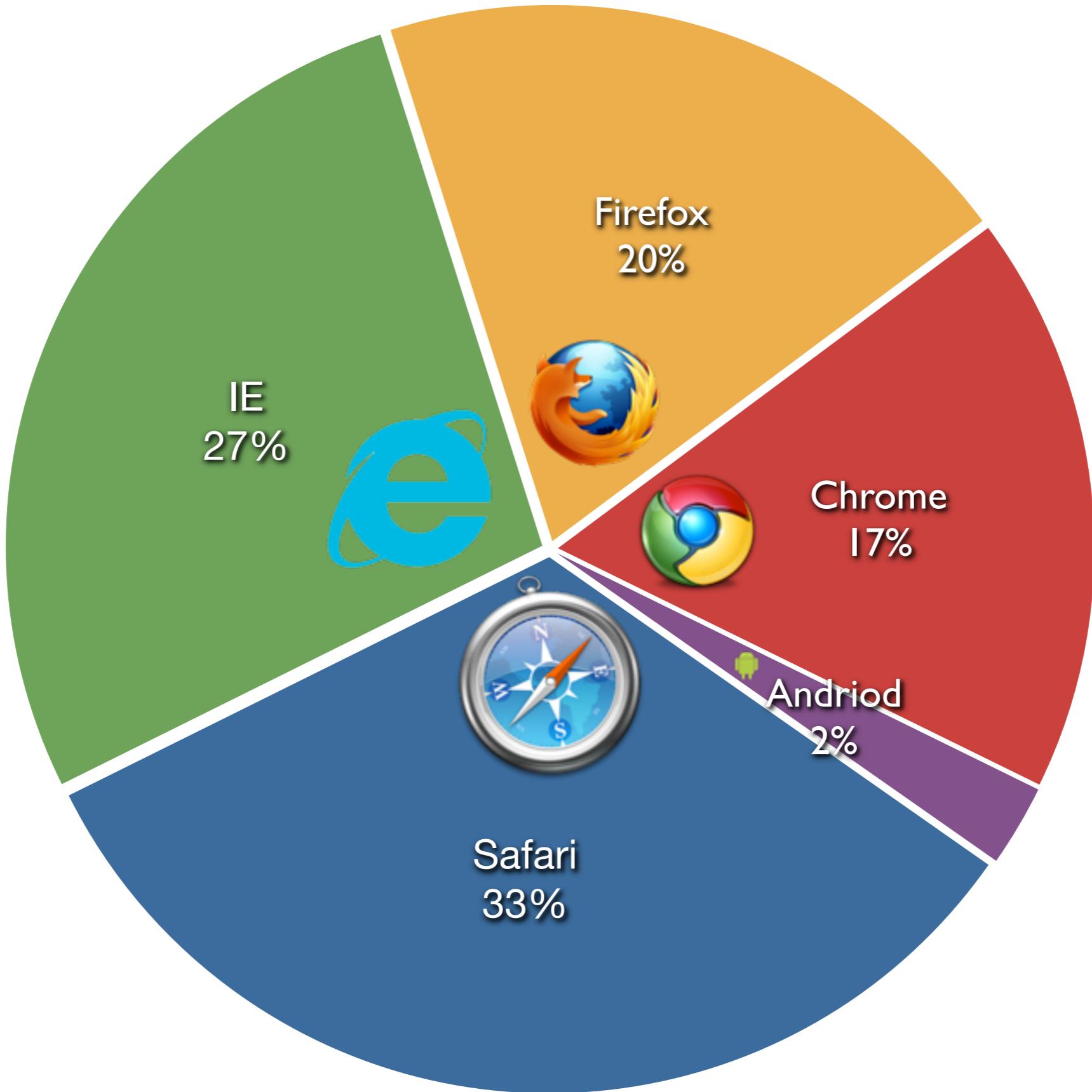
World Wide Visitors by Device Type



