Janos Pasztor

How I built my own CDN for less than 100$ a month

Stuff I do


ENTRECLOUD


The Ops Notepad
document your cloud


LET'S
CODE
.HU


Opsbears
We BEAR the load of IT operations


IntoTech


Refactor
ZONE


Refaktor
Magazin

Follow me!

https://pasztor.at

@janoszen

About this talk

1. The problem with CDNs

About this talk

1. The problem with CDNs
2. How does a CDN work?

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1. The problem with CDNs
2. How does a CDN work?
3. Static content CDN

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1. The problem with CDNs
2. How does a CDN work?
3. Static content CDN
4. Hosting dynamic content

Assumptions

You know what HTTP is.

Assumptions

You know what HTTP is.

You know what a DNS is.

Assumptions

You know what HTTP is.

You know what a DNS is.

You know what a CDN is.

Warning!

Don’t do this at home!

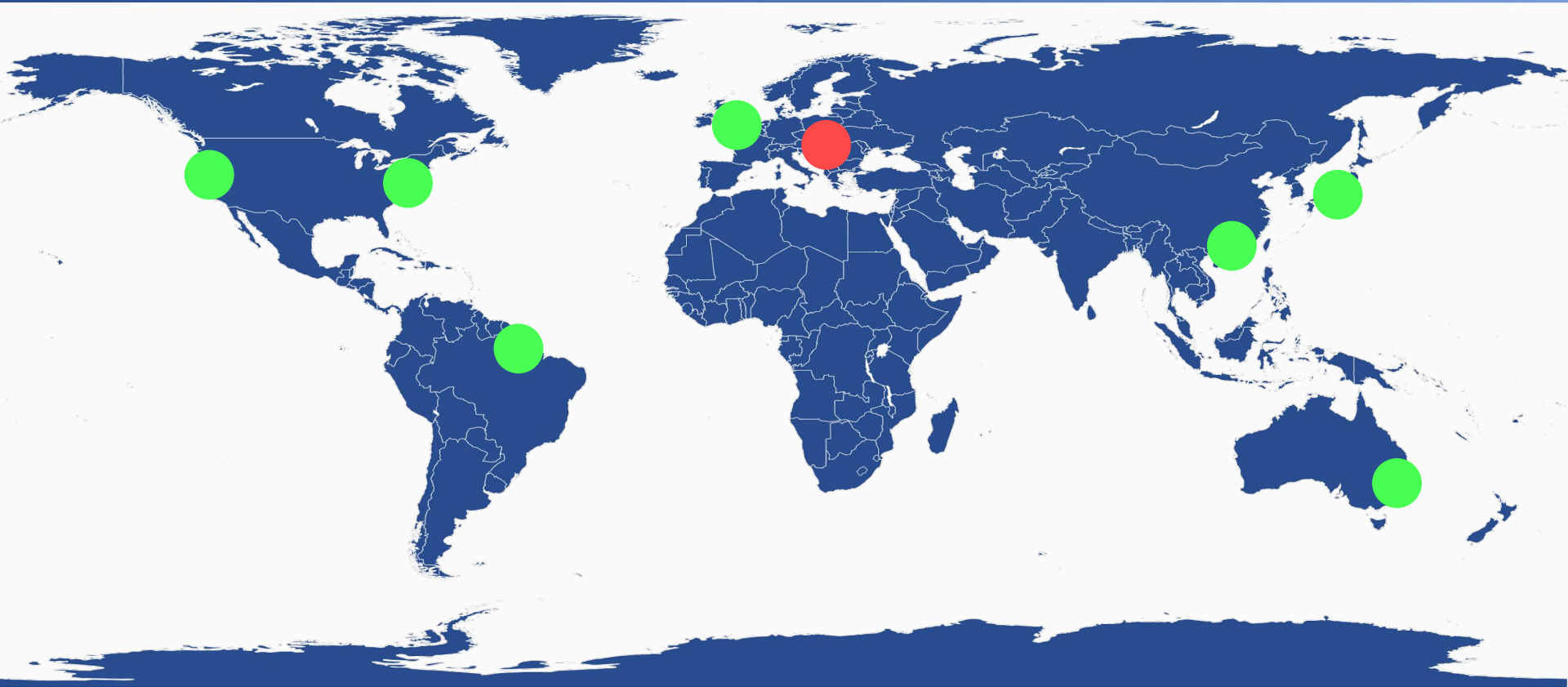
This is as experimental as it gets.

The problem with CDNs

Low-traffic sites don’t work well with a CDN

The problem with CDNs

The problem with CDNs



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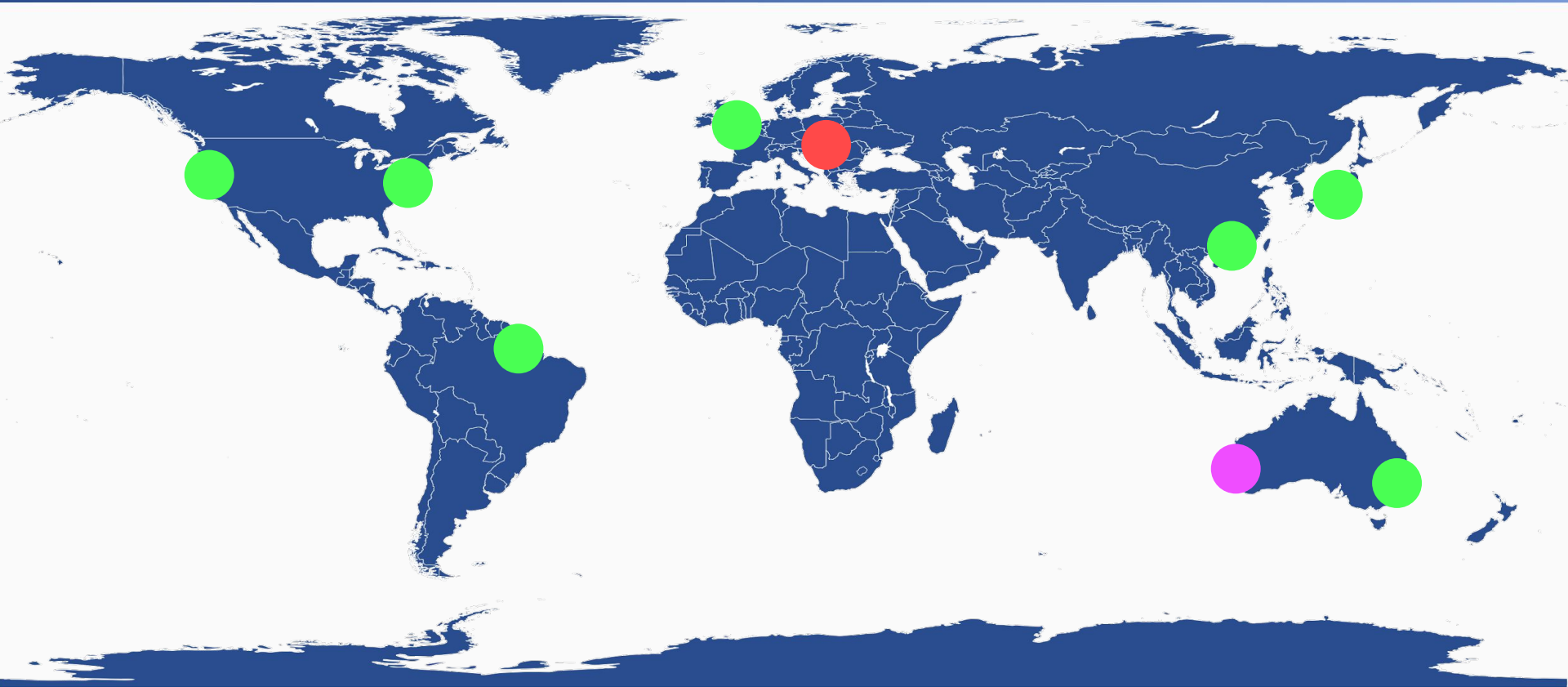

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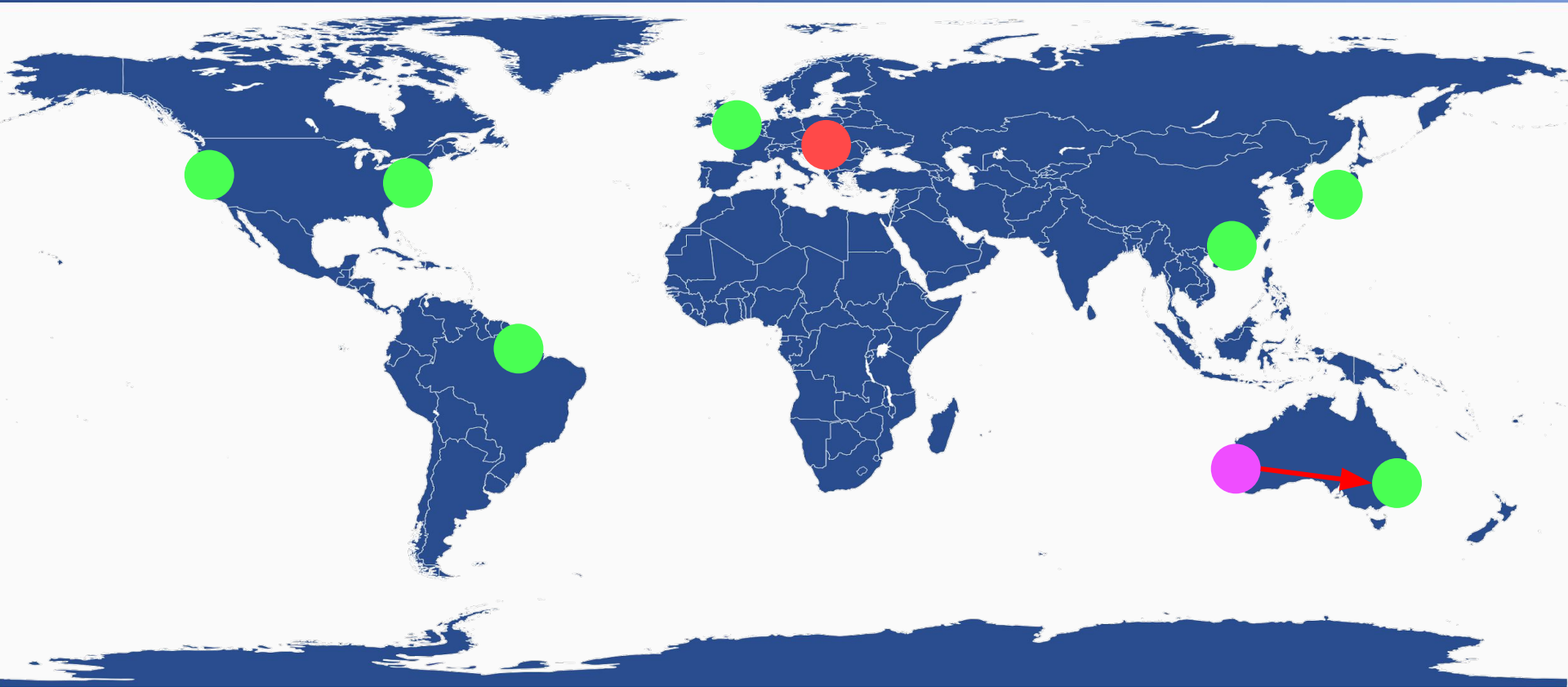

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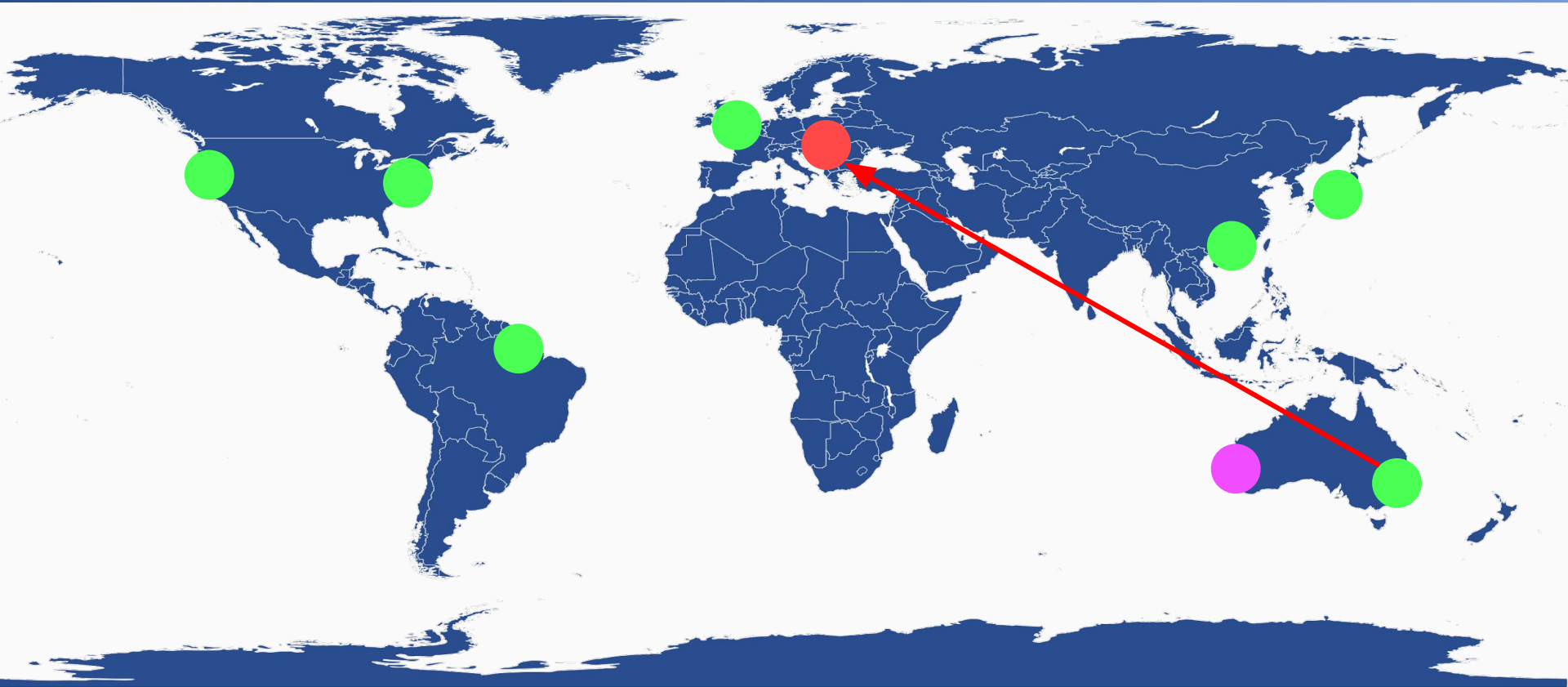

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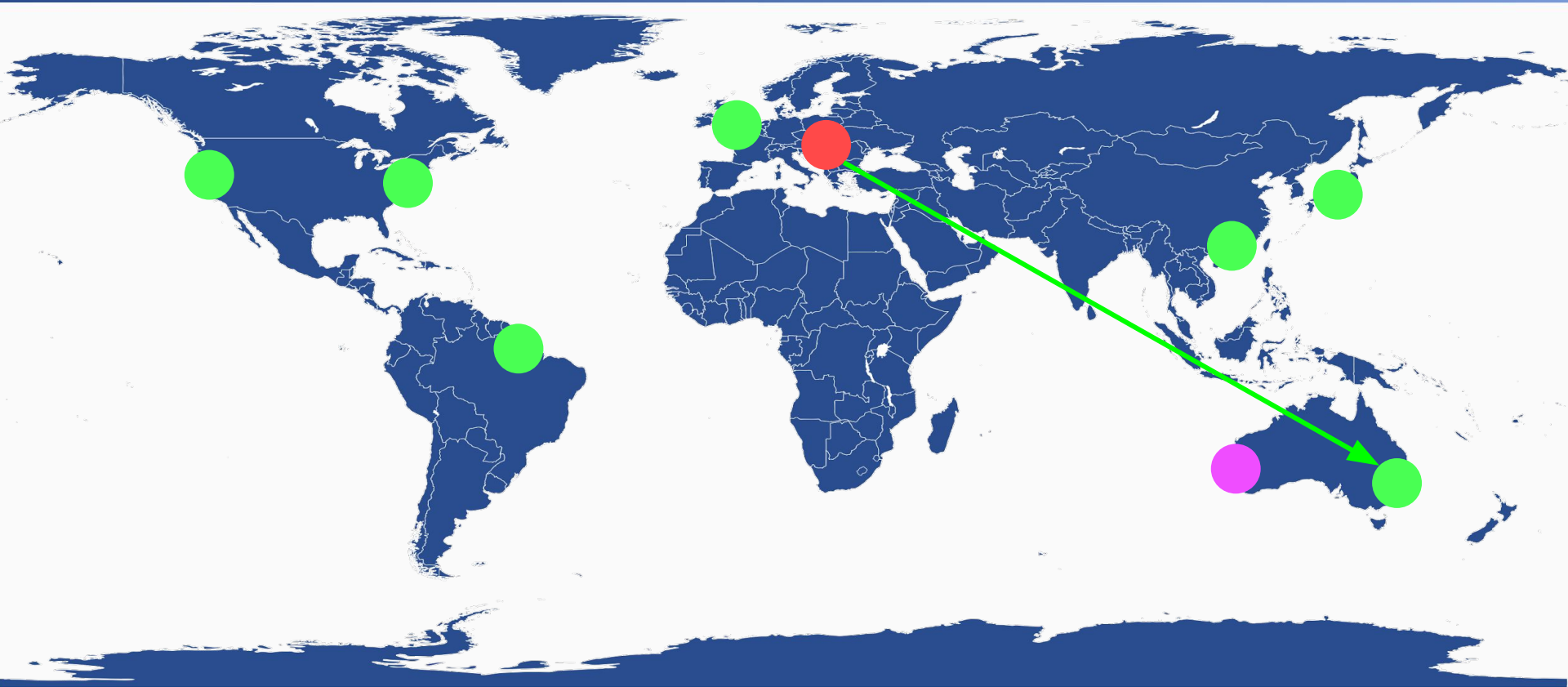

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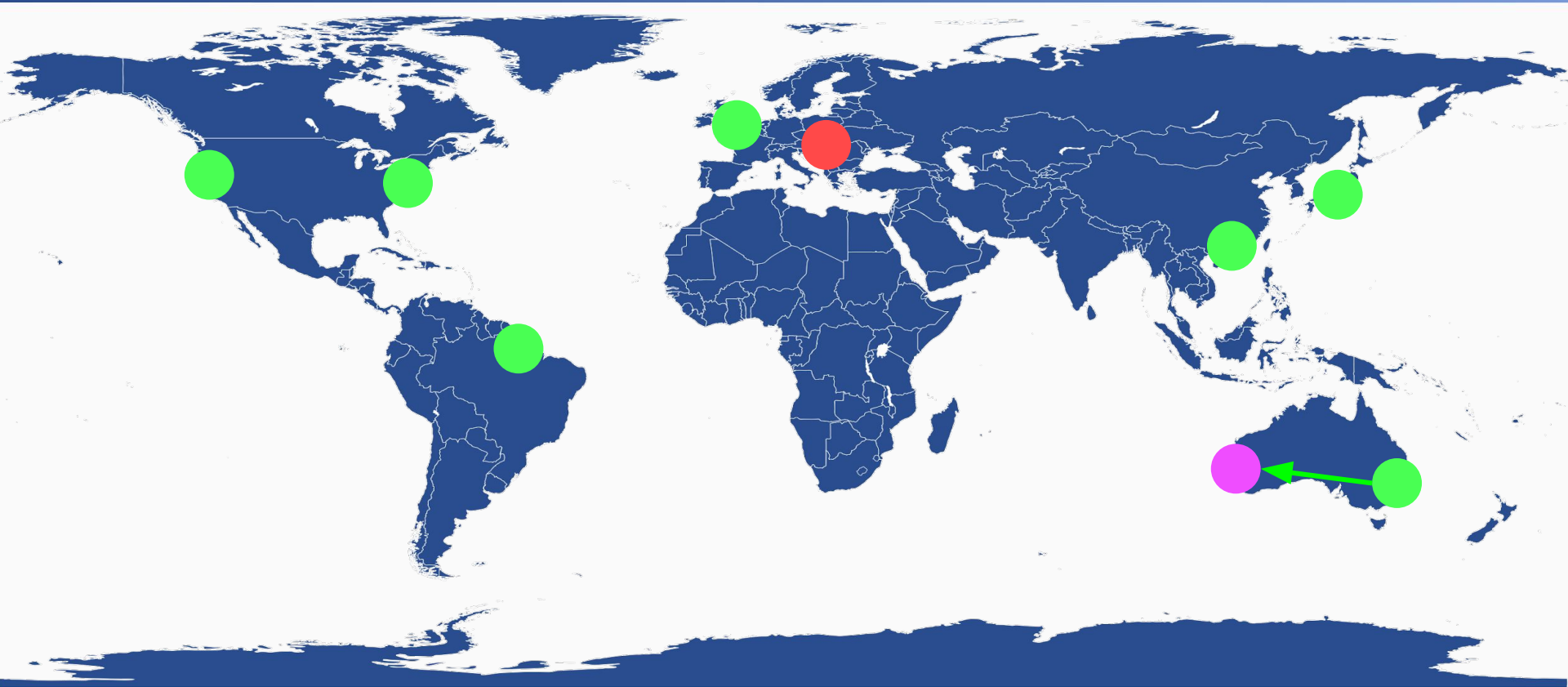

