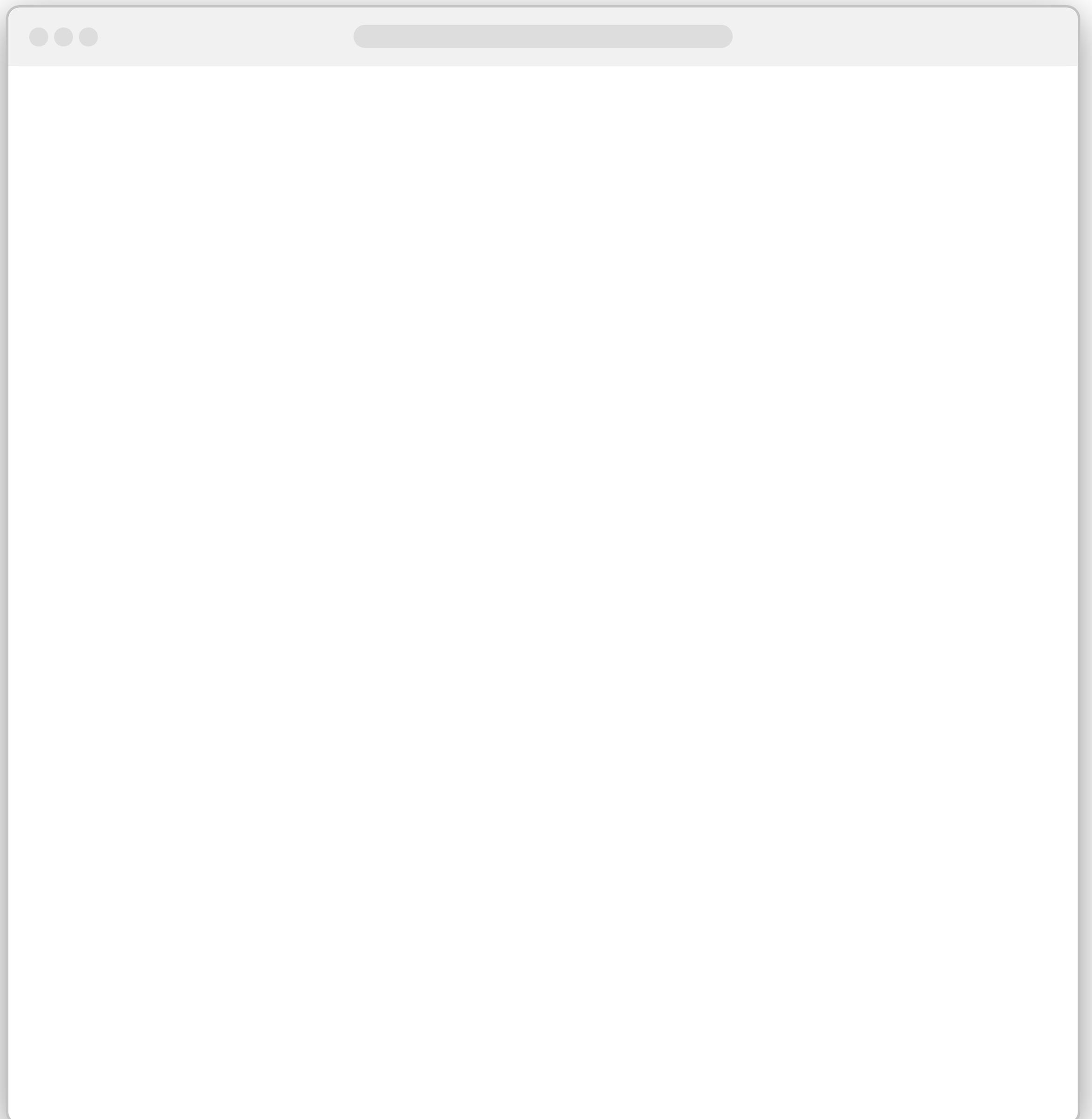


# How the Internet Works