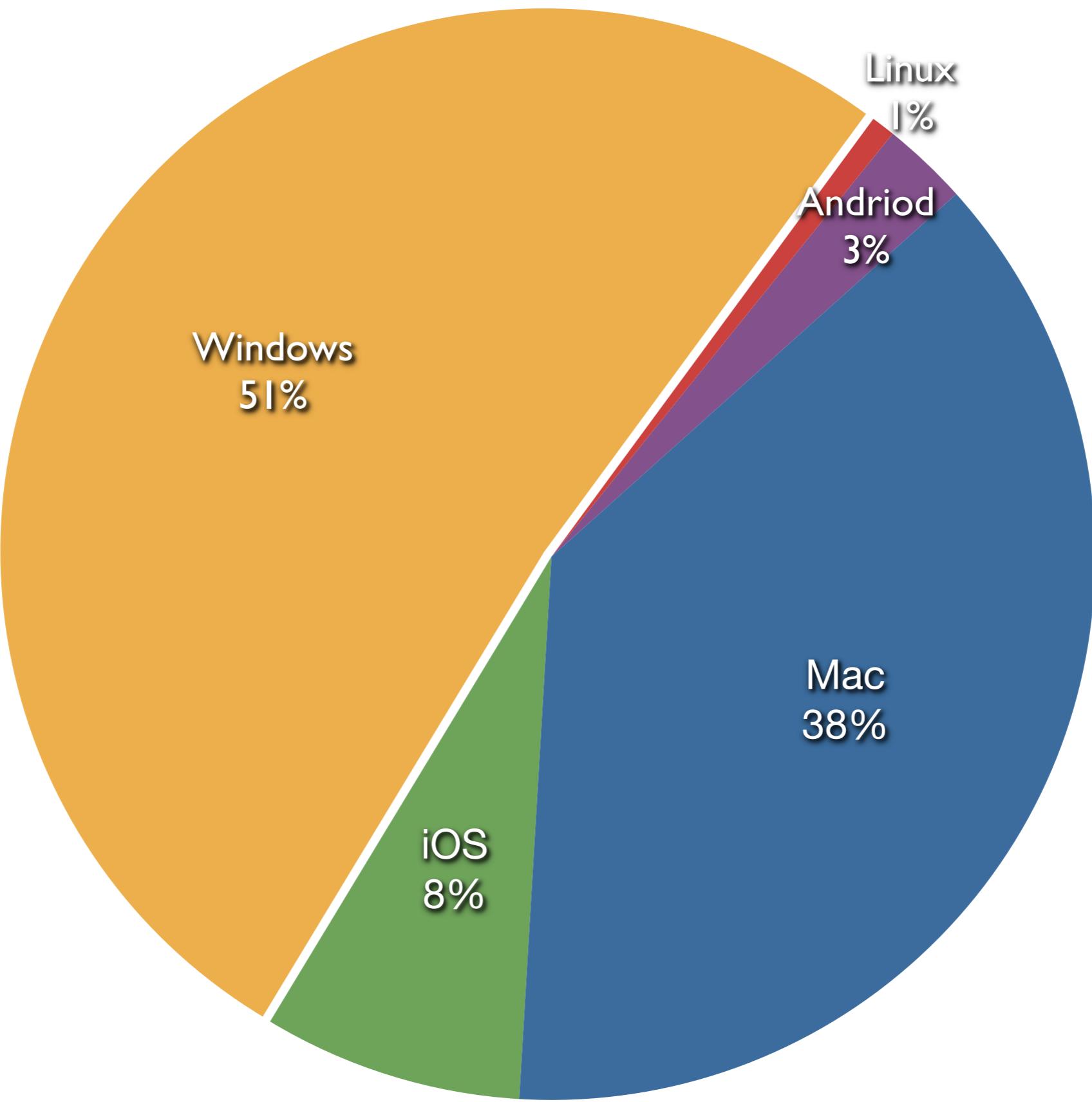
World Wide Mobile Traffic by Device Brand