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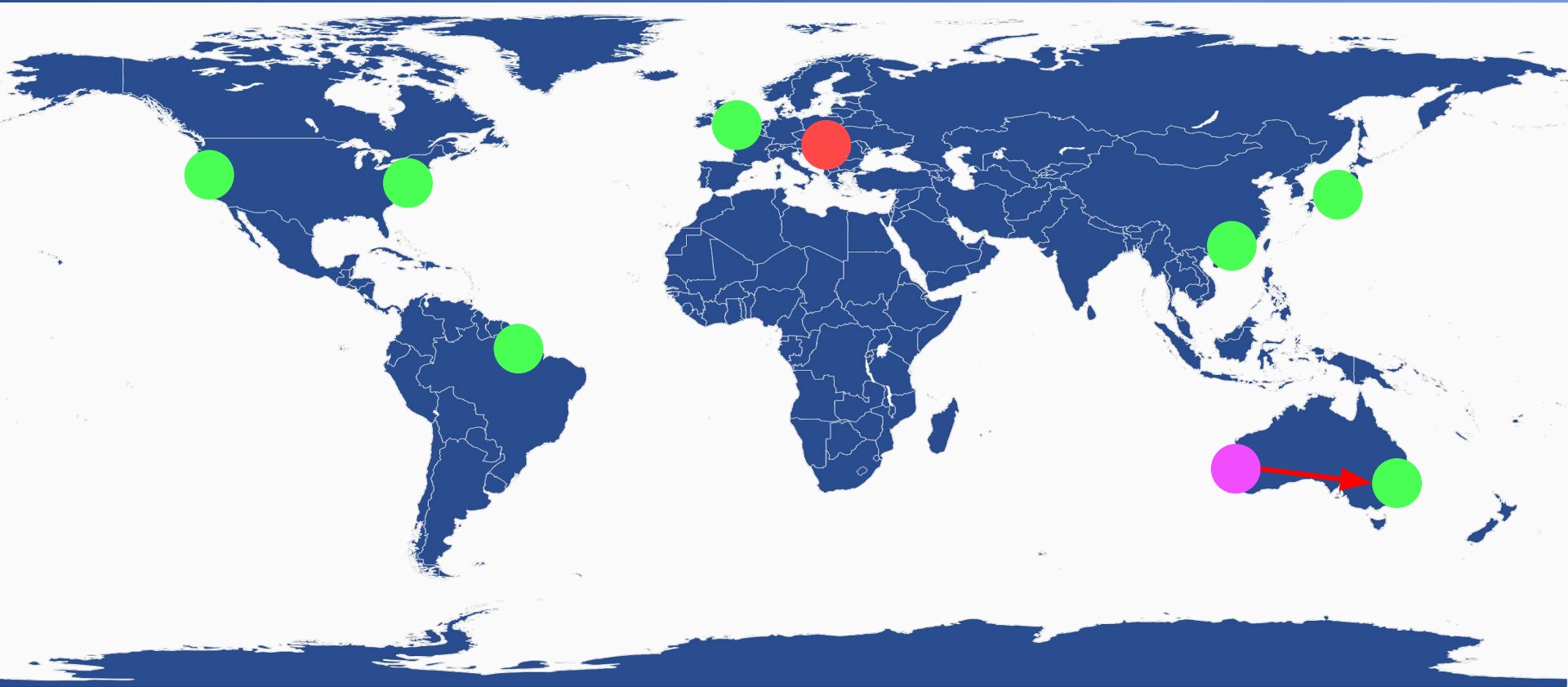

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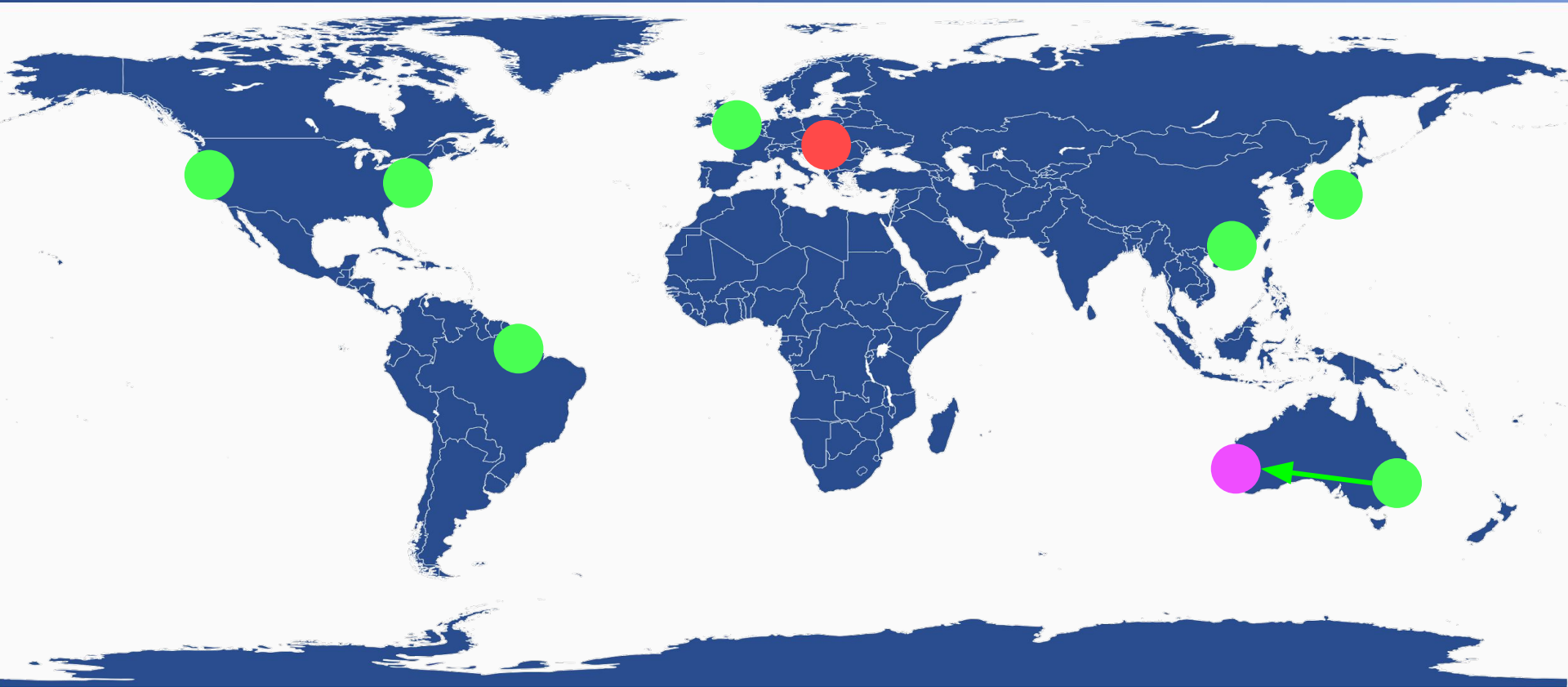

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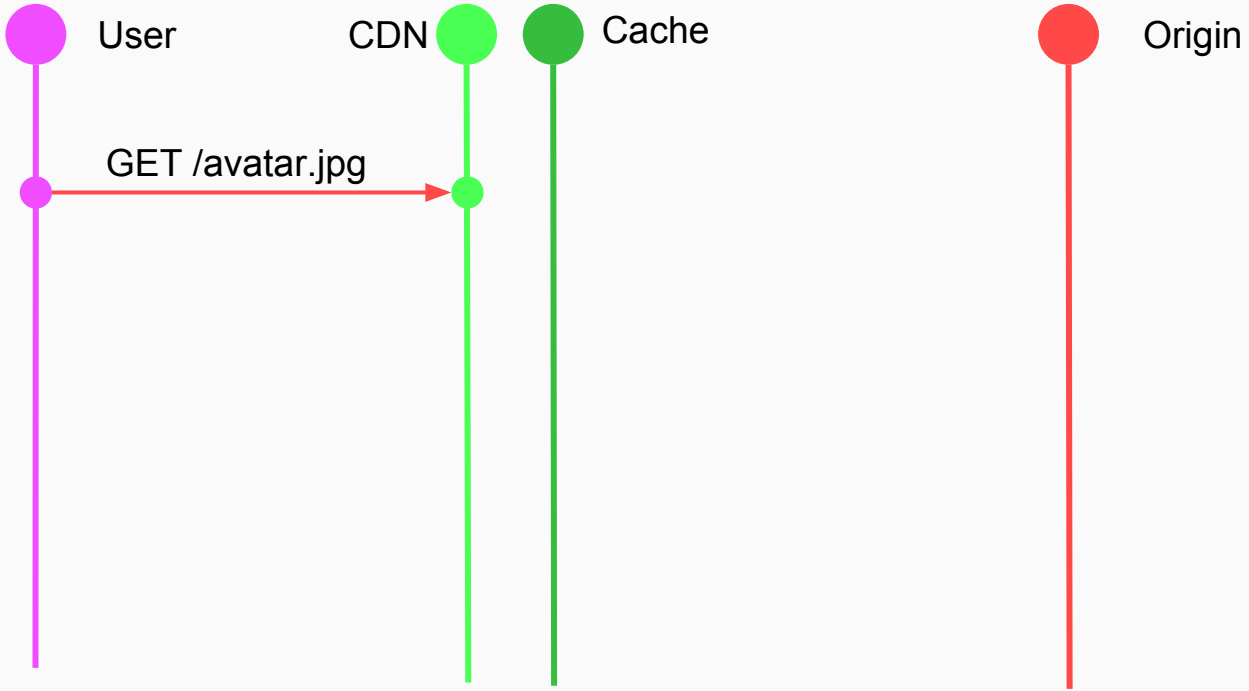

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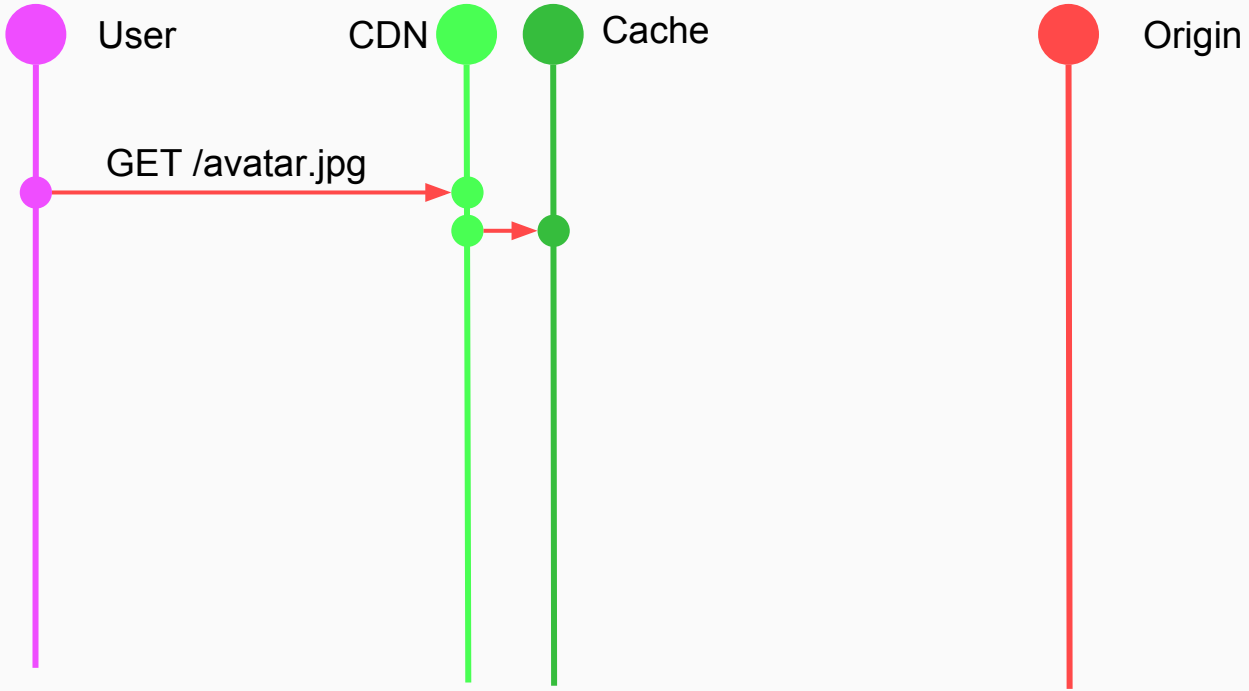

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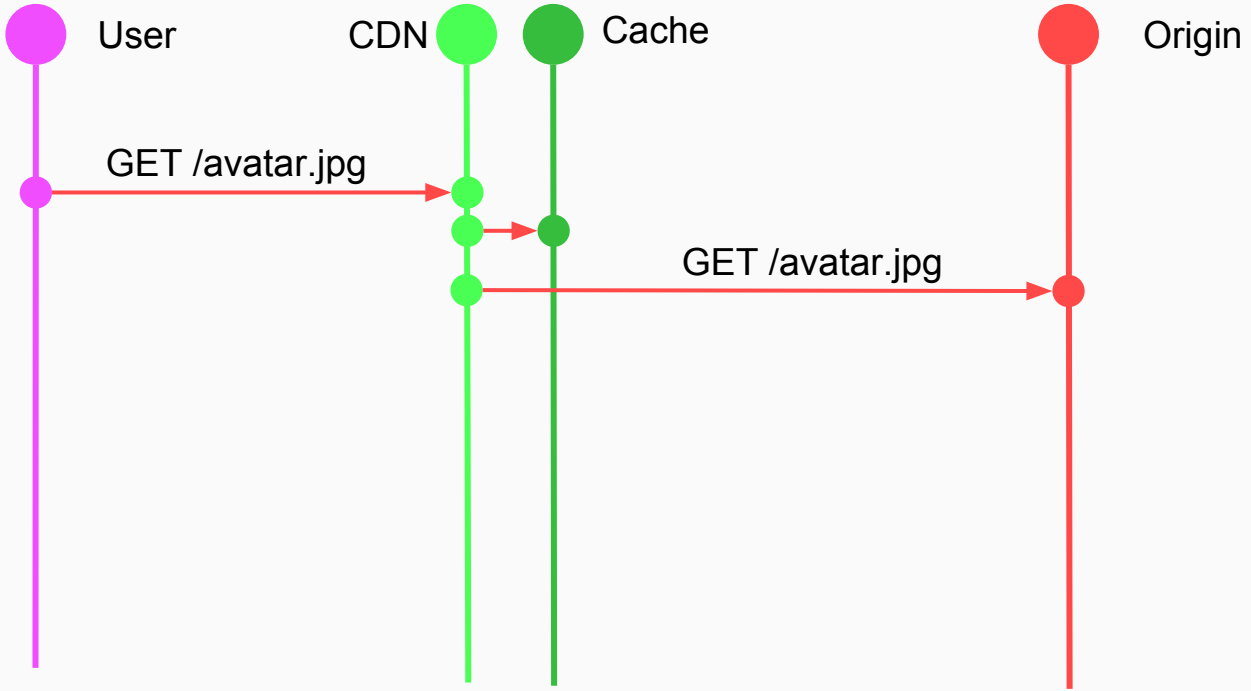

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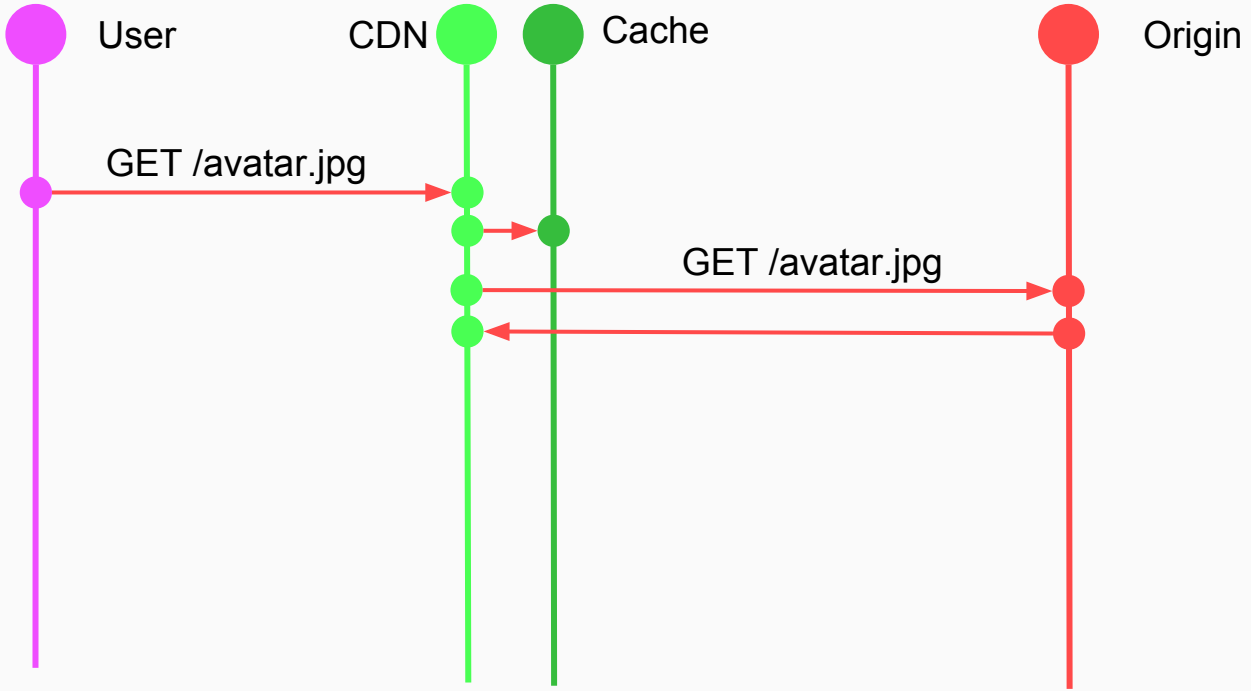

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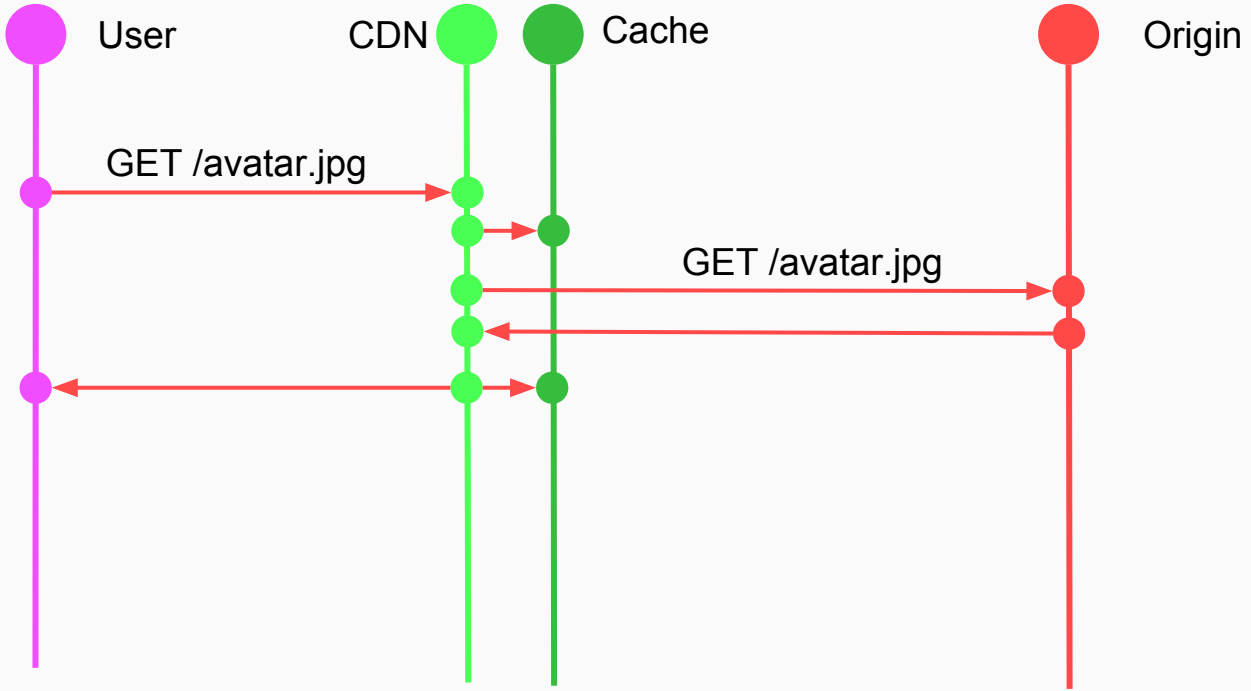

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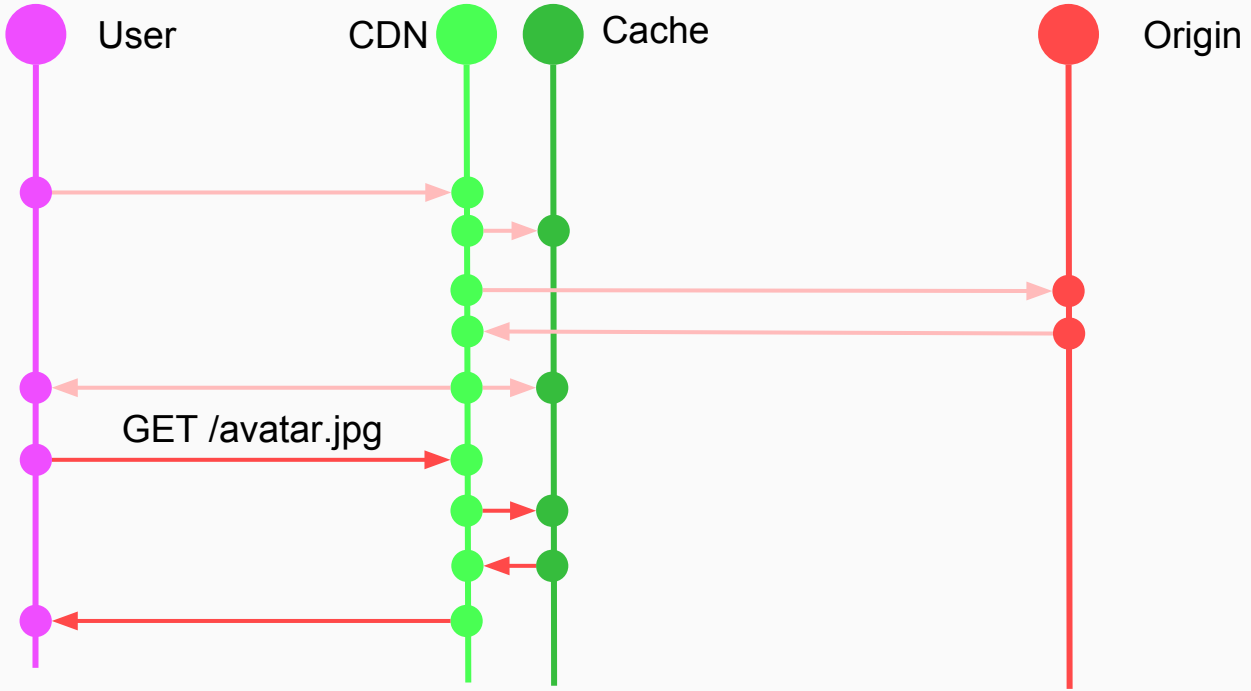