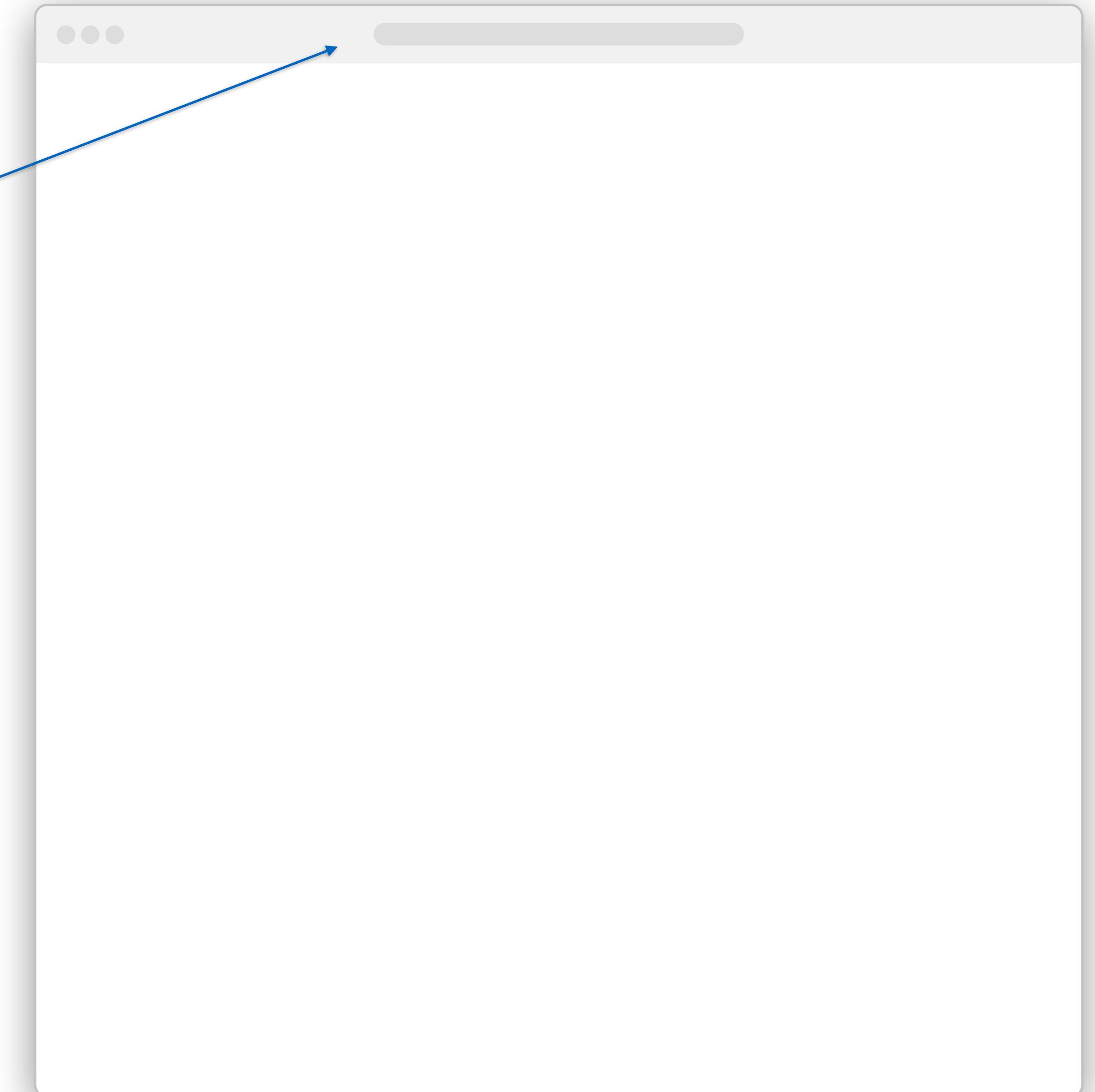
# **What Happens...**

...when you type this in to your browser?