World Wide Apple Traffic by iDevice



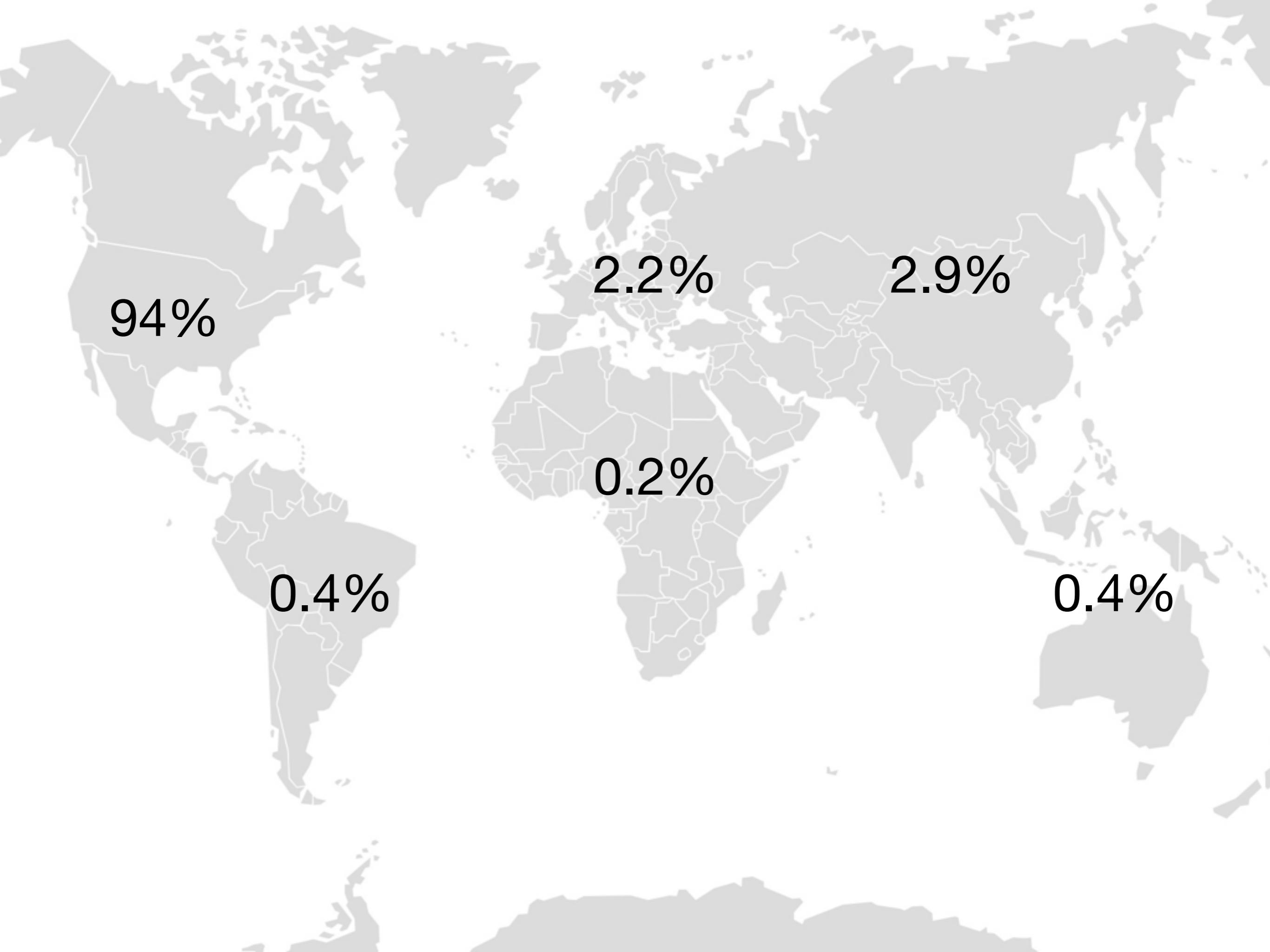
World Wide Traffic by Browser

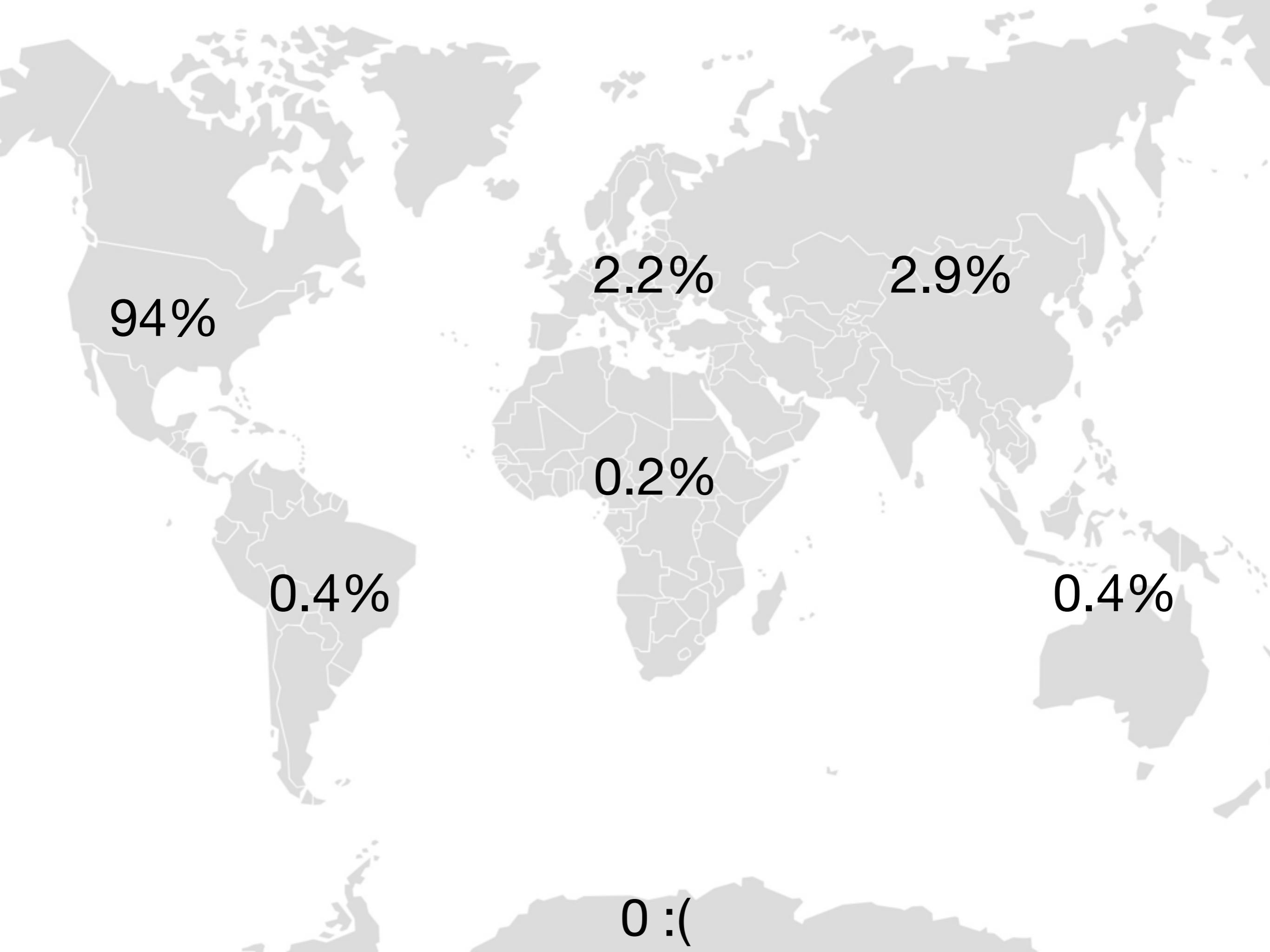


Apple vs Microsoft

Random stats

- 27% of visitors served from campus network
- 25% of total traffic is google search -> homepage
- 60% of traffic leaves within 10 secs
- 20% stay for 1 min+





Top 10 Countries

1. United States	92.5%
2. India	0.79%
3. China	0.64%
4. Canada	0.61%
5. United Kingdom	0.52%
6. Germany	0.29%
7. Australia	0.29%
8. Spain	0.25%
9. Japan	0.19%
10. Saudi Arabia	0.19%

World Wide Visitors by Country

3.7s average load time
2.8s on campus

Top 10 Countries' Load Times

Rank	Country	Percentage	Average Load Time
1.	United States	92.5%	3.2s
2.	India	0.79%	16.7s
3.	China	0.64%	17.8s
4.	Canada	0.61%	3.5s
5.	United Kingdom	0.52%	4.3s
6.	Germany	0.29%	3.4s
7.	Australia	0.29%	7.8s
8.	Spain	0.25%	3.9s
9.	Japan	0.19%	5.0s
10.	Saudi Arabia	0.19%	14.0s

World Wide Visitors by Country + Average Load Time

Top 10 States

1. Colorado	58.4%
2. California	7.0%
3. Texas	3.4%
4. New York	2.4%
5. Illinois	2.3%
6. Florida	1.8%
7. Pennsylvania	1.3%
8. Massachusetts	1.3%
9. Washington	1.3%
10. Virginia	1.2%