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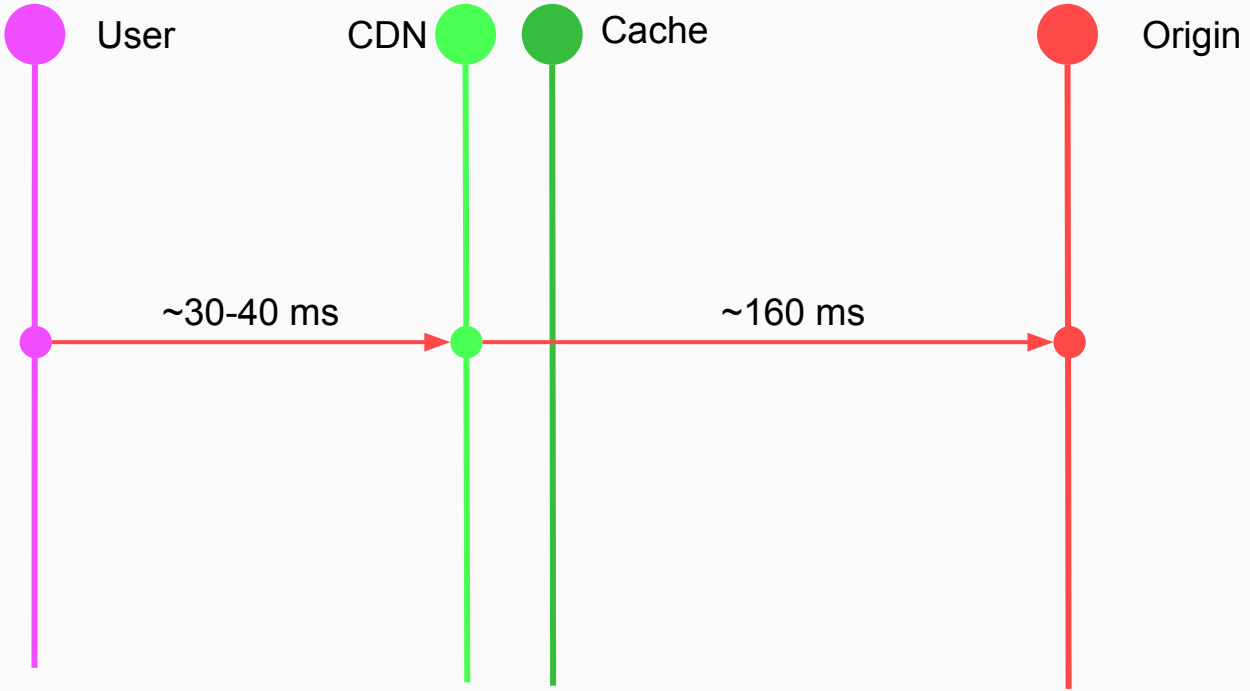

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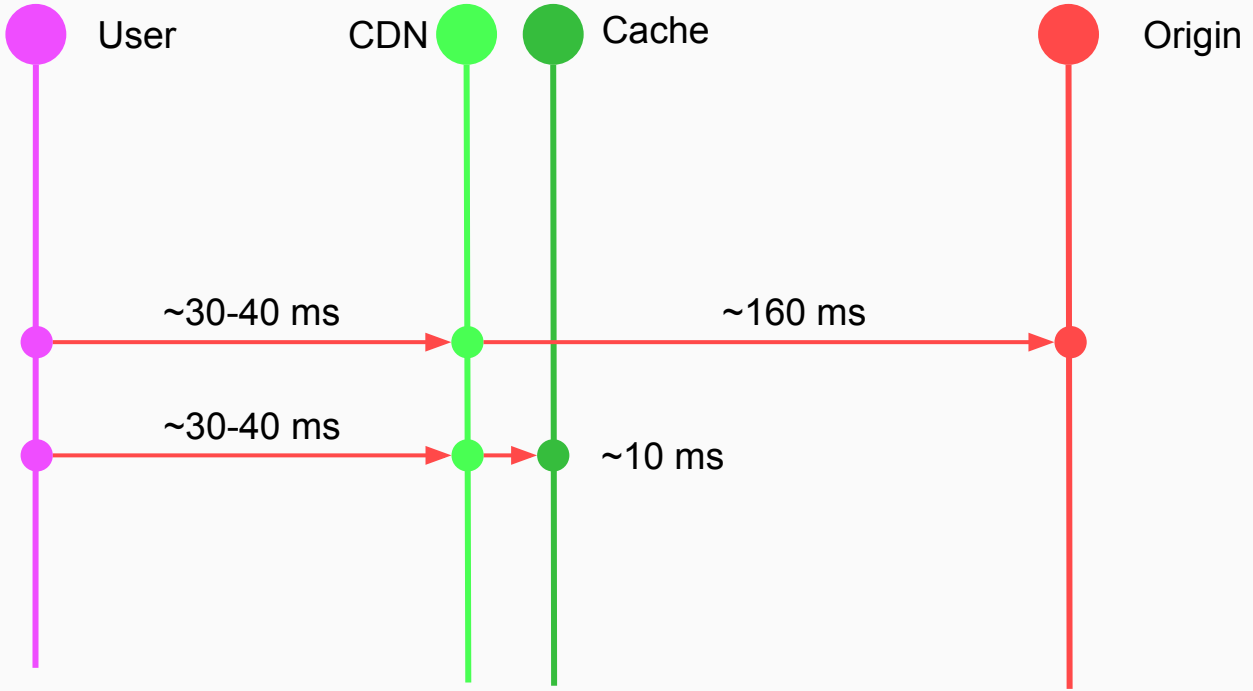

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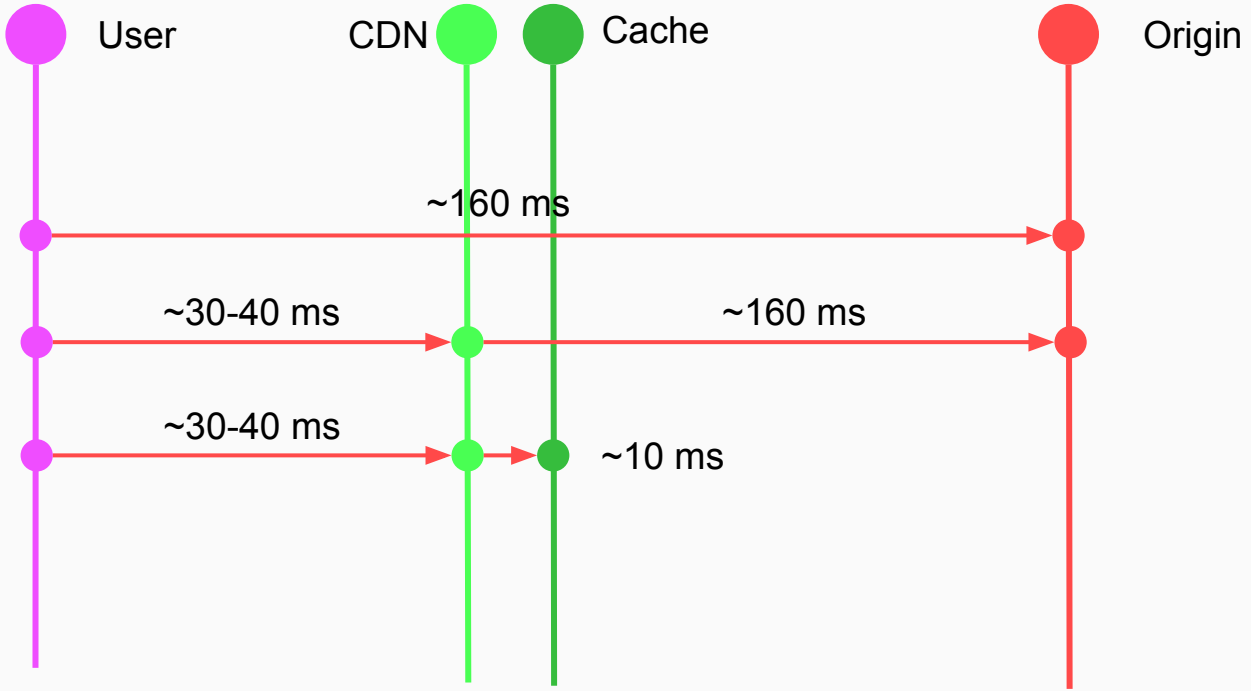

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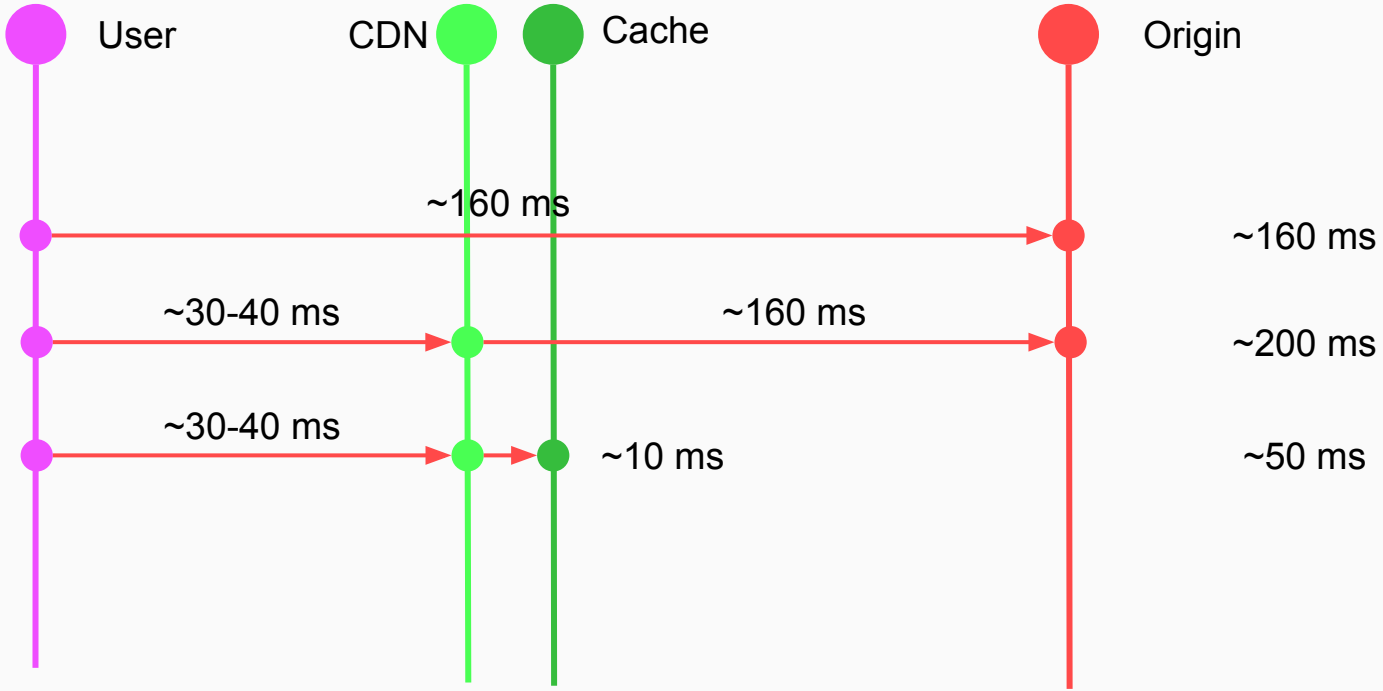


The problem with CDNs

Workaround:

The problem with CDNs

Workaround:

Cache-Control: s-maxage=31536000

The problem with CDNs

Caveat:

All files must have unique URLs!

Does not always work.

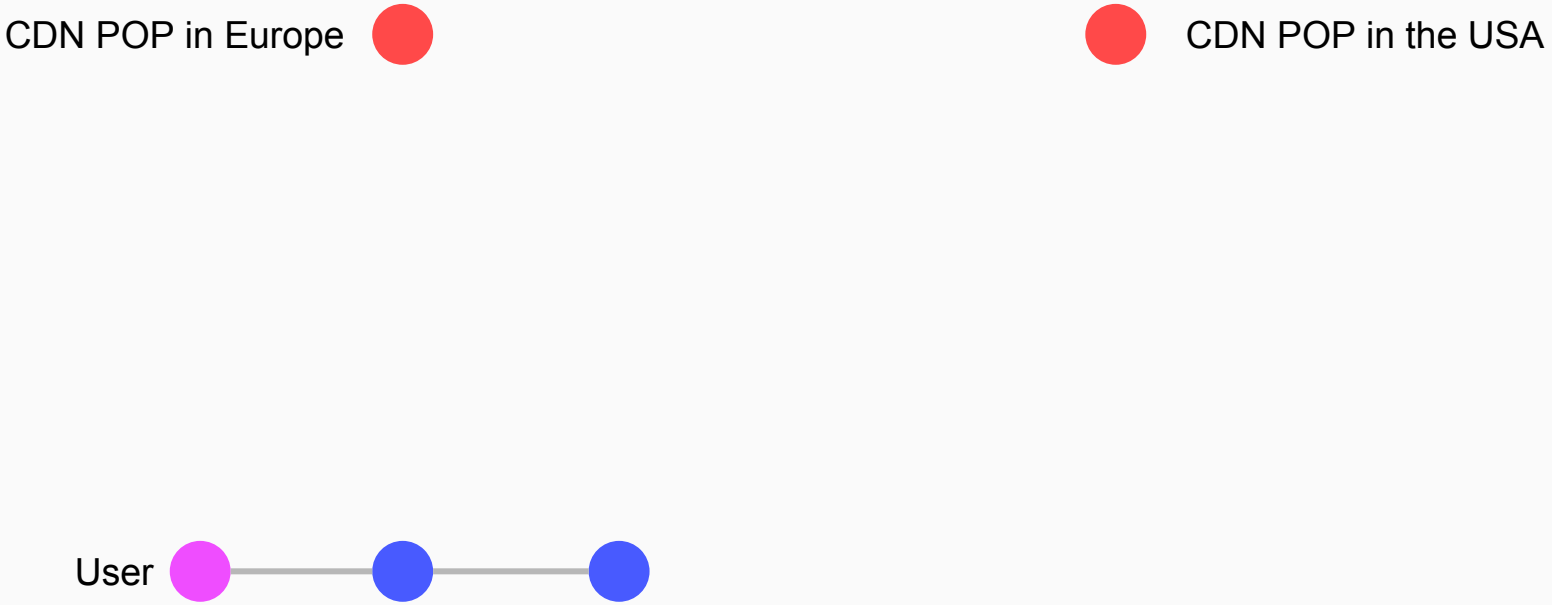
How do CDNs work?

Locating the proper edge node

How do CDNs work?

How do CDNs work?

How do CDNs work?



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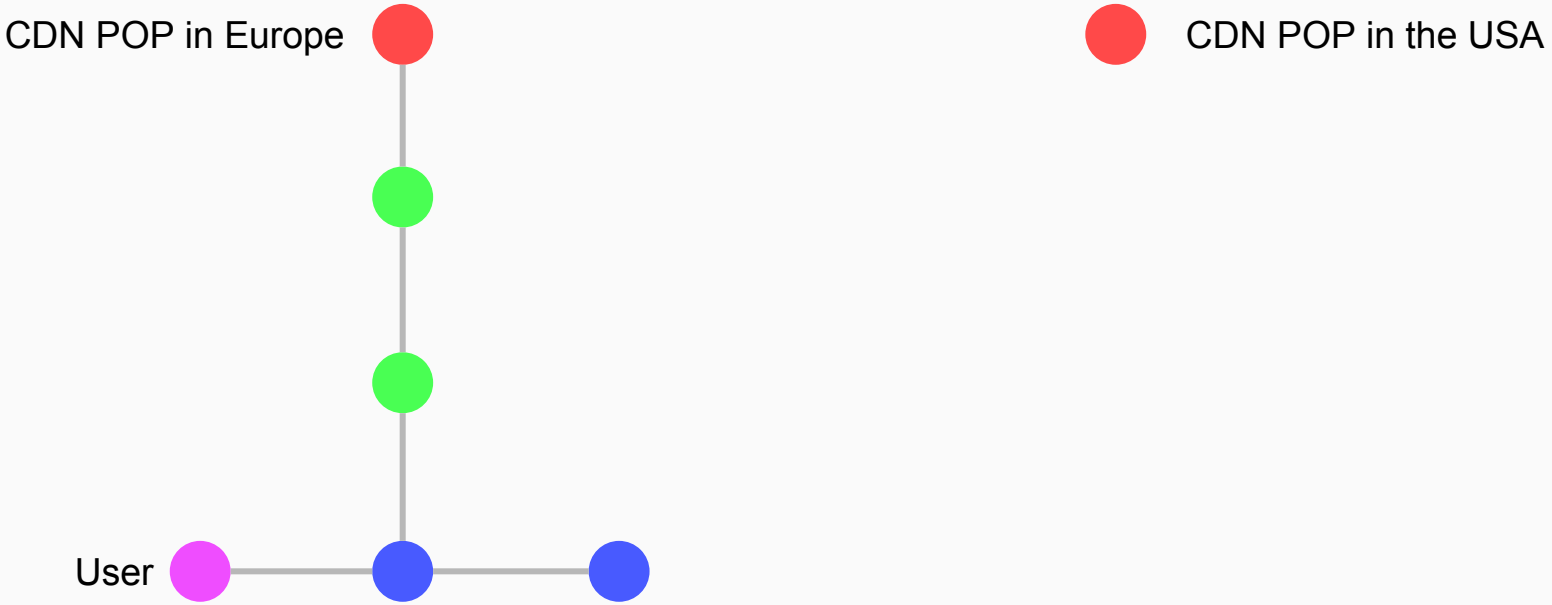

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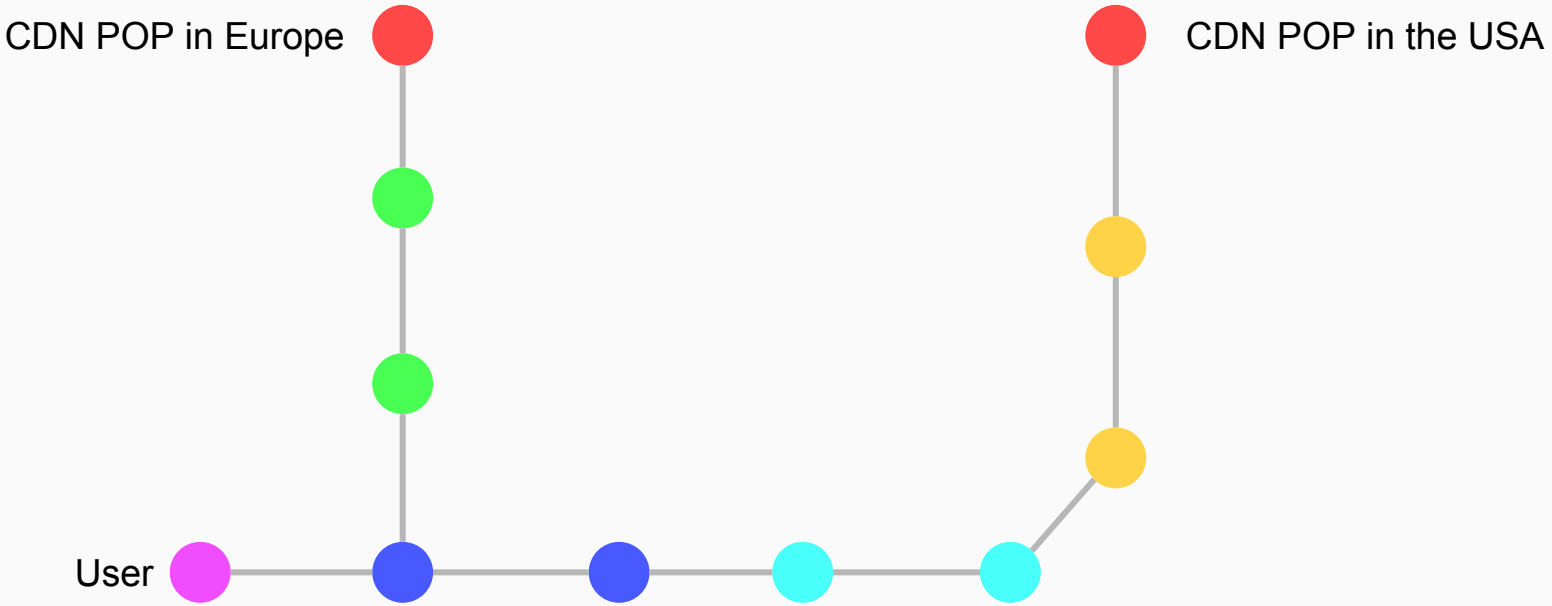