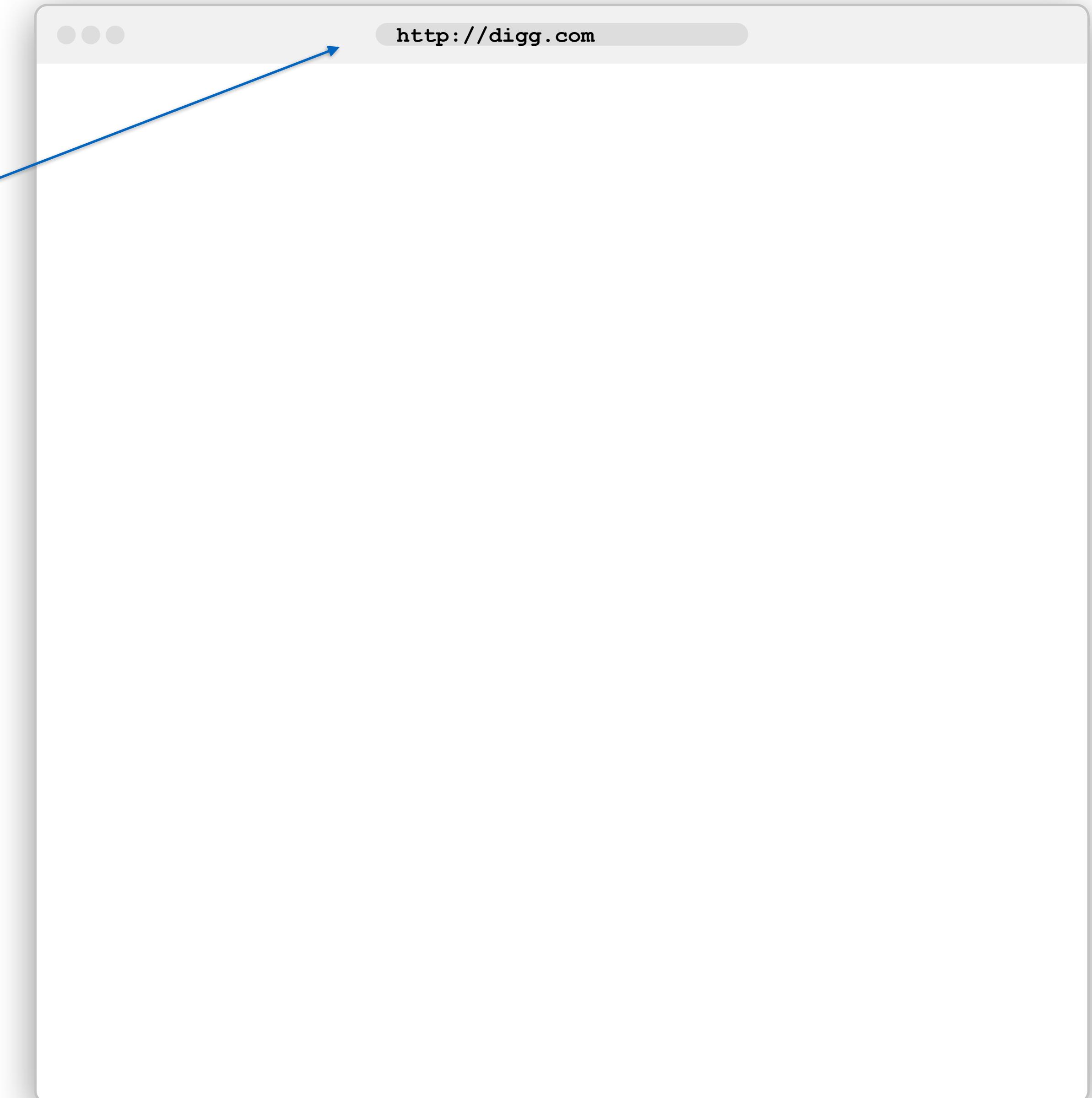
# What Happens...