United States Visitors by State

3. Texas	3.4%
4. New York	2.4%
5. Illinois	2.3%
6. Florida	1.8%
7. Pennsylvania	1.3%
8. Massachusetts	1.3%
9. Washington	1.3%
10. Virginia	1.2%

48. South Dakota
49. West Virginia
50. North Dakota
51. Delaware

Top 10 Cities

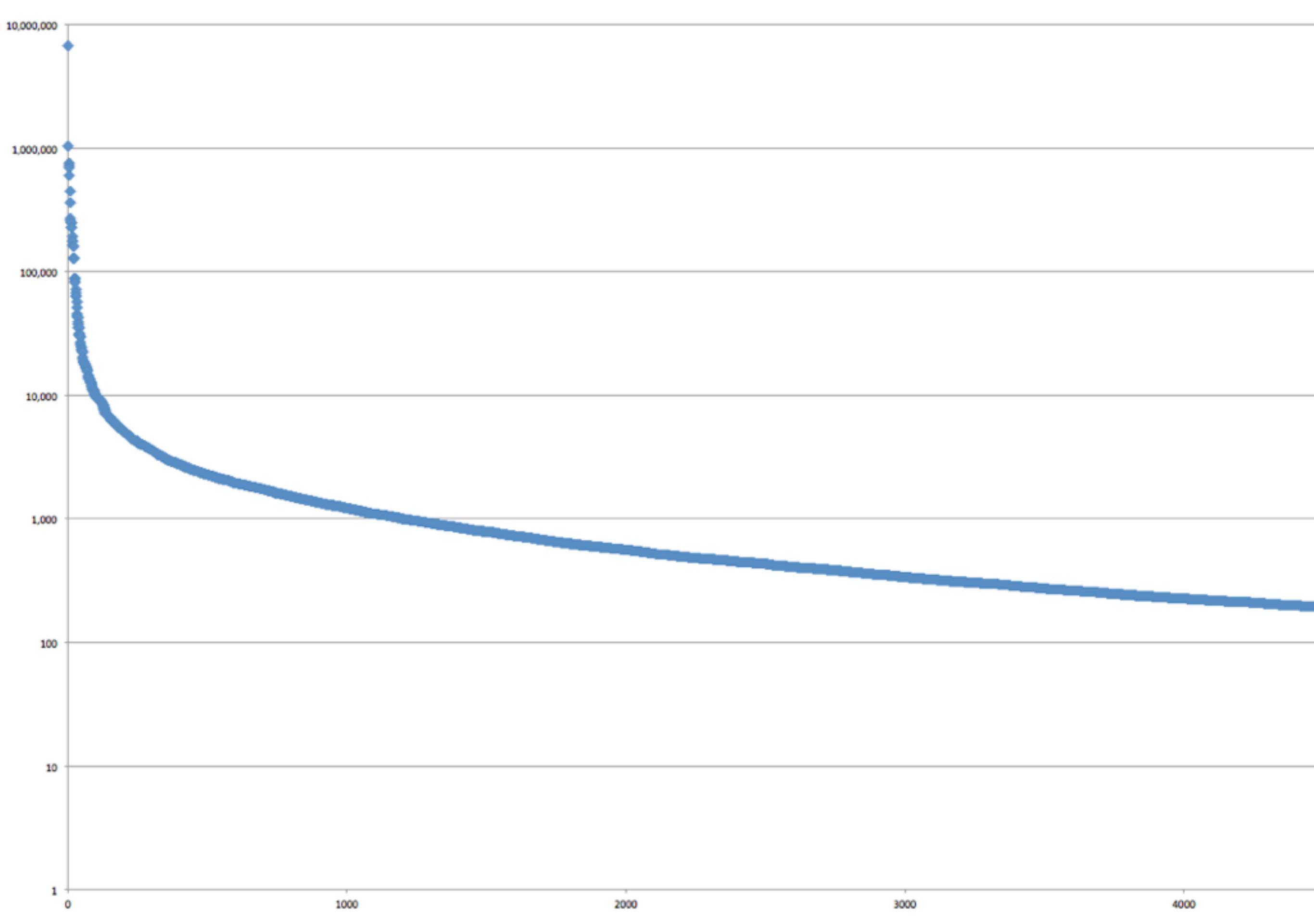
1. Boulder	38.1%
2. Denver	8.7%
3. New York	1.2%
4. Colorado Springs	1.2%
5. Los Angeles	0.8%
6. Littleton	0.8%
7. Eldorado Springs	0.7%
8. Broomfield	0.7%
9. Longmont	0.7%
10. Chicago	0.6%