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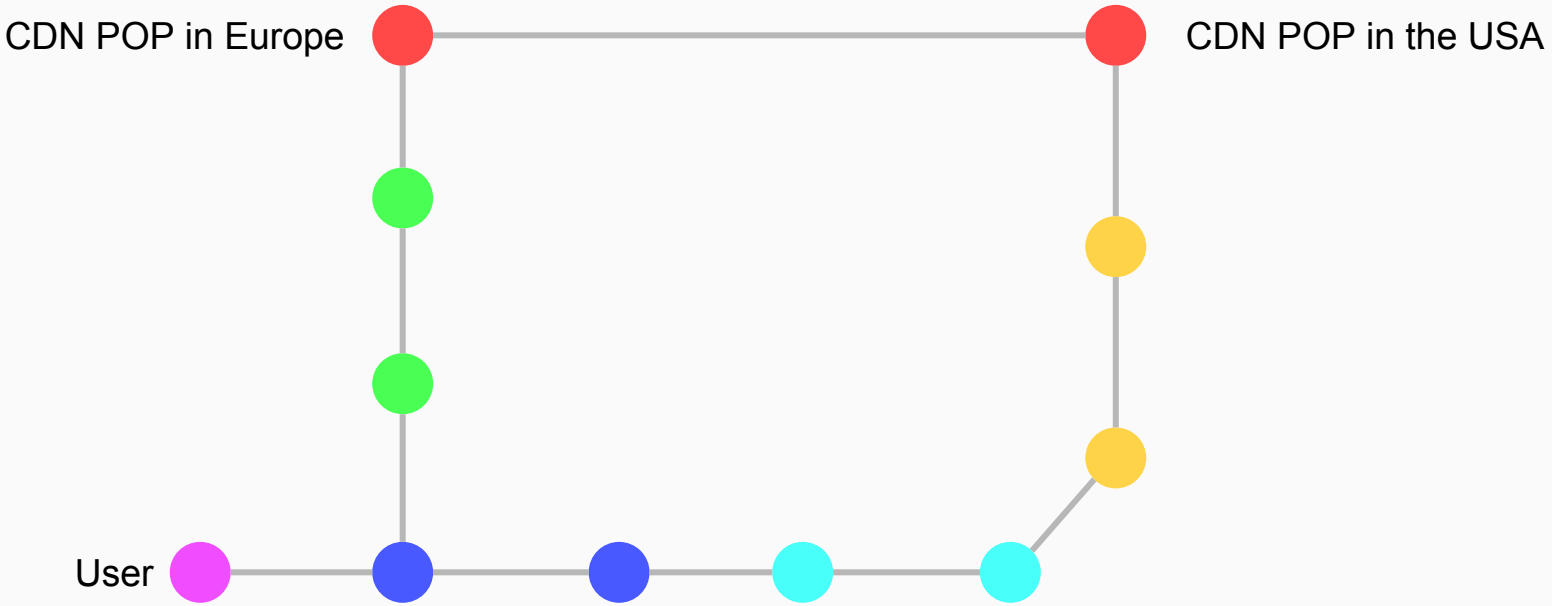

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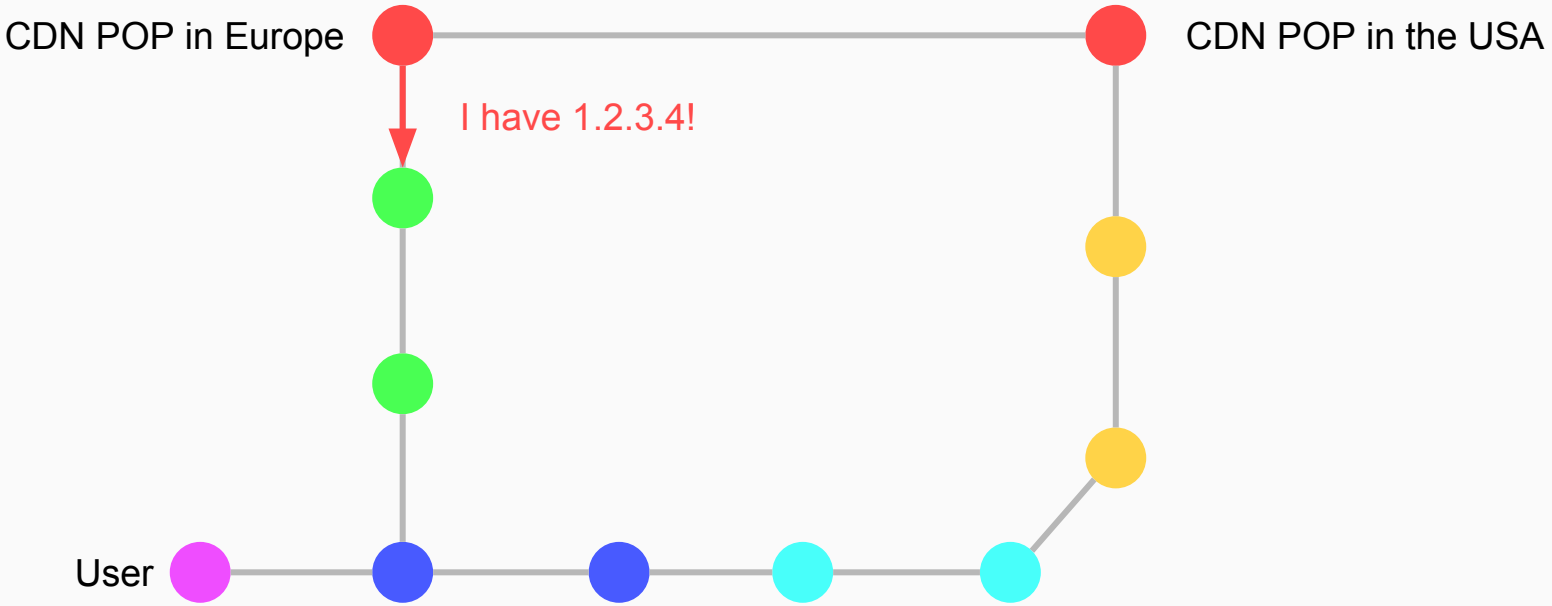

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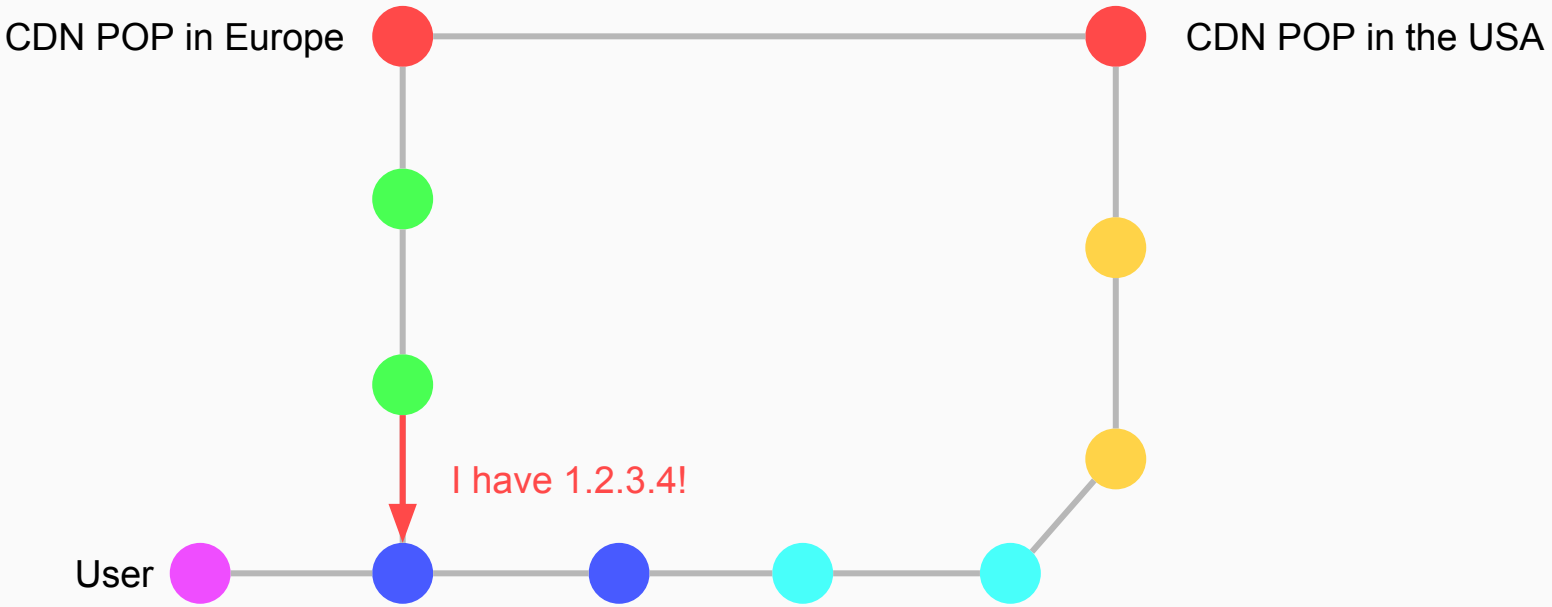

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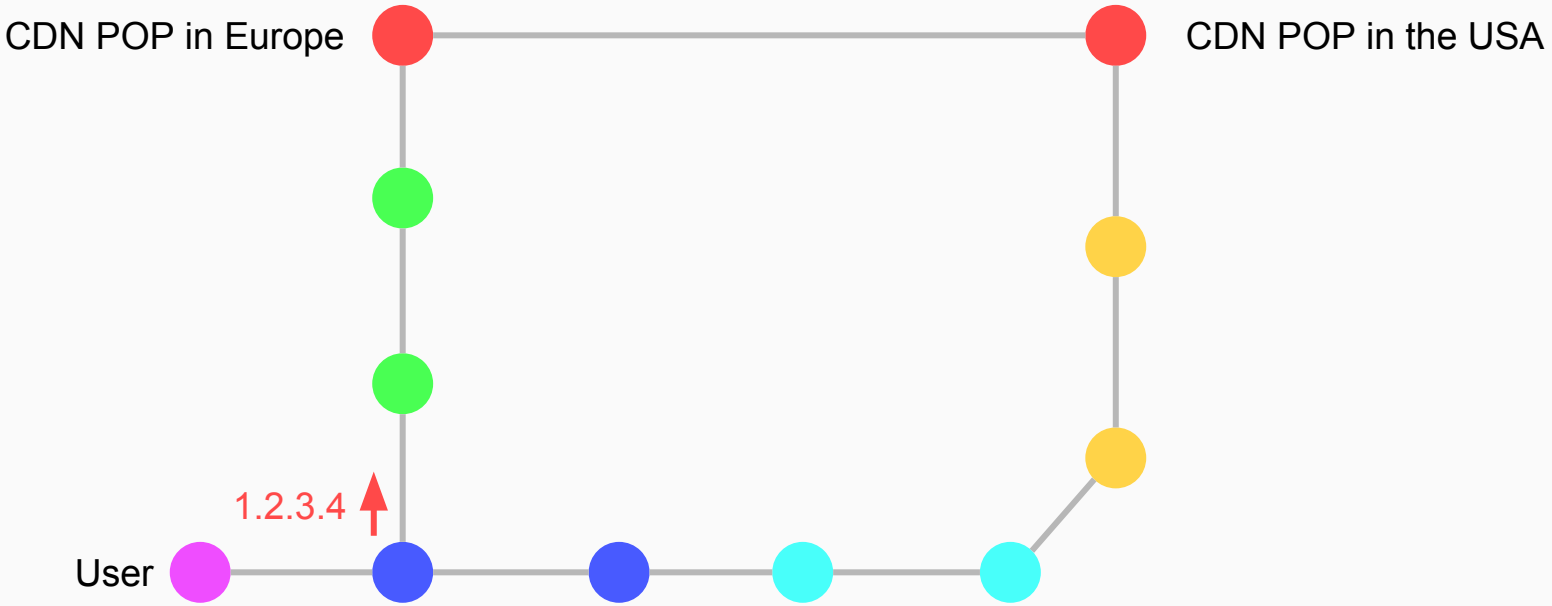

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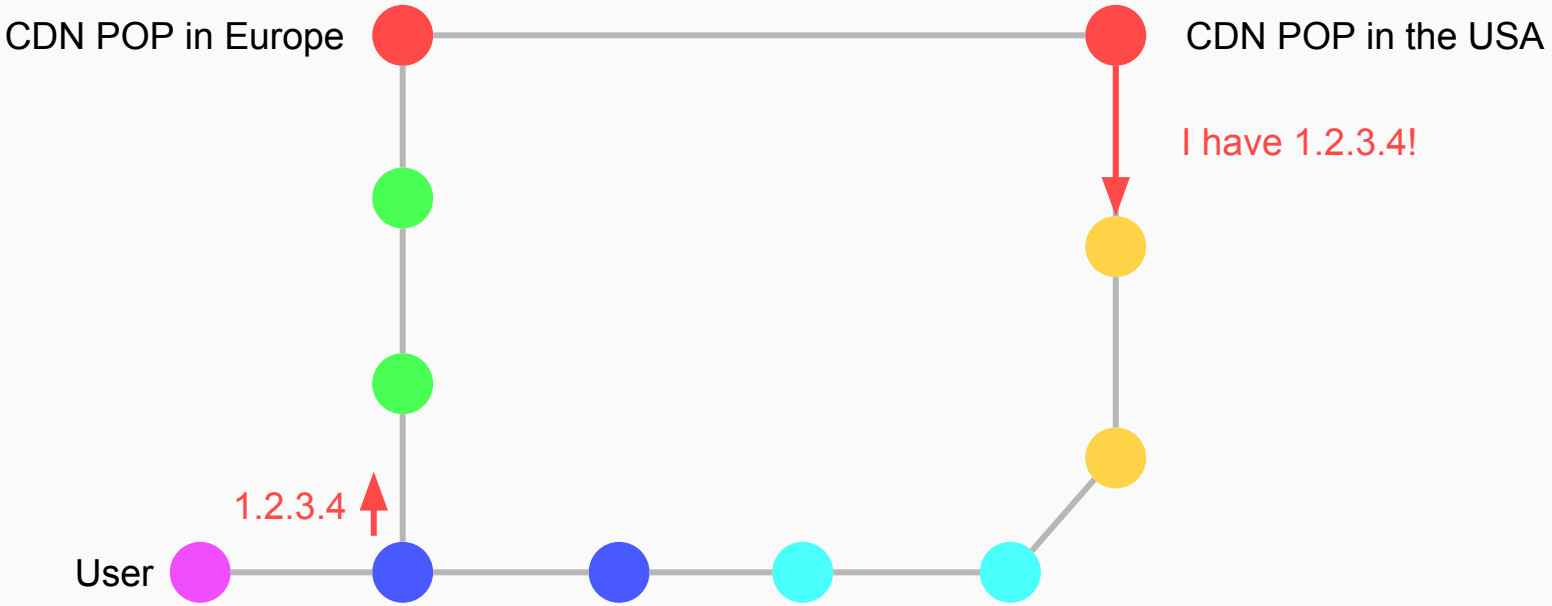

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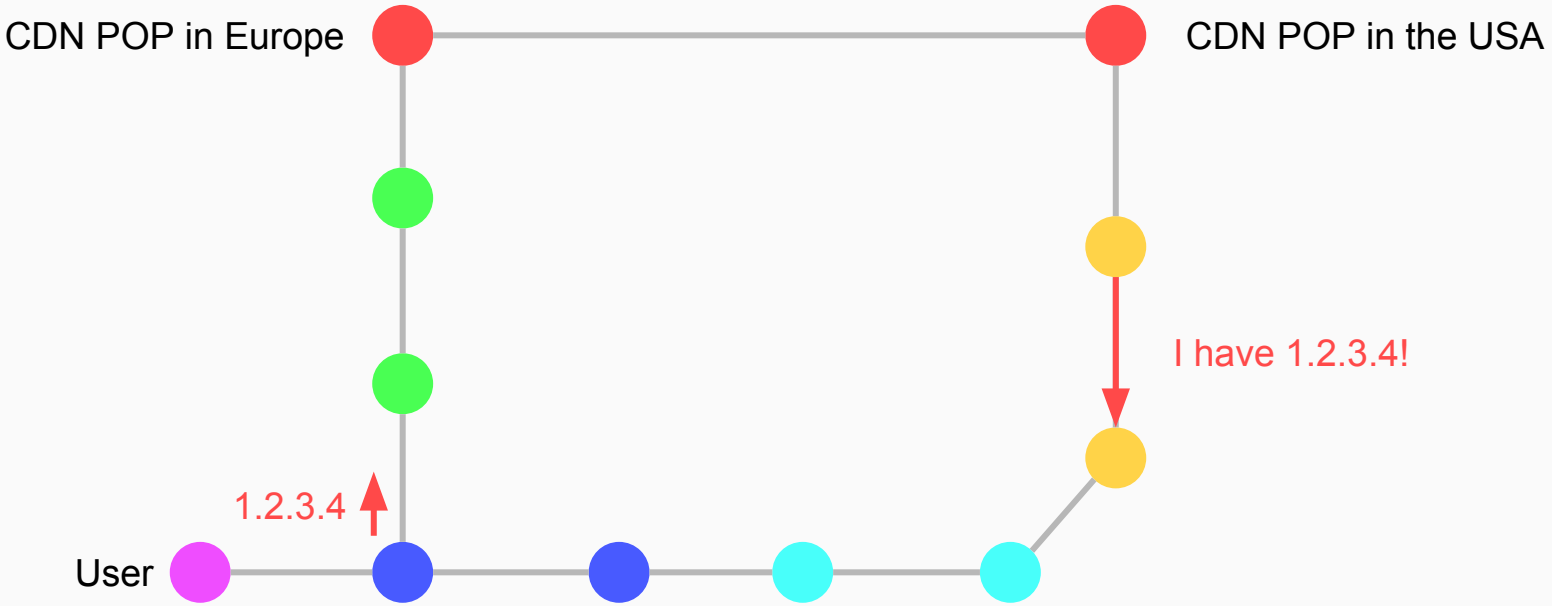

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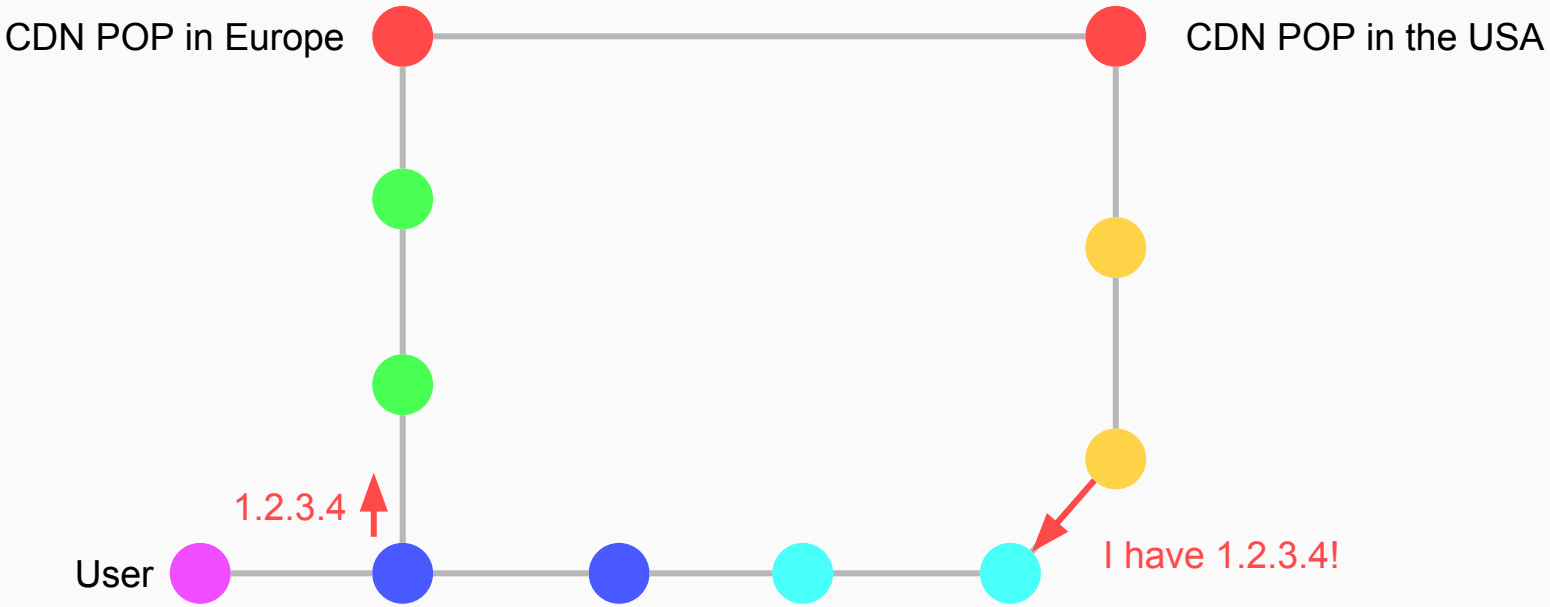