...when you type this in to your browser?



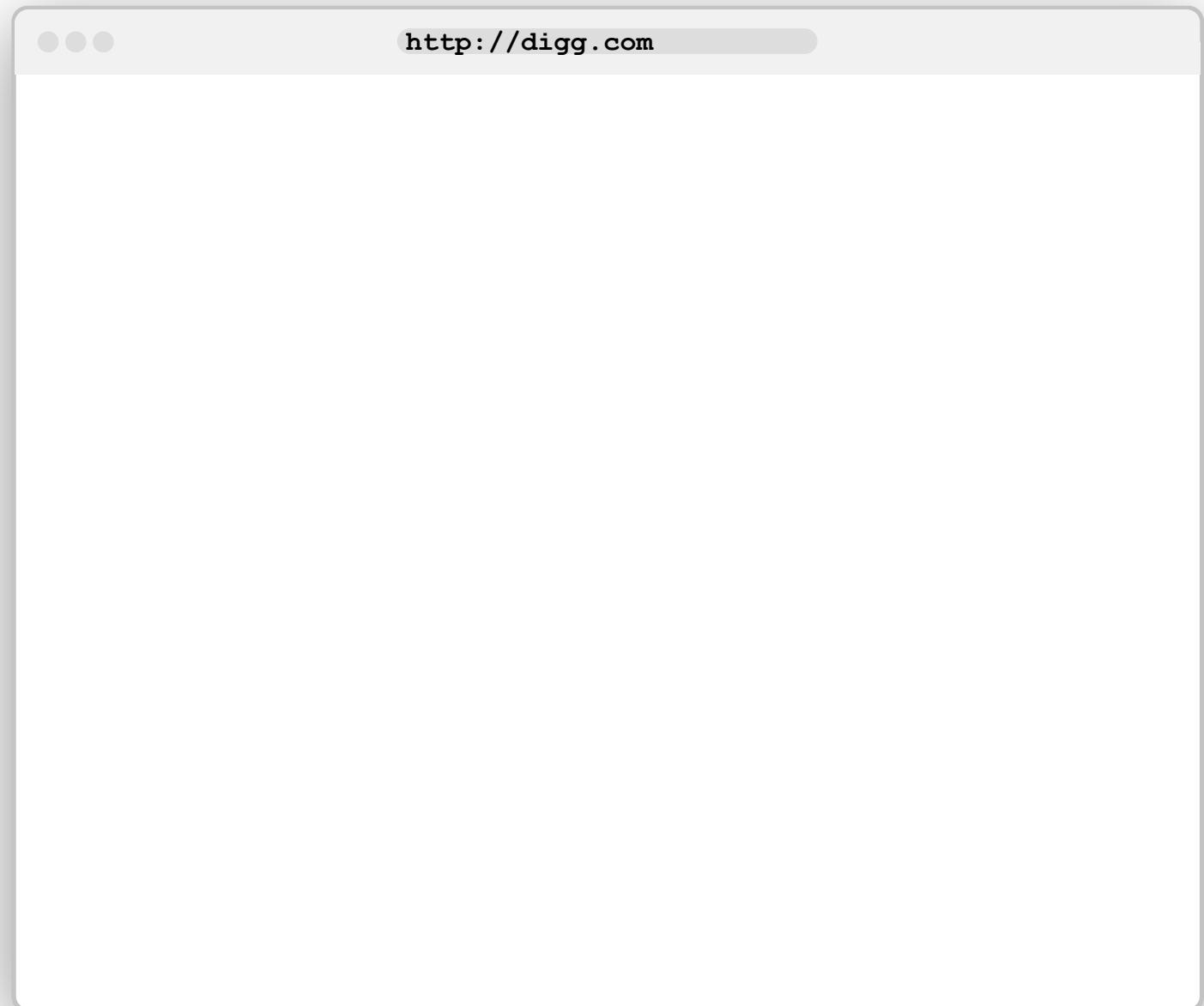
# What Happens...