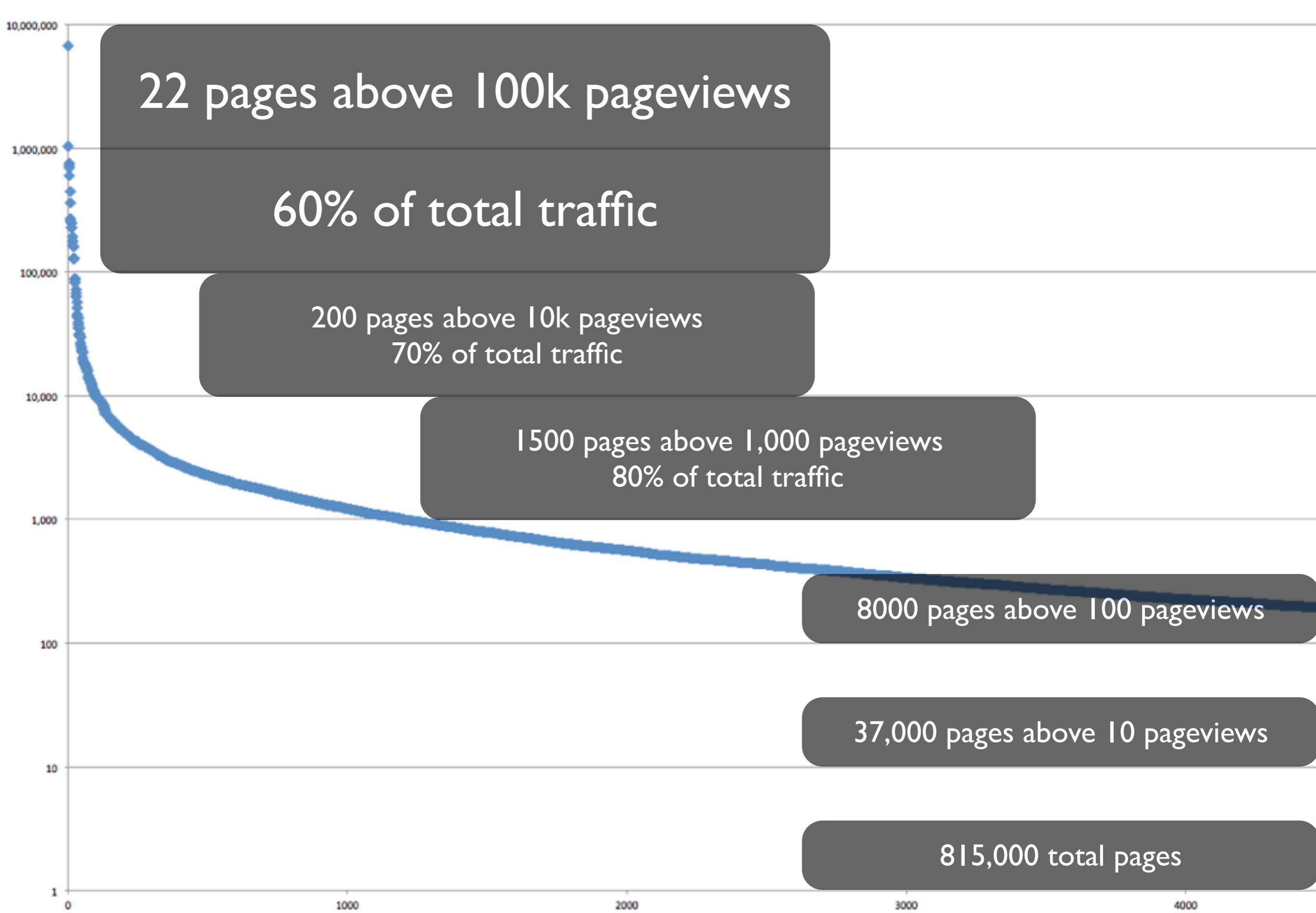
World Wide Visitors by City

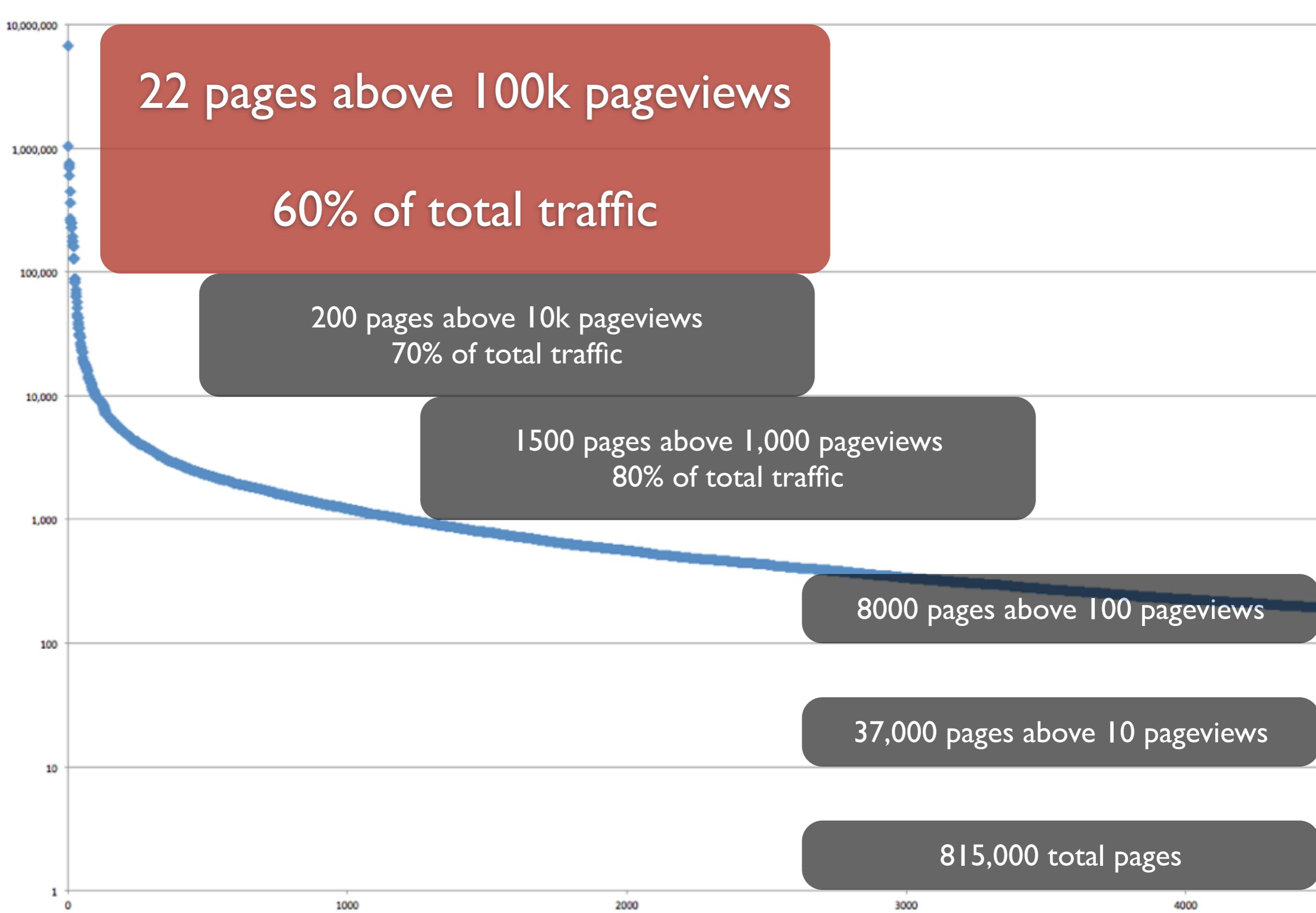
Top 10 Internal Searches

1. culink
2. calendar
3. library
4. cu link
5. housing
6. tuition
7. academic calendar
8. jobs
9. bookstore
10. mycuinfo

**25 million pageviews
in 2012**







Next Steps

- ✓ Phase I: Infrastructure (new & legacy) & website
- ▶ Phase II: Drupal CMS service
- ▶ Phase III: Web application hosting



Expected Outcomes

- Unified campus support & service structure
- Campus-wide CMS Services
 - Self-service website configuration
 - Professional services
- Centralized training & support
- Web application hosting







Questions?