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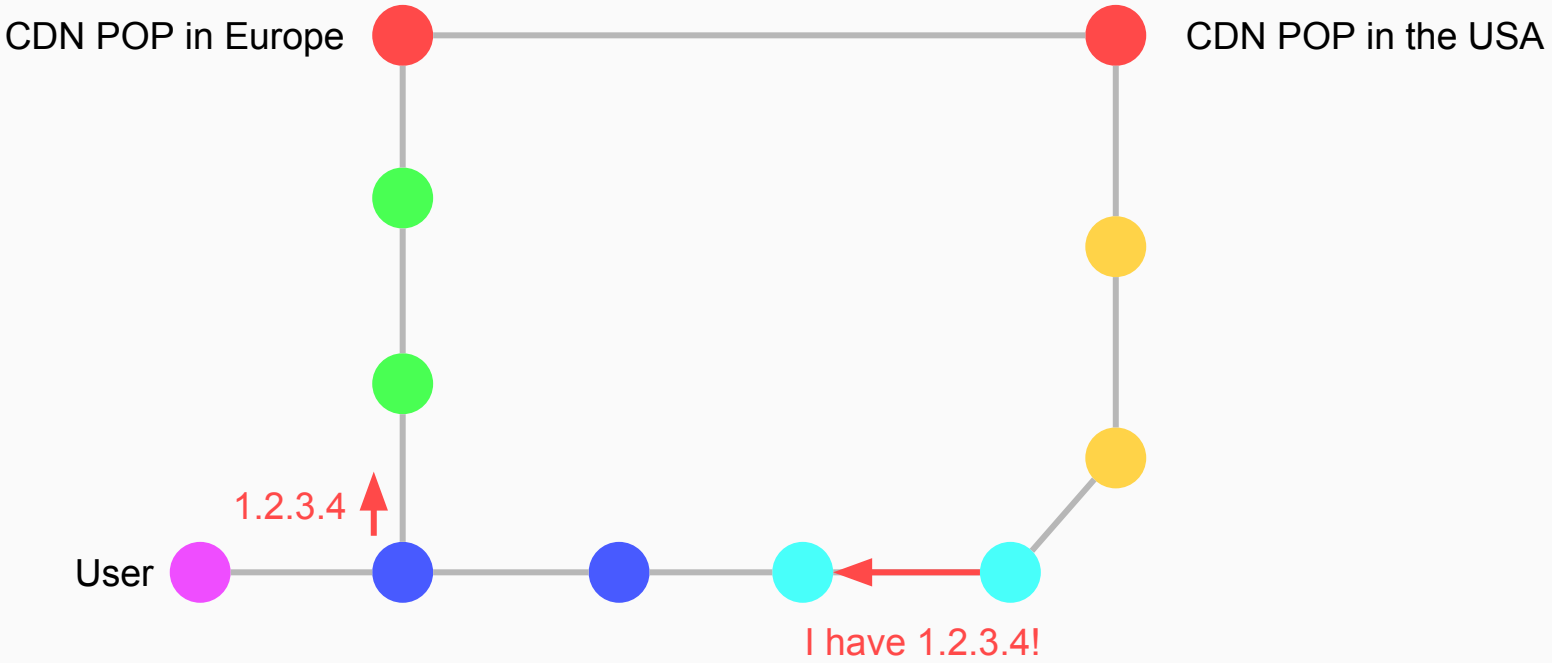

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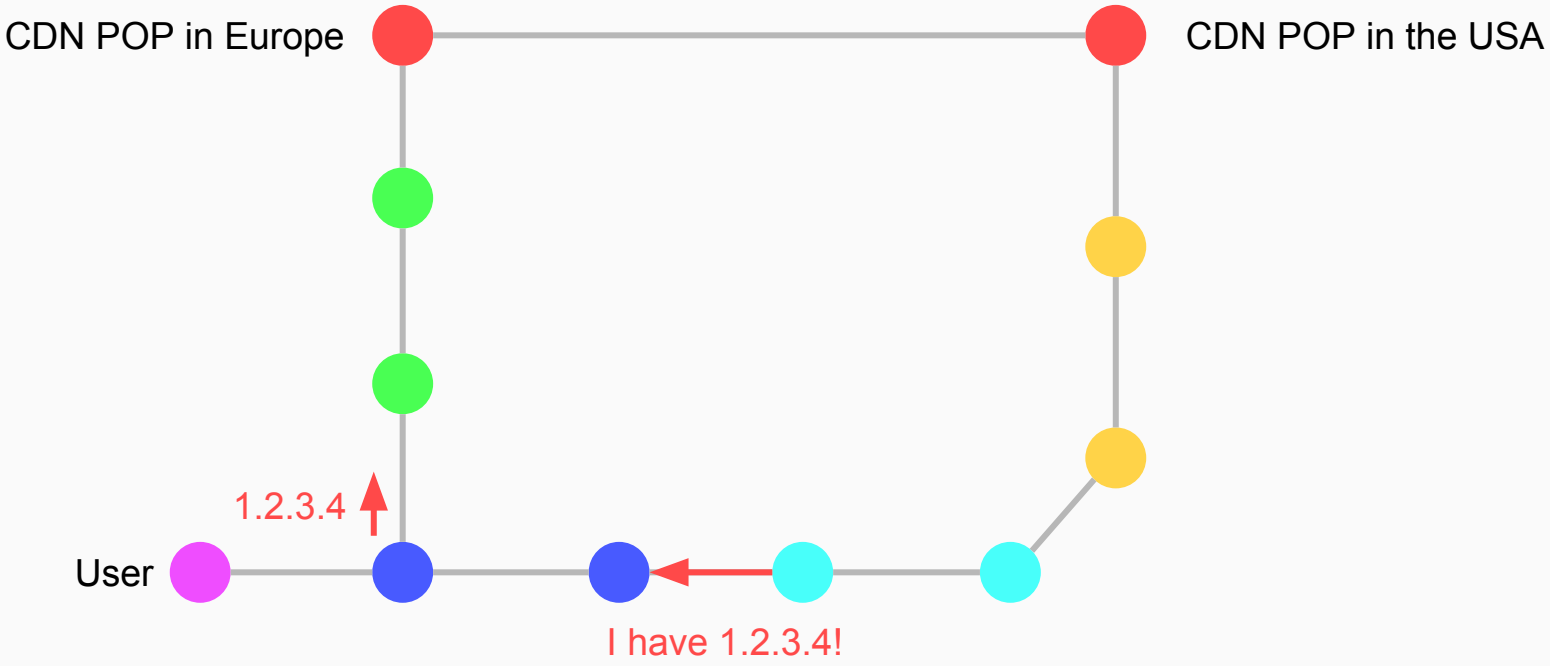

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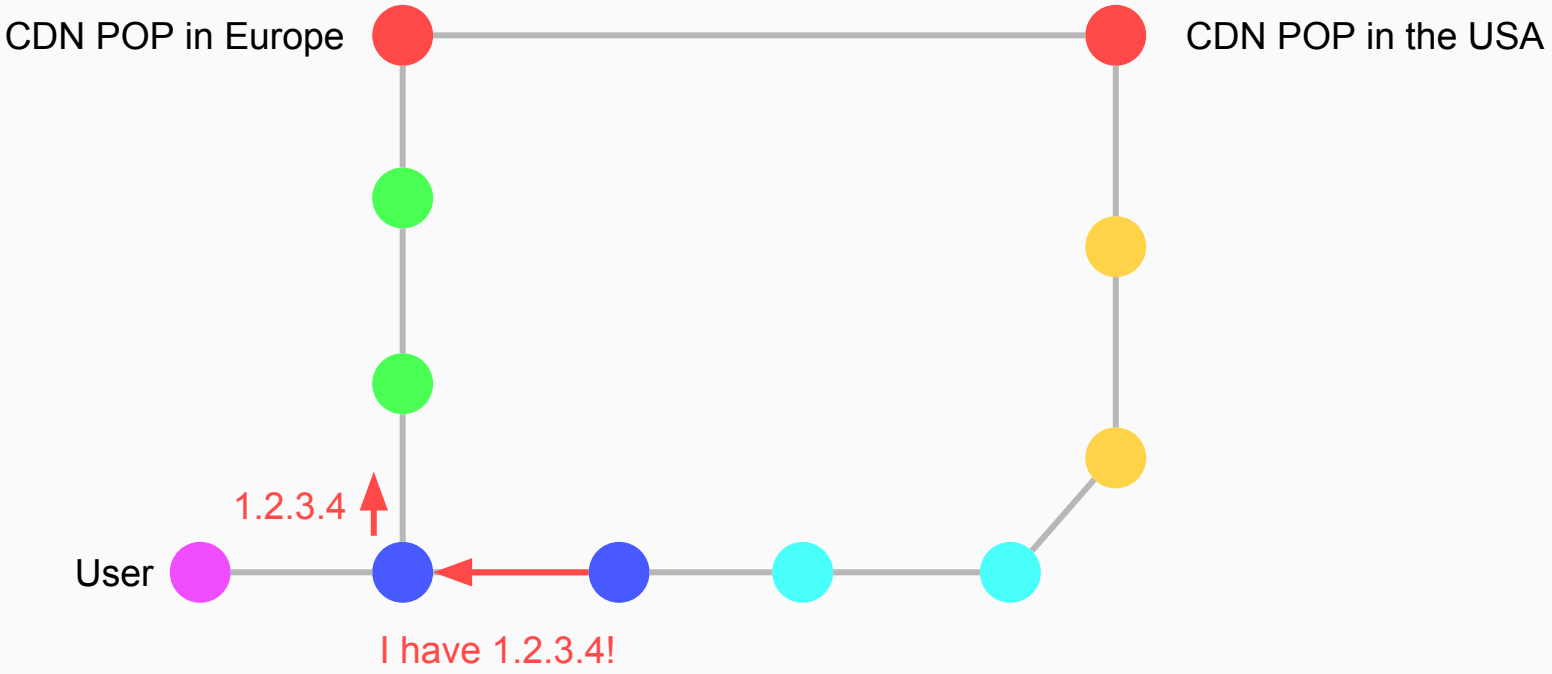

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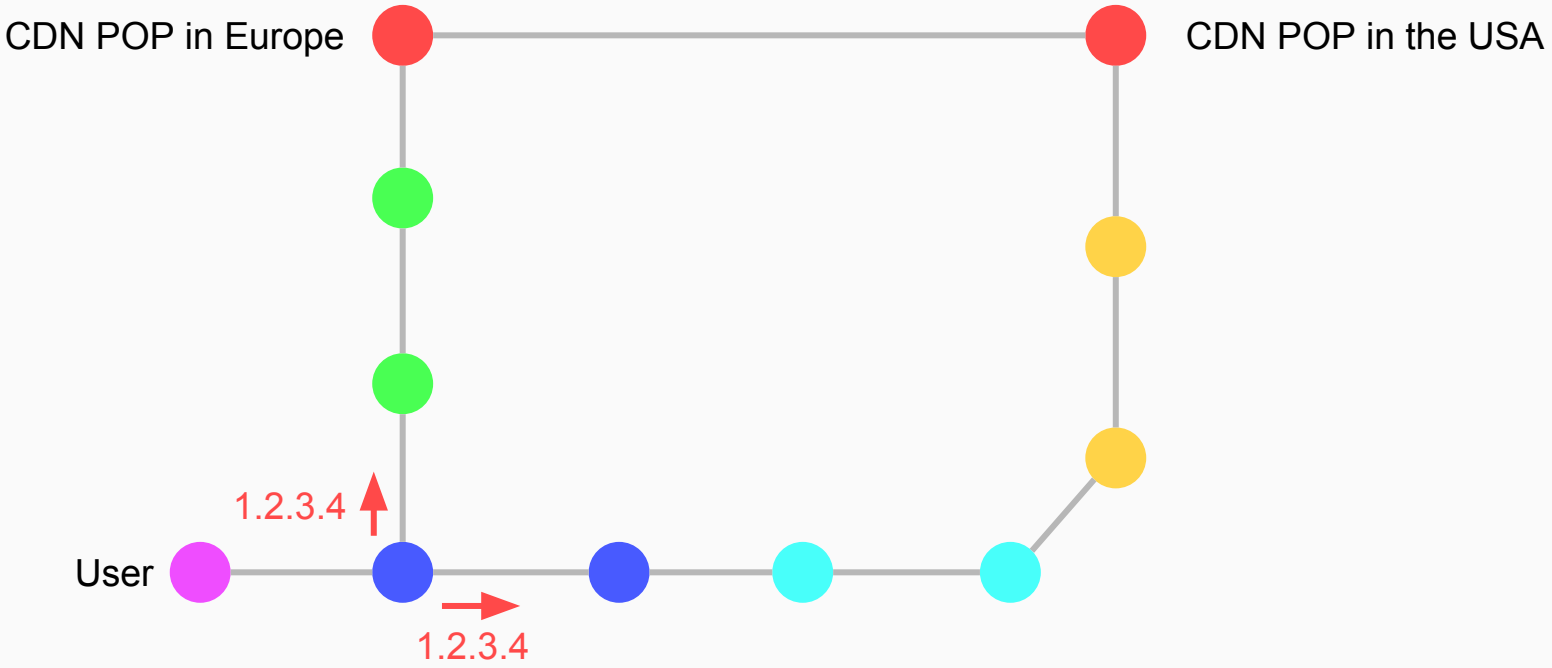

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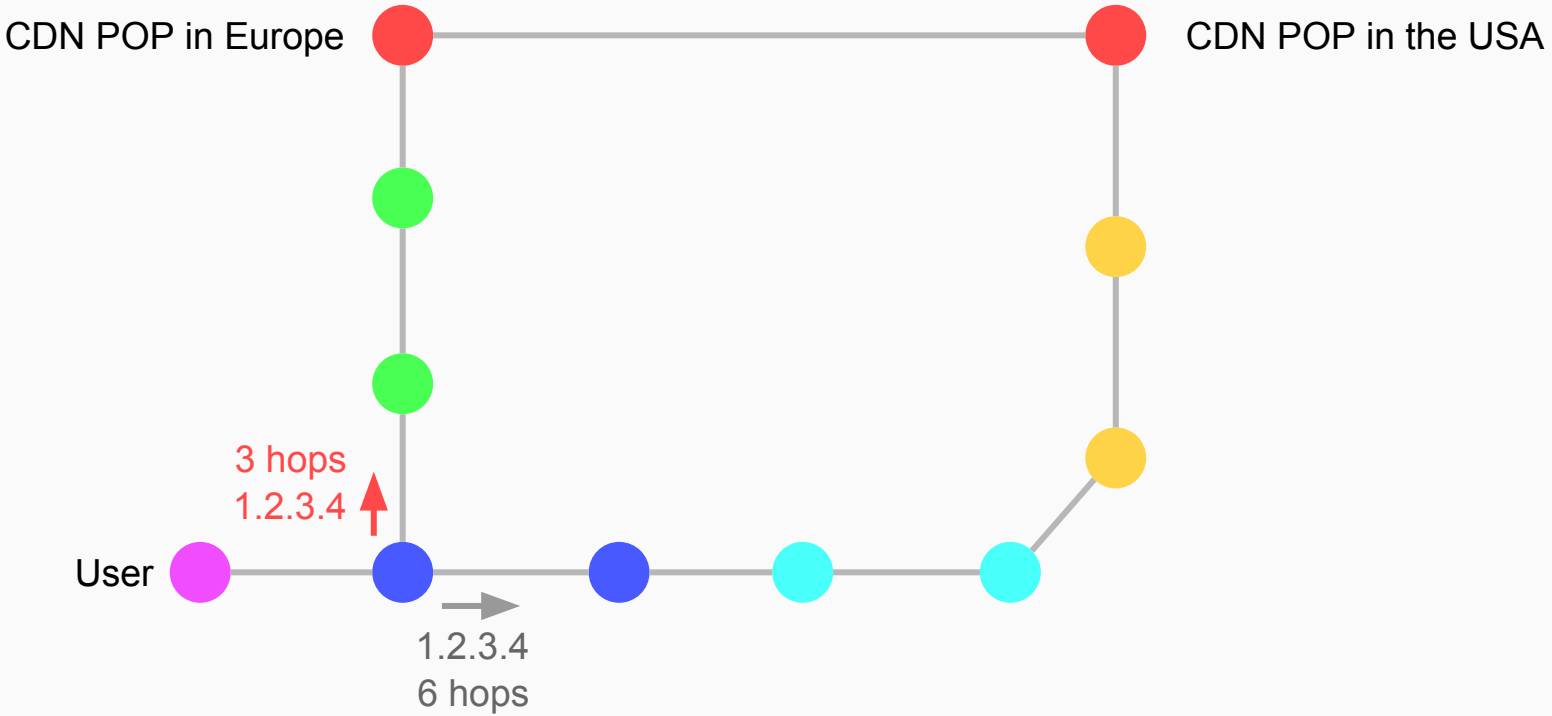

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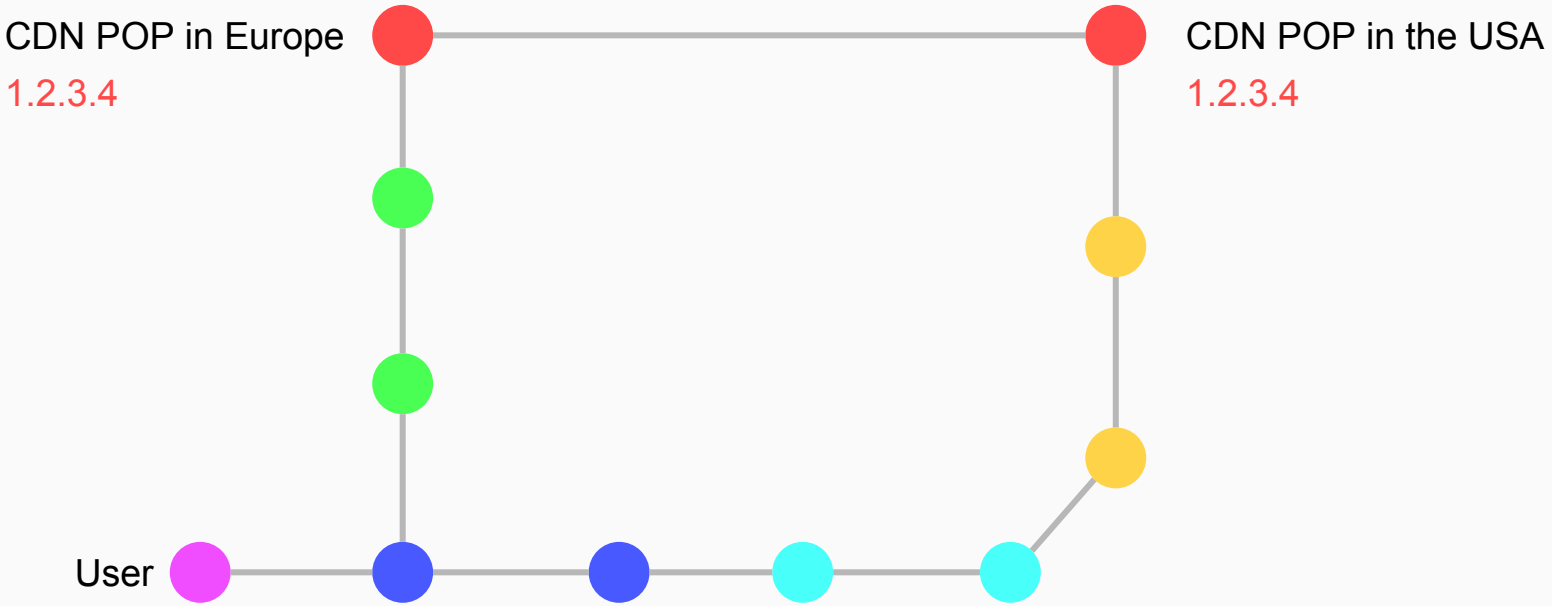

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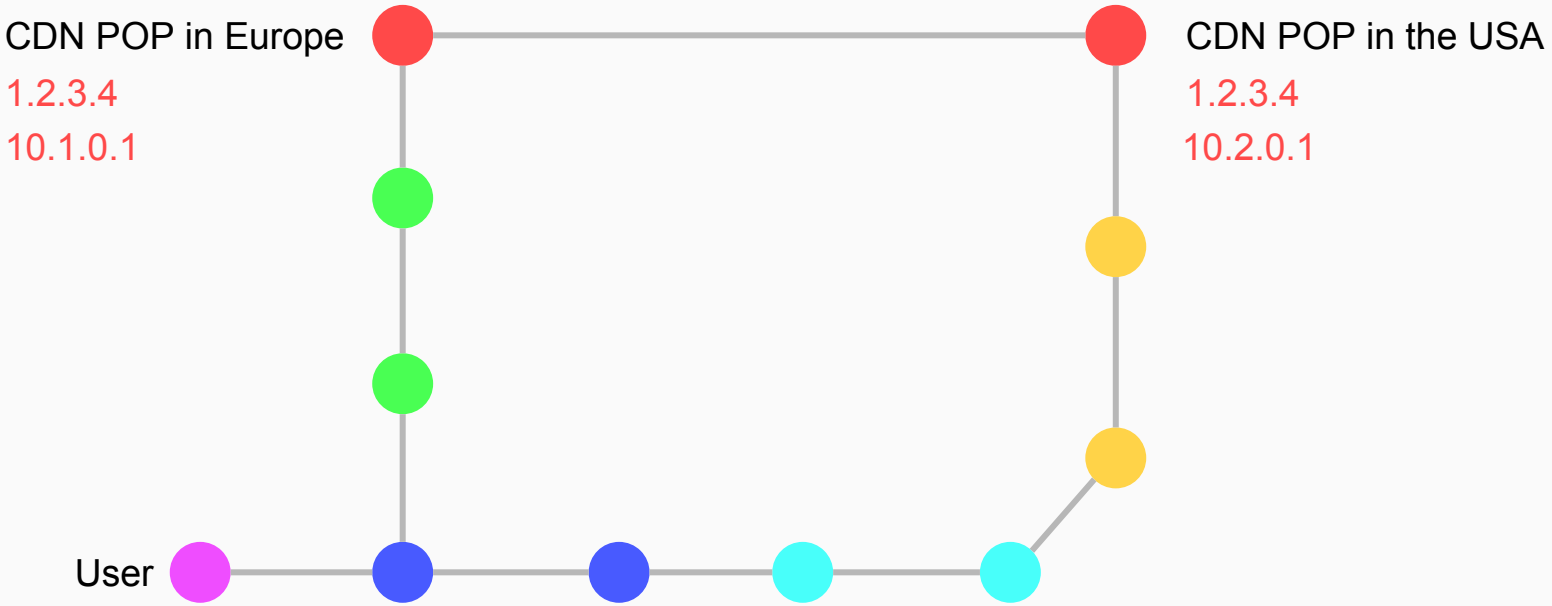