...when you type this in to your browser?

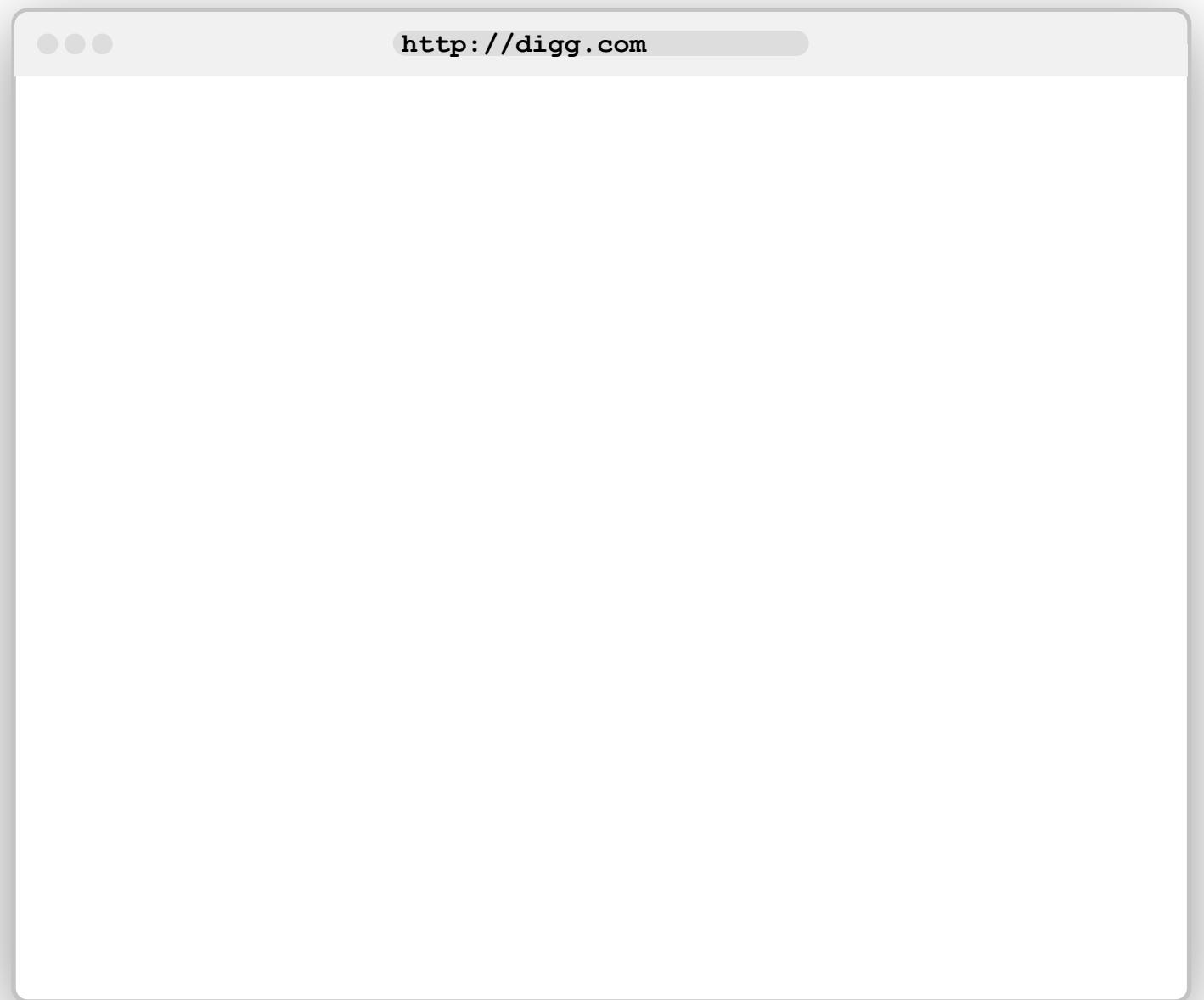