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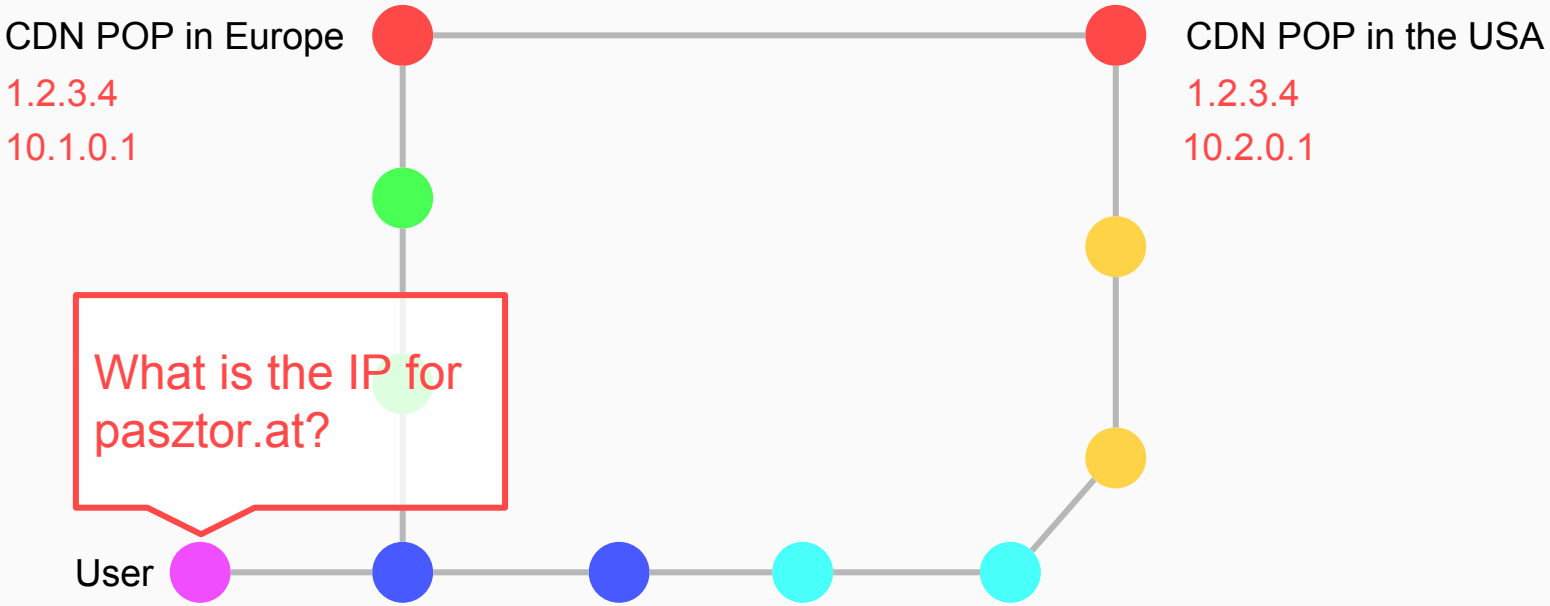

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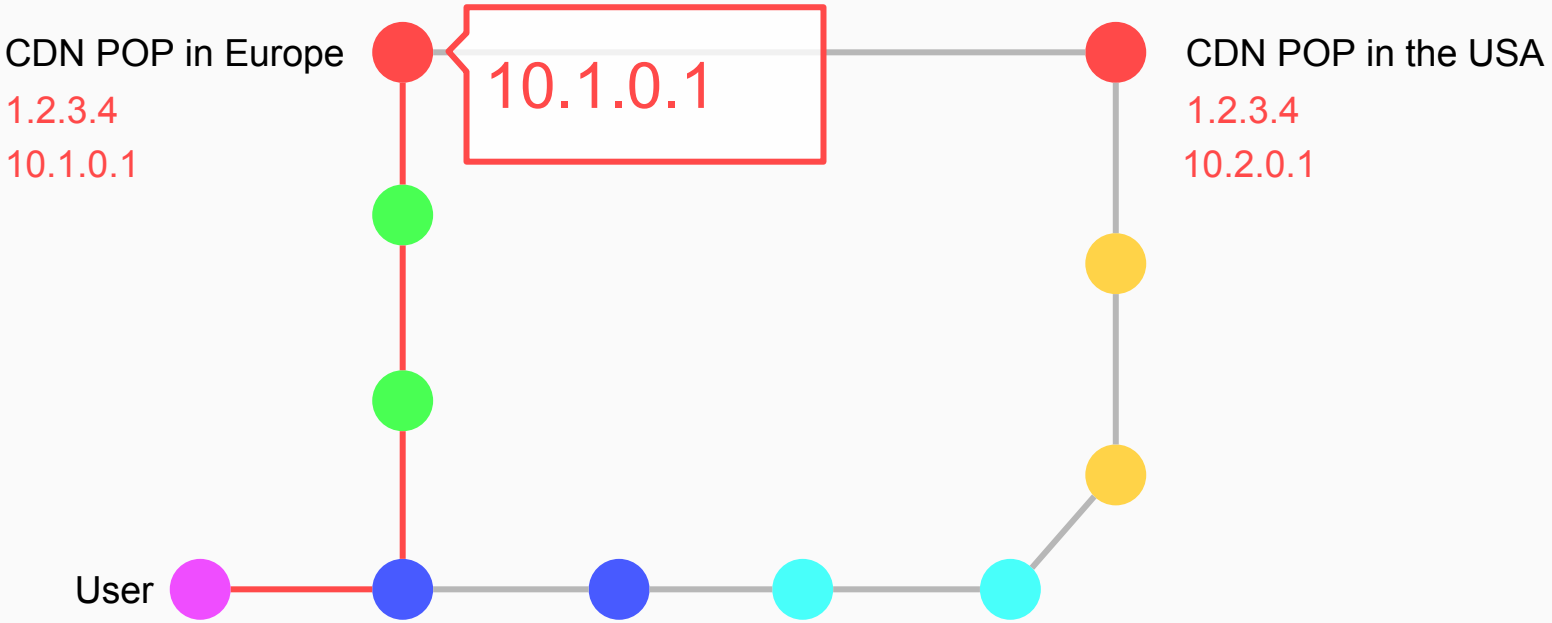

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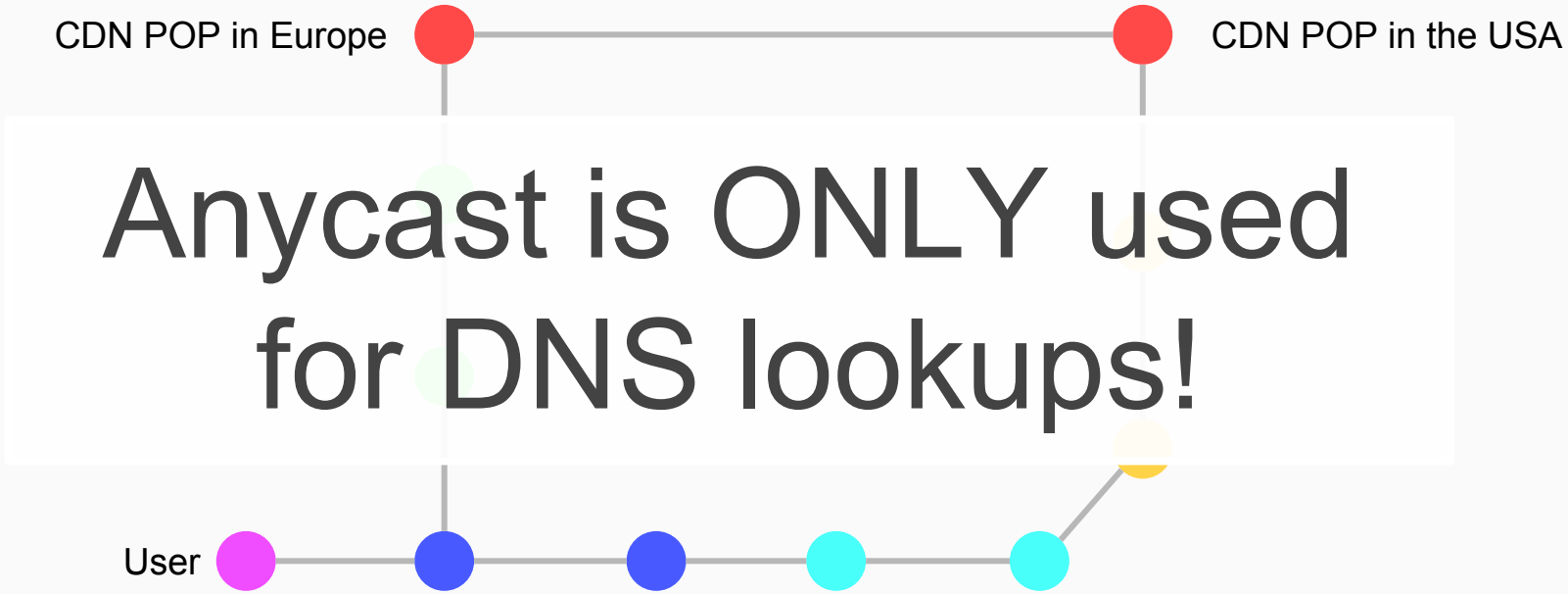


See https://engineering.linkedin.com/network-performance/tcp-over-ip-anycast-pipe-dream-or-reality

Hosting static content

Part 1:

Finding a DNS provider

Hosting static content

- [ ] Anycast servers

Hosting static content

- [ ] Anycast servers
- [ ] Latency- or GeoIP based responses

Hosting static content

- [x] Anycast servers
- [x] Latency- or GeoIP based responses

Hosting static content

```
eu-central-1.glb.techblog.cloud.   IN  A      18.194.241.96
   us-east-1.glb.techblog.cloud.   IN  A      54.152.113.29
   us-west-1.glb.techblog.cloud.   IN  A      52.9.244.13
```

Hosting static content

```
eu-central-1.glb.techblog.cloud.   IN  A      18.194.241.96
   us-east-1.glb.techblog.cloud.   IN  A      54.152.113.29
   us-west-1.glb.techblog.cloud.   IN  A      52.9.244.13

            glb.techblog.cloud.    IN  ALIAS  eu-central-1.glb.techblog.cloud.
            glb.techblog.cloud.    IN  ALIAS  us-east-1.glb.techblog.cloud.
            glb.techblog.cloud.    IN  ALIAS  us-west-1.glb.techblog.cloud.
```

Hosting static content

Record Set Name | Any Type | Aliases Only | Weighted Only | Displaying 1 to 15 out of 15 Record Sets

Name	Type	Value	Evaluate Target Health	Health Check ID	TTL	Region	Weight	Geolocation
techblog.cloud.	A	ALIAS glb.techblog.cloud. (zvm597mo9f8w)	No	-				
techblog.cloud.	NS	ns1.techblog.cloud. ns2.techblog.cloud. ns3.techblog.cloud. ns4.techblog.cloud.	-	-	172800			
techblog.cloud.	SOA	ns1.techblog.cloud. domains.opsbears.com. 1 7200	-	-	900			
glb.techblog.cloud.	A	ALIAS eu-central-1.glb.techblog.cloud. (zvm597mo9	Yes	4534c3c0-8d5c-4f4f-b264-43a588a55558		eu-central-1		
glb.techblog.cloud.	A	ALIAS us-east-1.glb.techblog.cloud. (zvm597mo9f8v	Yes	b472aa42-f3d0-4aa8-89a1-3cf95e748b72		us-east-1		
glb.techblog.cloud.	A	ALIAS us-west-1.glb.techblog.cloud. (zvm597mo9f8\	Yes	abf3189a-61b2-4f0d-bae7-45b7f3bdf7ad		us-west-1		
all.glb.techblog.cloud.	A	54.152.113.29 18.194.241.96 52.9.244.13	-	-	60			
eu-central-1.glb.techblog.cloud.	A	18.194.241.96	-	-	60			
us-east-1.glb.techblog.cloud.	A	54.152.113.29	-	-	60			
us-west-1.glb.techblog.cloud.	A	52.9.244.13	-	-	60			
ns1.techblog.cloud.	A	205.251.194.6	-	-	3600			
ns2.techblog.cloud.	A	205.251.196.28	-	-	3600			
ns3.techblog.cloud.	A	205.251.199.159	-	-	3600			
ns4.techblog.cloud.	A	205.251.193.202	-	-	3600			
www.techblog.cloud.	A	ALIAS glb.techblog.cloud. (zvm597mo9f8w)	No	-				

Edit Record Set

Name: glb .techblog.cloud.

Type: A – IPv4 address

Alias: Yes / No

Alias Target: eu-central-1.glb.techblog.cloud.

Alias Hosted Zone ID: ZVM597MO9F8W

You can also type the domain name for the resource. Examples:
- CloudFront distribution domain name: d111111abcdef8.cloudfront.net
- Elastic Beanstalk environment CNAME: example.elasticbeanstalk.com
- ELB load balancer DNS name: example-1.us-east-1.elb.amazonaws.com
- S3 website endpoint: s3-website.us-east-2.amazonaws.com
- Resource record set in this hosted zone: www.example.com

Learn More

Routing Policy: Latency

Route 53 responds to queries based on regions that you specify in this and other record sets that have the same name and type. Learn More

Region: eu-central-1

Set ID: eu-central-1

Description of this record set that is unique within the group of latency sets.
Example:
My Seattle Data Center

Evaluate Target Health: Yes / No

Associate with Health Check: Yes / No

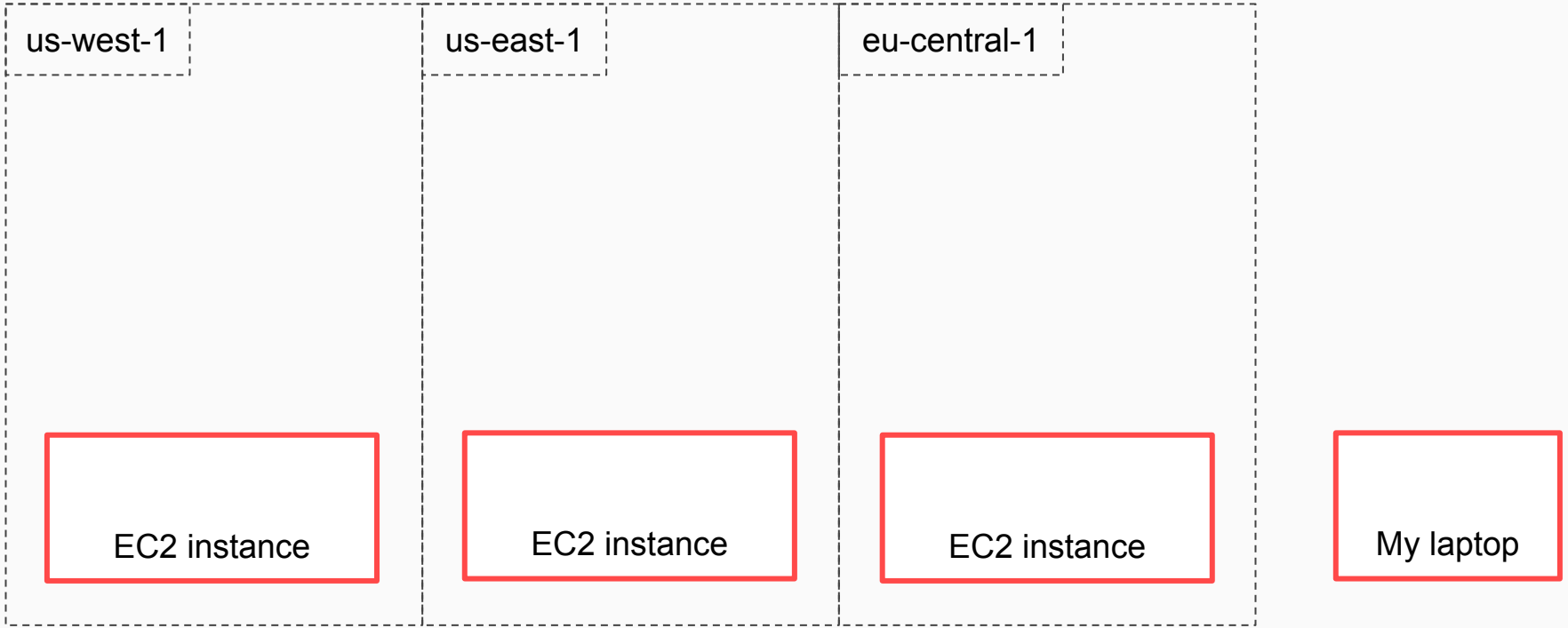
Save Record Set

Hosting static content

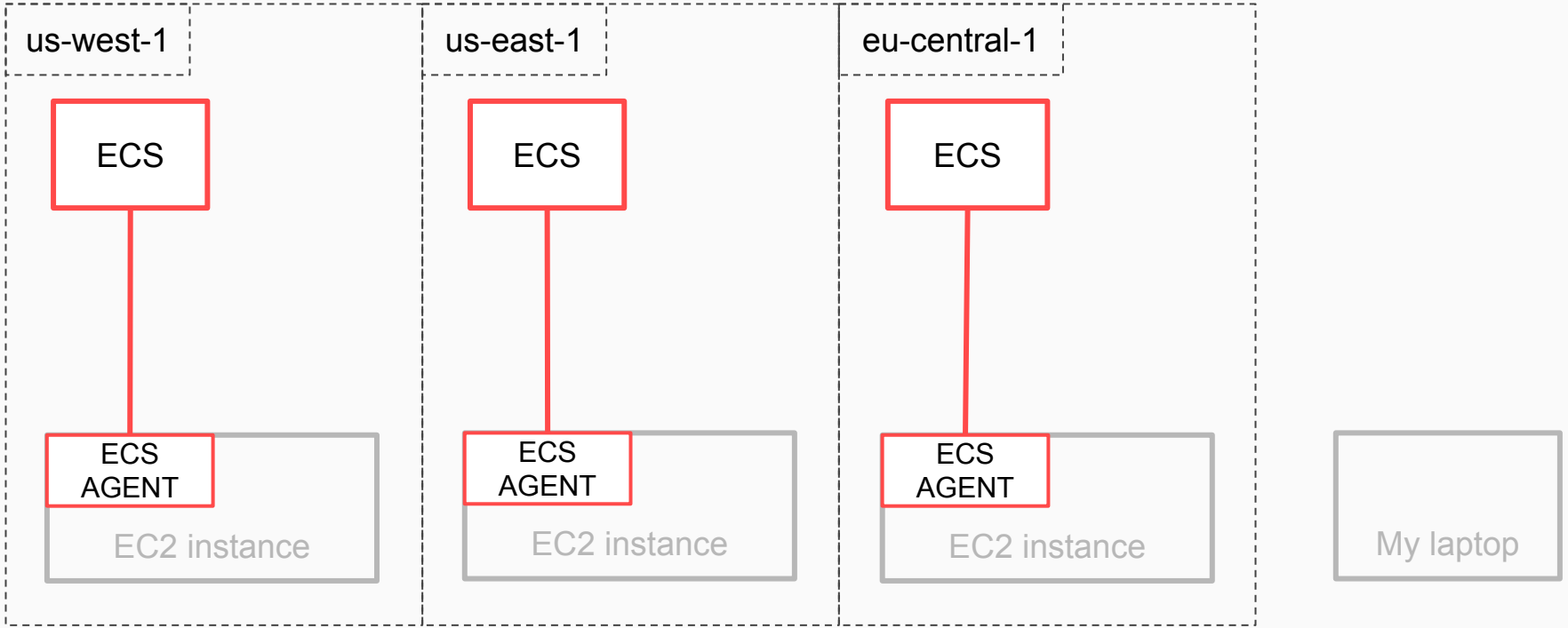
Part 2:

Docker

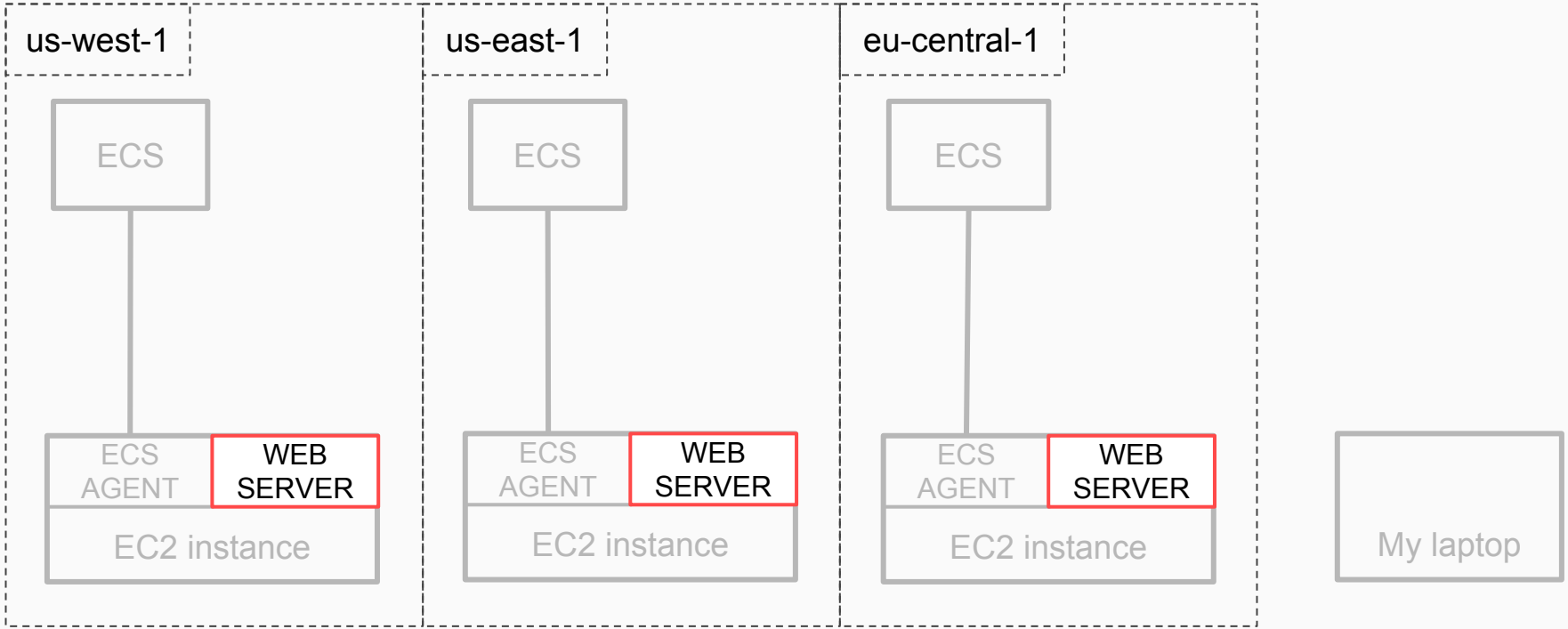
Hosting static content



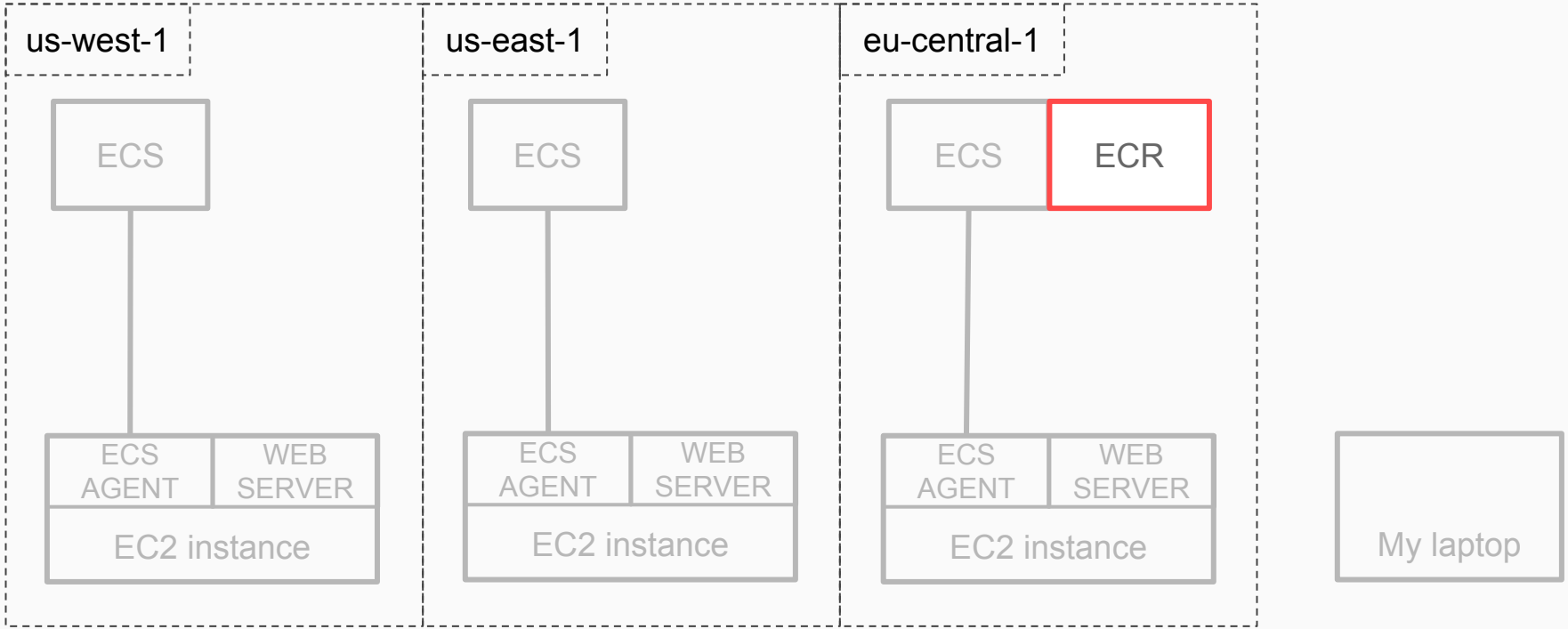
Hosting static content



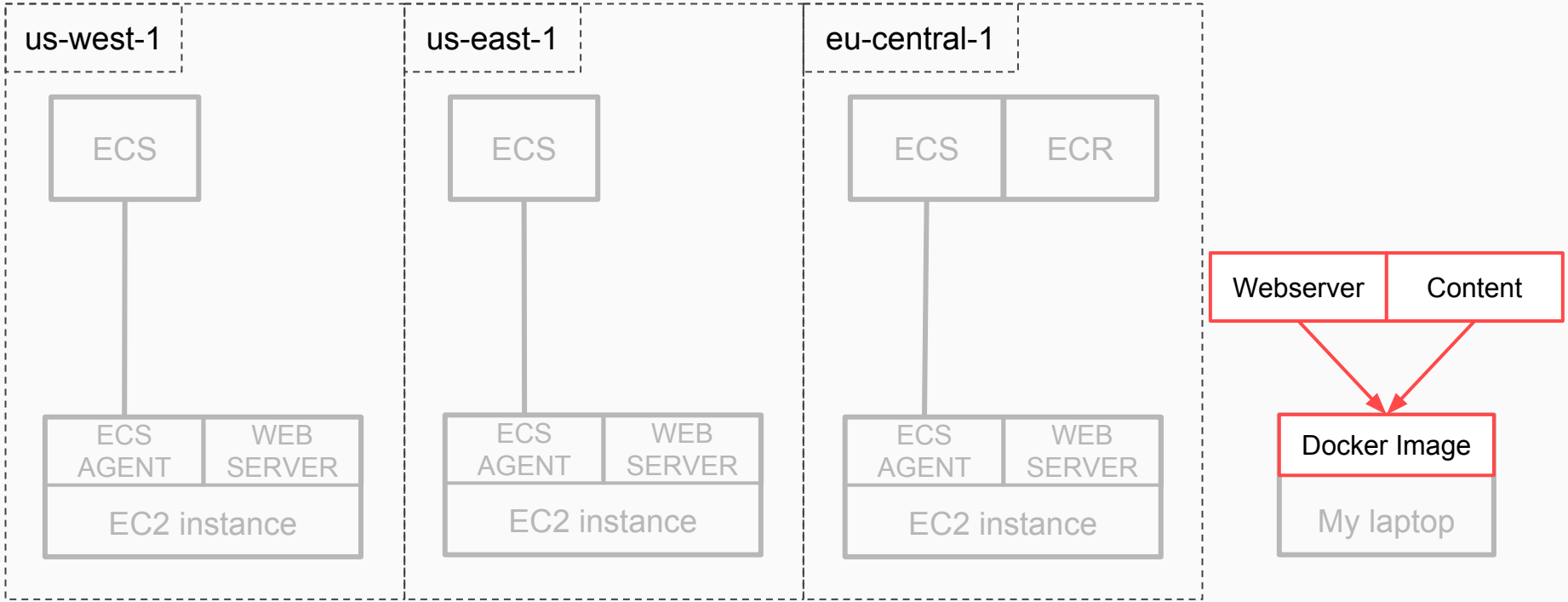
Hosting static content



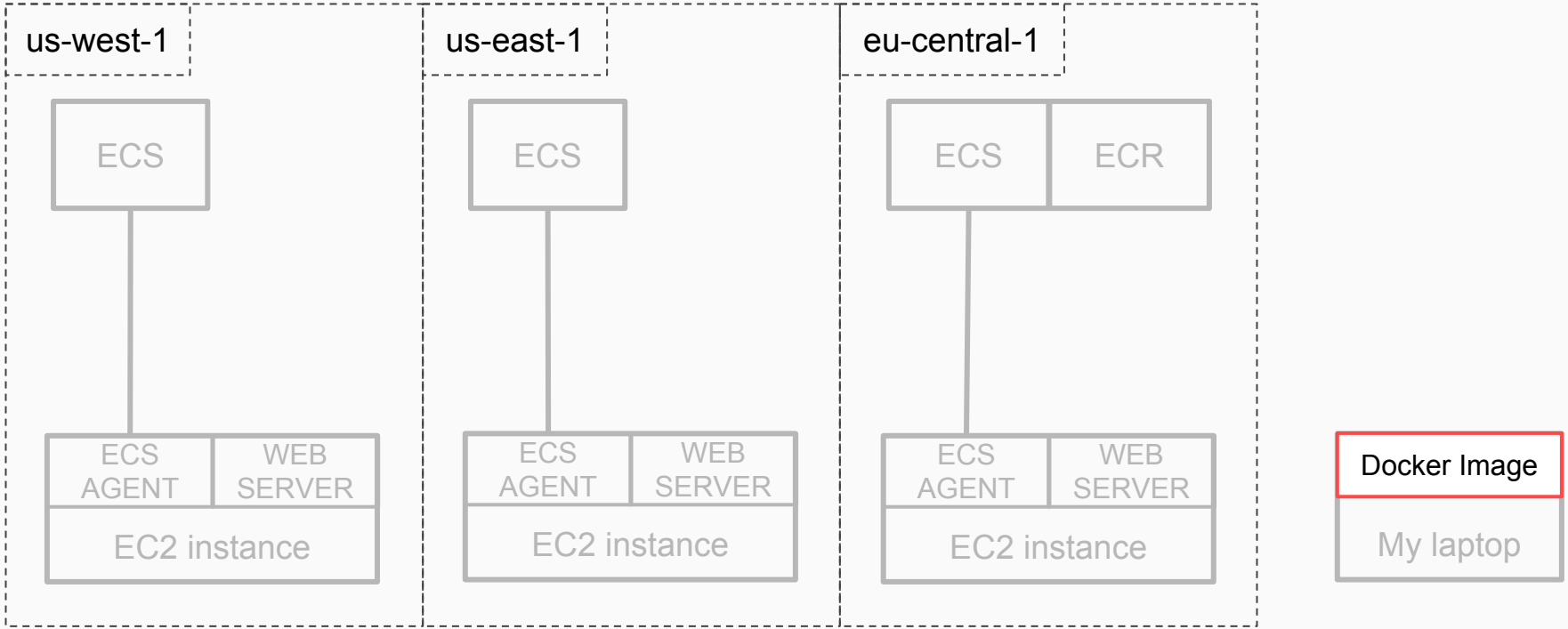
Hosting static content



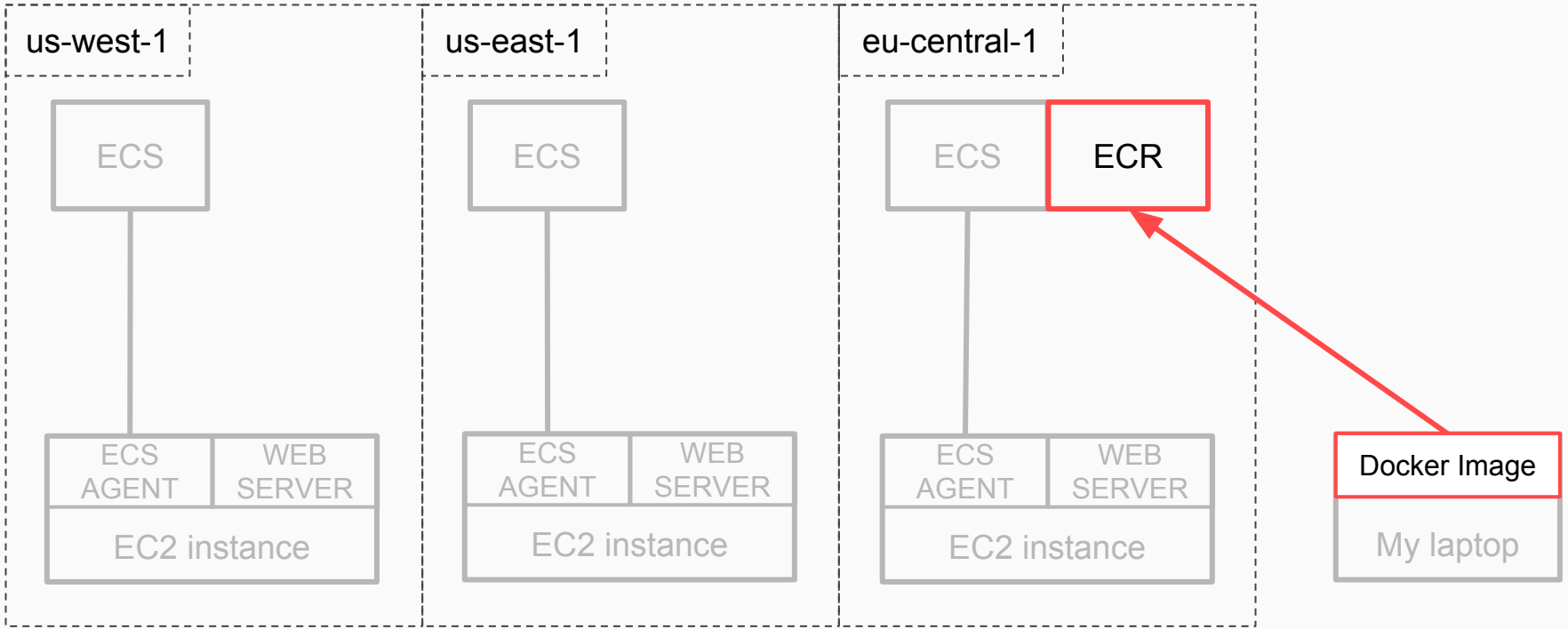
Hosting static content



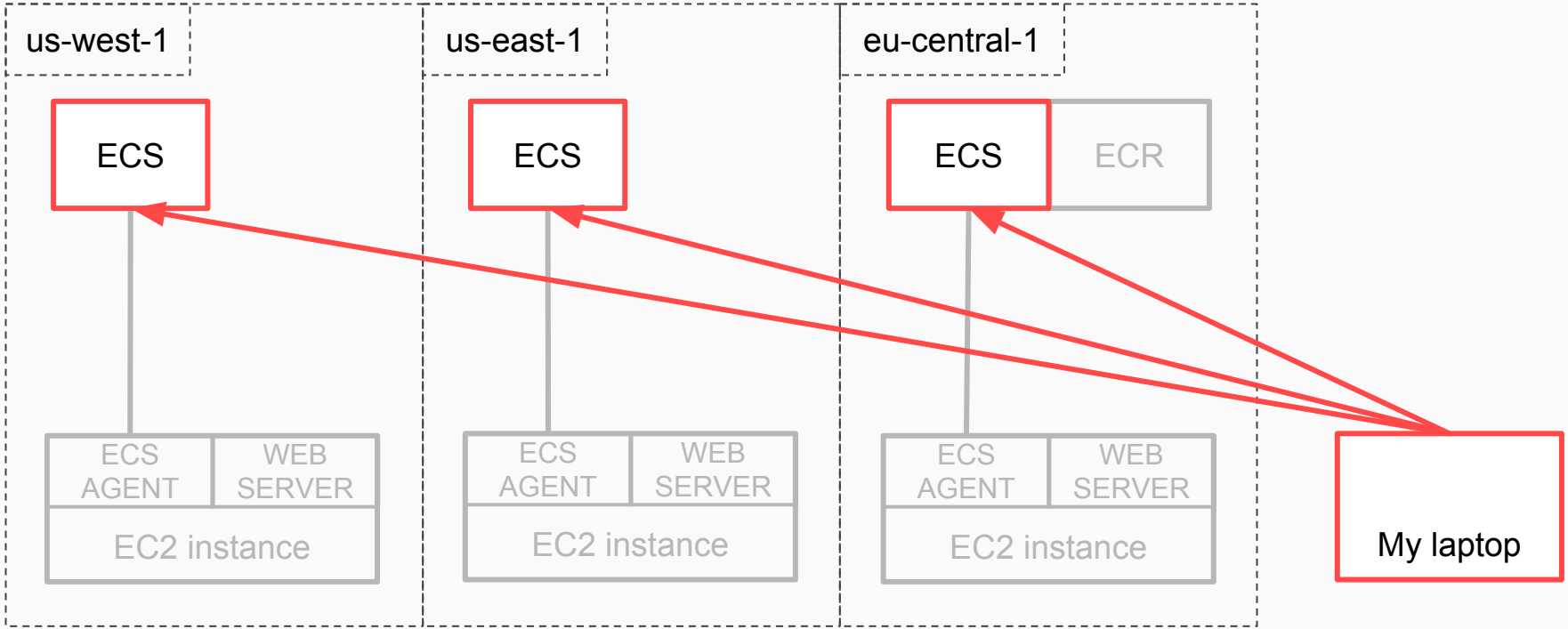
Hosting static content



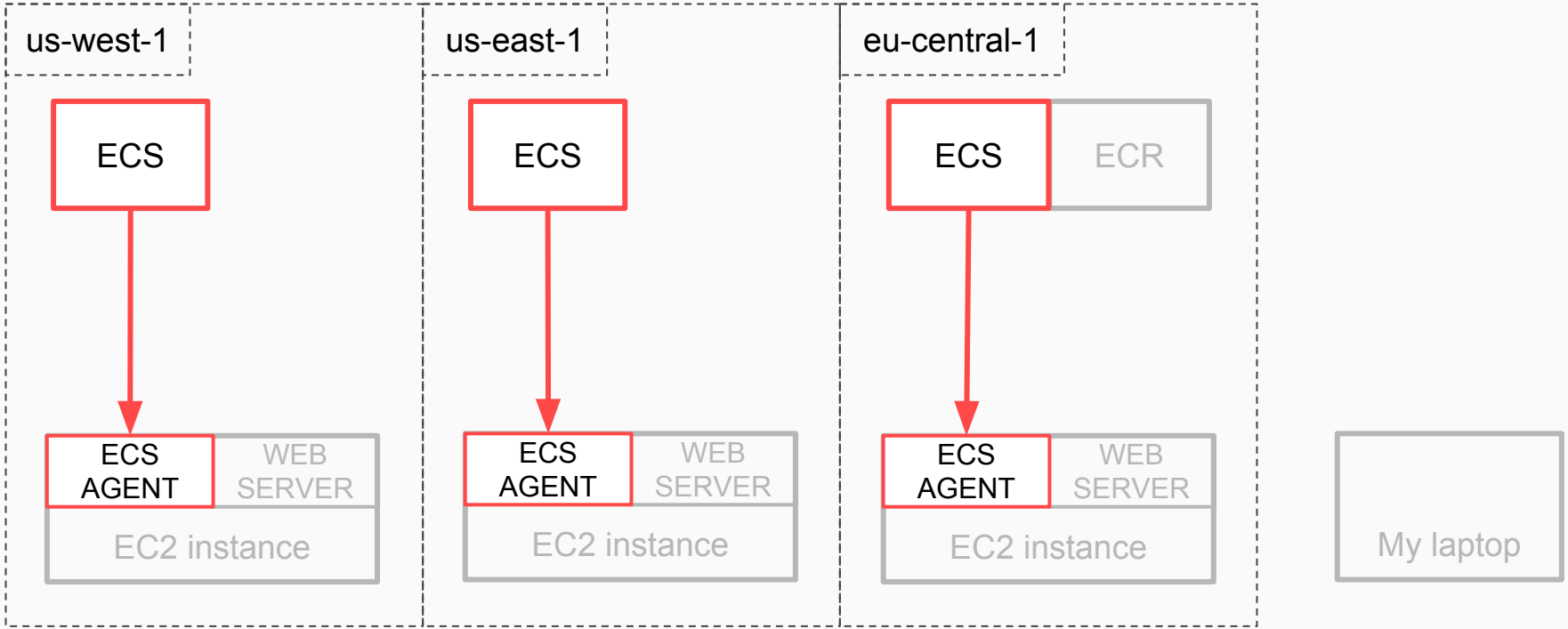
Hosting static content



Hosting static content



Hosting static content



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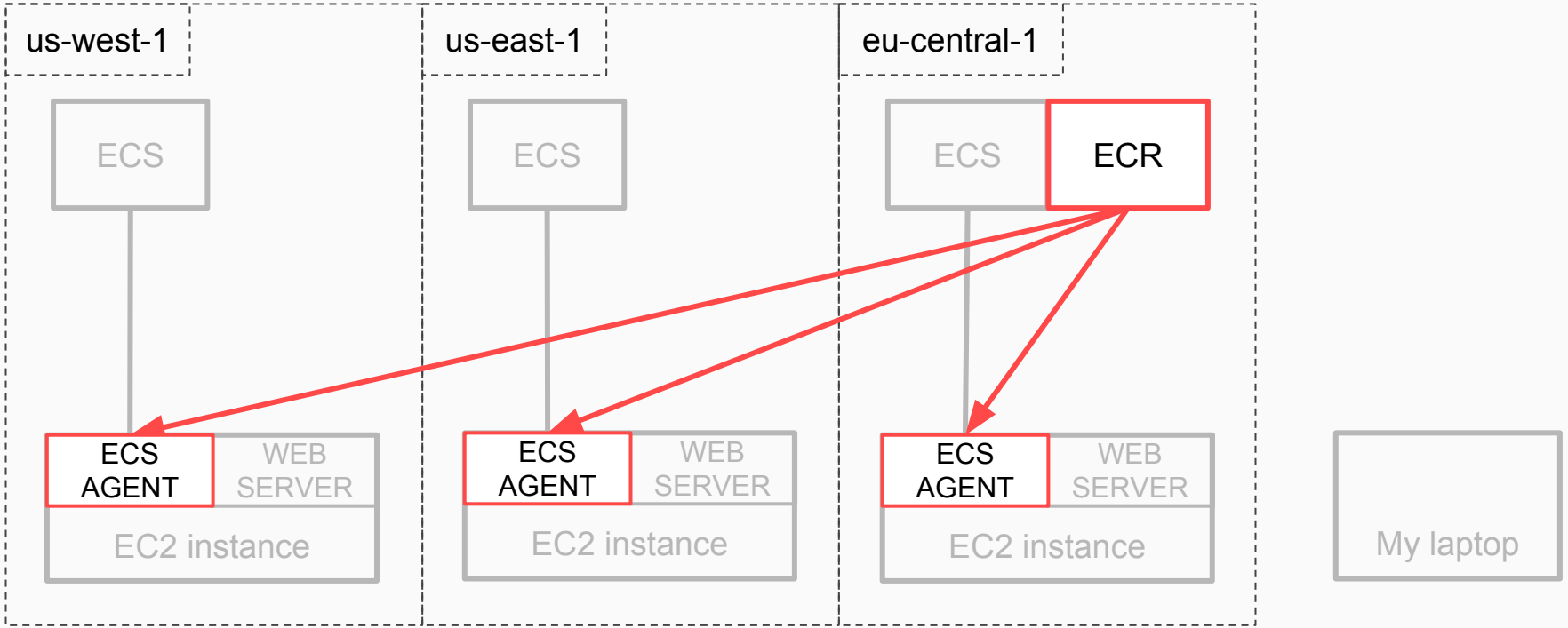

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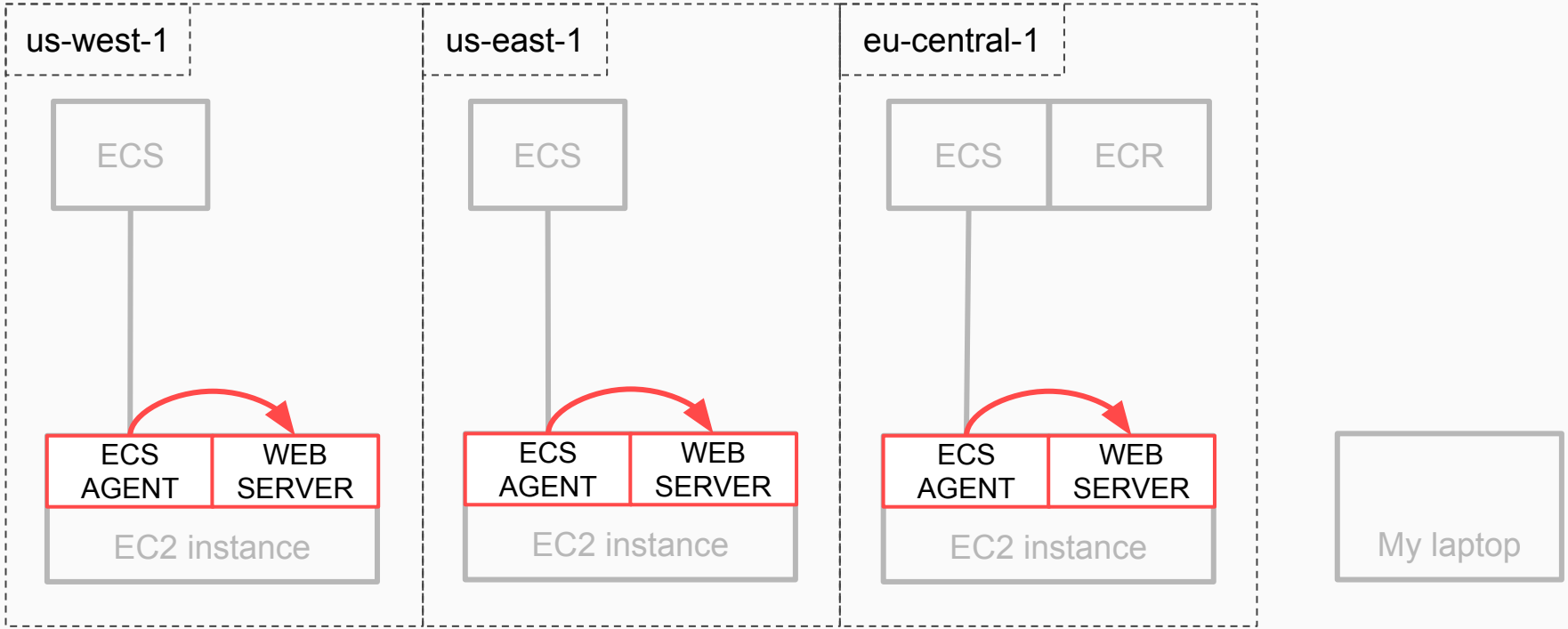
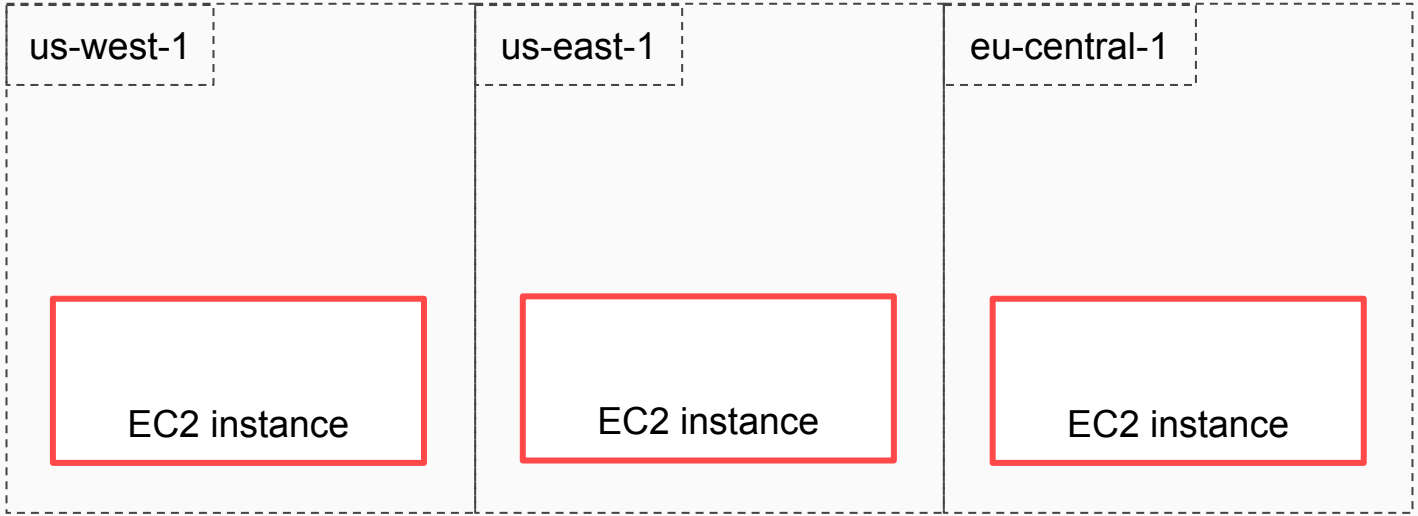


Hosting dynamic content

Can it run Wordpress?

Hosting dynamic content



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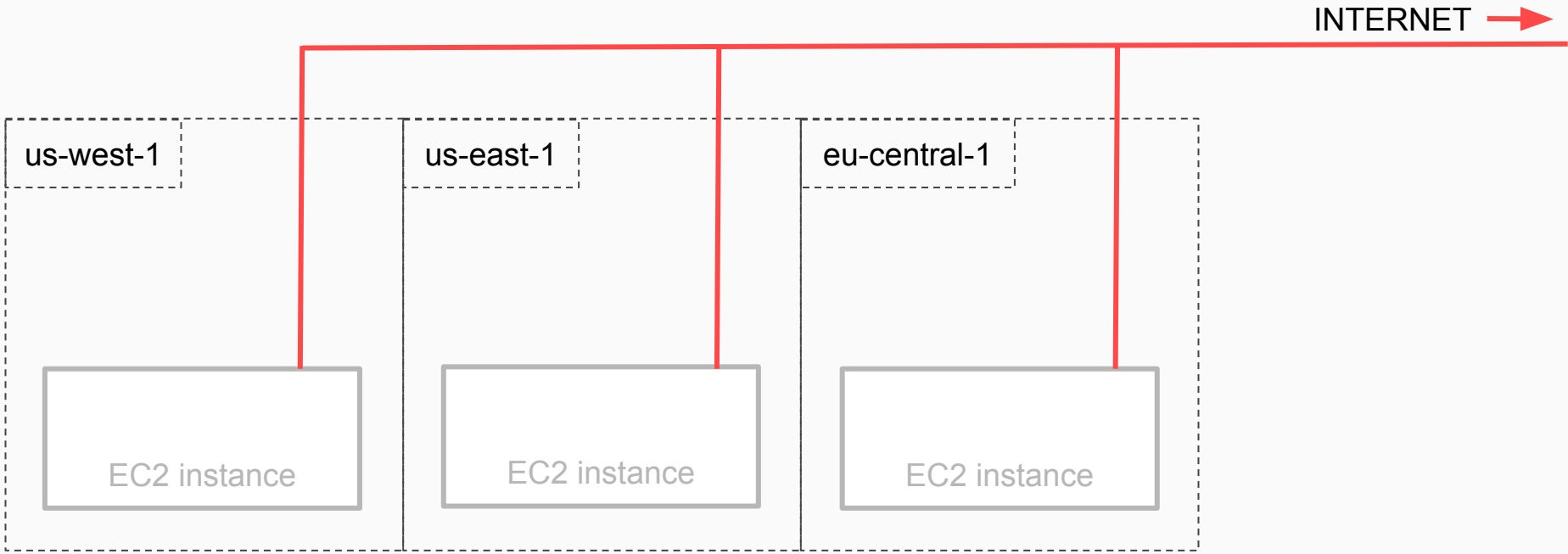
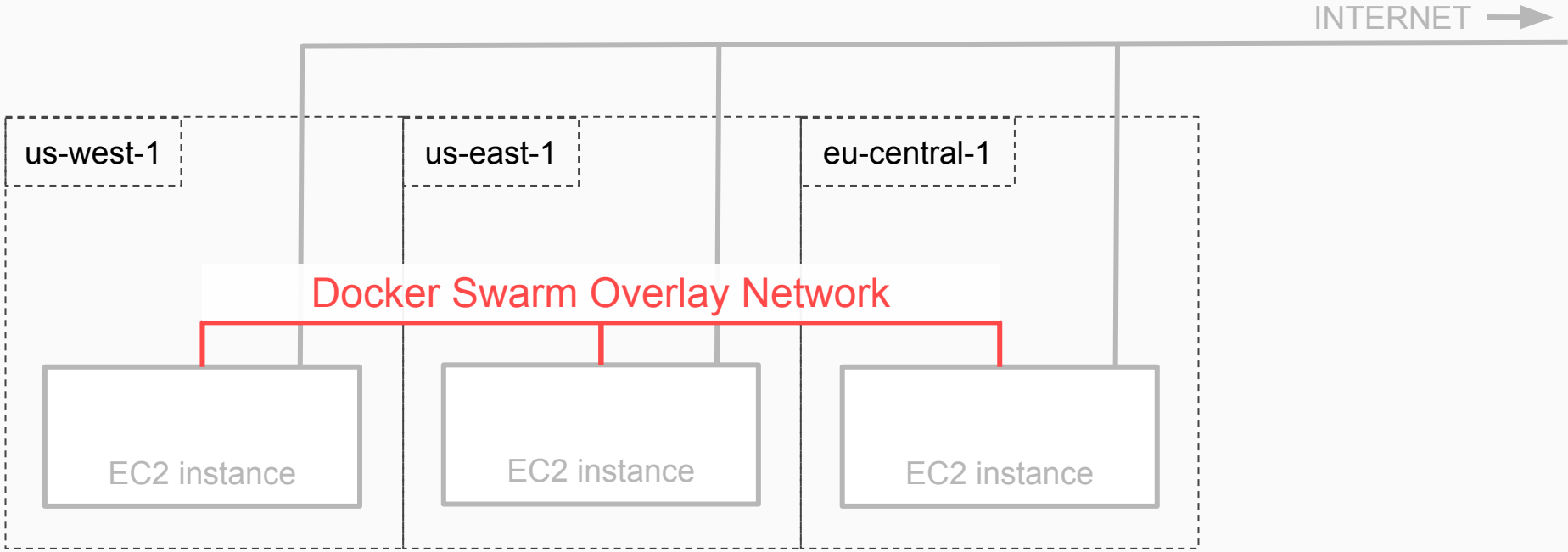
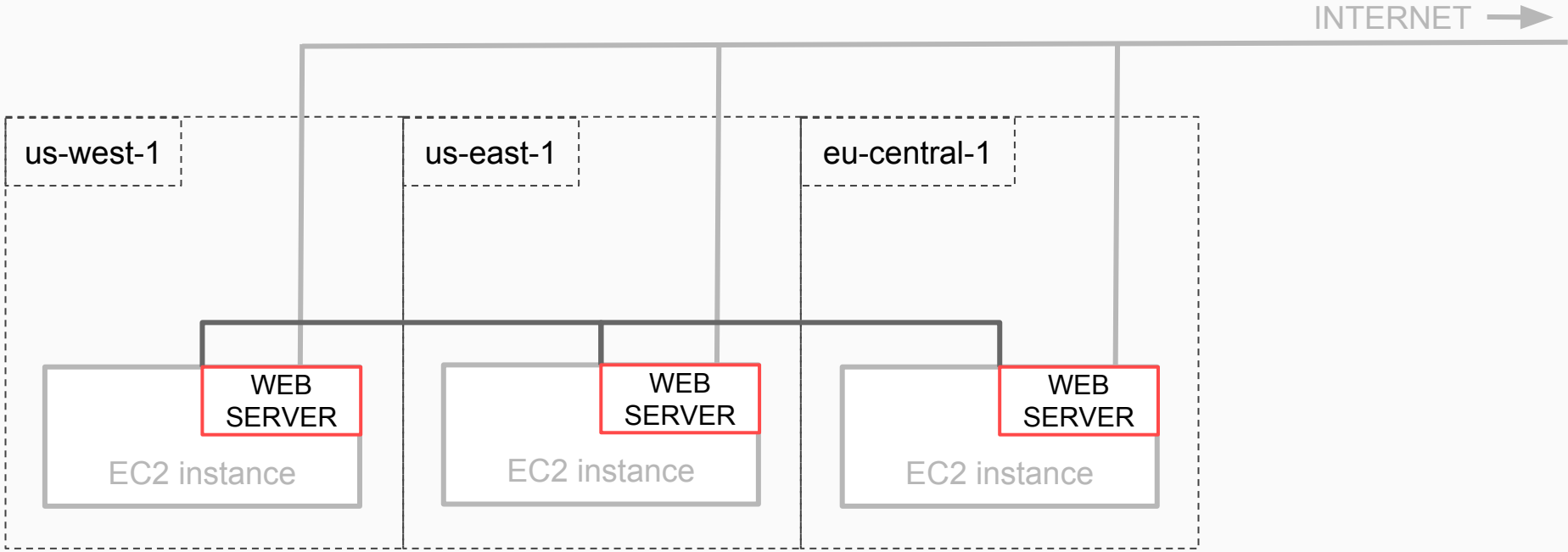


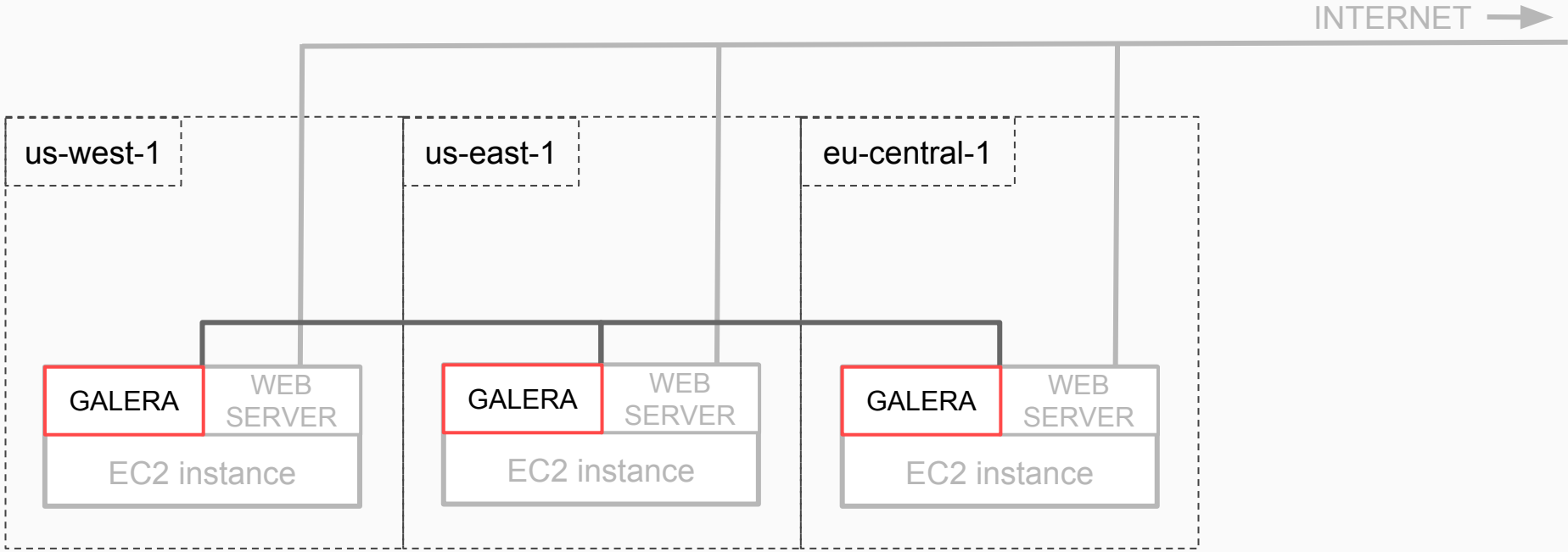
Hosting dynamic content



Hosting dynamic content



Hosting dynamic content



Hosting dynamic content

Summary

Performance grade	Load time	Faster than
C 79	246 ms	99 % of tested sites

Page size	Requests	Tested from
445.2 kB	14	San Jose on Nov 1 at 10:23

pingdom

Summary

Performance grade	Load time	Faster than
C 79	305 ms	99 % of tested sites

Page size	Requests	Tested from
445.3 kB	14	Stockholm on Nov 1 at 10:25

pingdom

Hosting dynamic content

Unsolved issues:

Hosting dynamic content

Unsolved issues:

Distributing Static Content

Hosting dynamic content

Unsolved issues:

Distributing Static Content

Downtime-less Updates

Hosting dynamic content

Unsolved issues:

Distributing Static Content

Downtime-less Updates

Monitoring

Summary

Is it worth it?

Summary

Janos Pasztor

DevOps Engineer with a Nack for the Unusual

Home | CV | Speaking | Blog | Contact

Hello, I'm Janos, and I'm a DevOps Engineer.

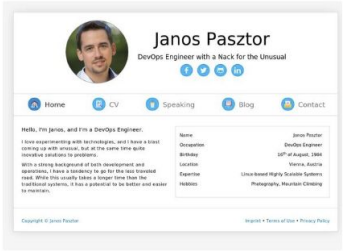
I love experimenting with technologies, and I have a blast coming up with unusual, but at the same time quite inovative solutions to problems.

With a strong background of both development and operations, I have a tendency to go for the less traveled road. While this usually takes a longer time than the traditional systems, it has a potential to be better and easier to maintain.

Name	Janos Pasztor
Occupation	DevOps Engineer
Birthday	16th of August, 1984
Location	Vienna, Austria
Expertise	Linux-based Highly Scalable Systems
Hobbies	Photography, Mountain Climbing

Summary

Summary

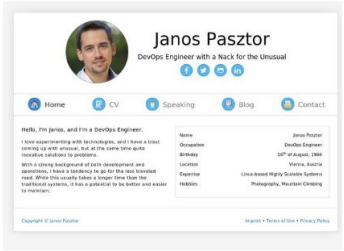


Performance grade	Load time	Faster than
B 89	1.16 s	86 % of tested sites

Page size	Requests	Tested from
77.2 kB	15	San Jose on Nov 1 at 10:30

pingdom

Summary



Performance grade	Load time	Faster than
B 89	309 ms	99 % of tested sites

Page size	Requests	Tested from
77.1 kB	15	Stockholm on Nov 1 at 10:39

pingdom

Summary

Name	Status	Type	Initiator	Size	Time
pasztor.at	304	document	Other	83.2 KB 82.4 KB	27 ms 23 ms
data:image/jpeg;bas...	200 OK	jpeg	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
analytics.js /assets	200	script	(index) Parser	1.0 KB 370 B	31 ms 29 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
data:image/svg+xml;...	200 OK	svg+xml	(index) Parser	(from memory cache)	0 ms 0 ms
js?id=UA-108462692-1 www.googletagmanager.com/gtag	200	script	analytics.j... Script	17.7 KB 51.5 KB	54 ms 45 ms
analytics.js www.google-analytics.com	200	script	js?id=UA-1... Script	14.3 KB 35.2 KB	61 ms 57 ms
collect?v=1&_v=j65&a=945426925&t=pageview&_s=1&dl=...1&_gid=1157744719.1509297556&gtm=uap&z=1003193069 www.google-analytics.com	200	gif	analytics.j... Script	109 B 35 B	43 ms 43 ms

15 requests | 116 KB transferred | Finish: 528 ms | DOMContentLoaded: 301 ms | Load: 391 ms

Summary

Good

97 / 100

Great job! This page applies most performance best practices and should deliver a good user experience.

! Possible Optimizations

Leverage browser caching

Setting an expiry date or a maximum age in the HTTP headers for static resources instructs the browser to load previously downloaded resources from local disk rather than over the network.

Leverage browser caching for the following cacheable resources:

https://pasztor.at/assets/analytics.js (expiration not specified)
https://www.googletagmanager.com/gtag/js?id=UA-108462692-1 (15 minutes)
https://www.google-analytics.com/analytics.js (2 hours)

▲ Hide details

✓ Optimizations Found

▸ Show details

**The results are cached for 30s. If you have made changes to your page, please wait for 30s before re-running the test.*

**This test checks to see if a page has applied common performance best practices. A high score is correlated with a fast user experience but does not guarantee it. Learn more.*

Summary

Probably not.

Summary

Questions?

Many thanks to

Bence Sántha, Dan Radenković, Gábor Vereb, János Angeli, Krisztián Papp

for their inspiration and feedback.