# **Step 1**



## **Step 1**



## **Step 2**

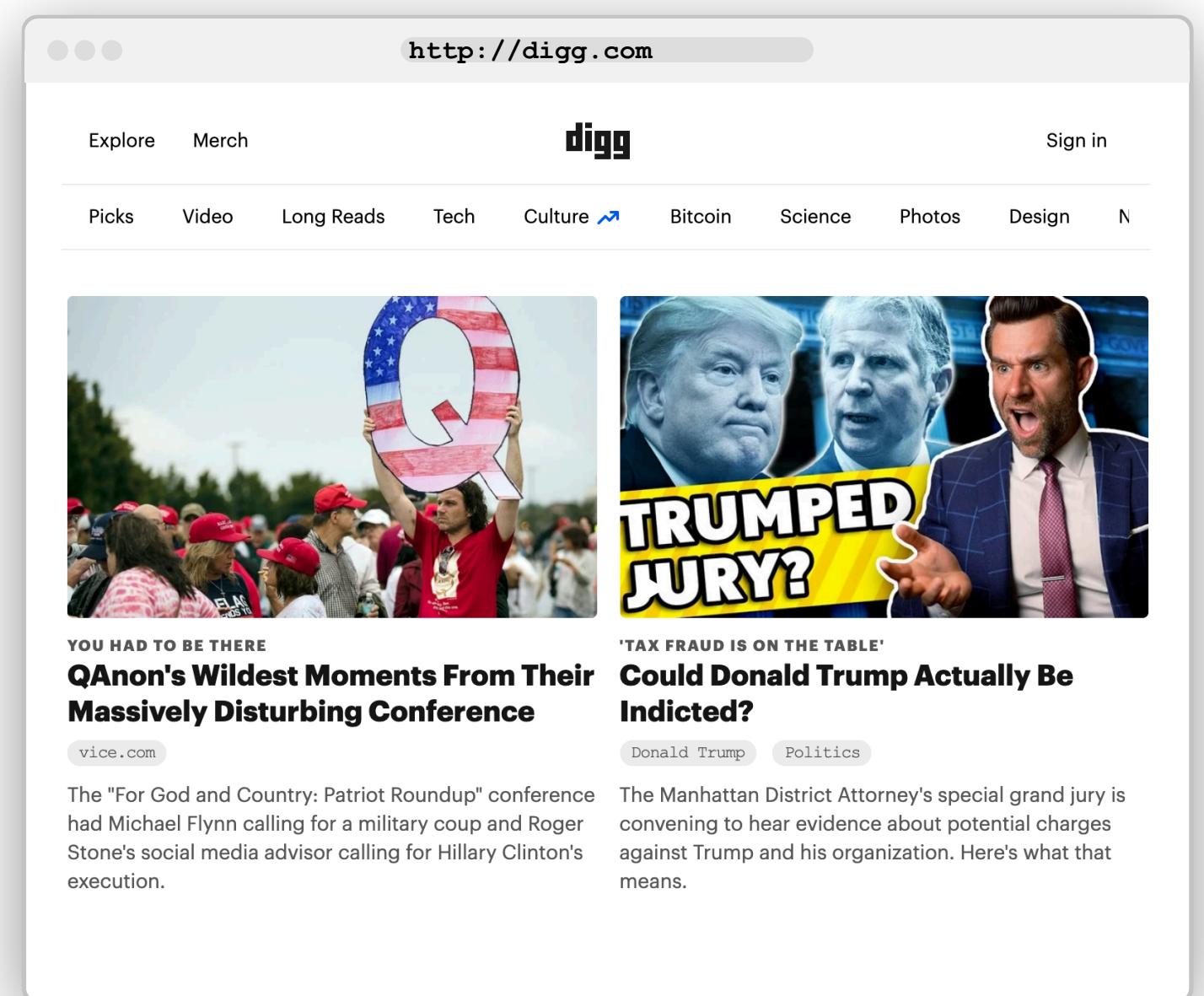
???

# Step 1



# Step 2

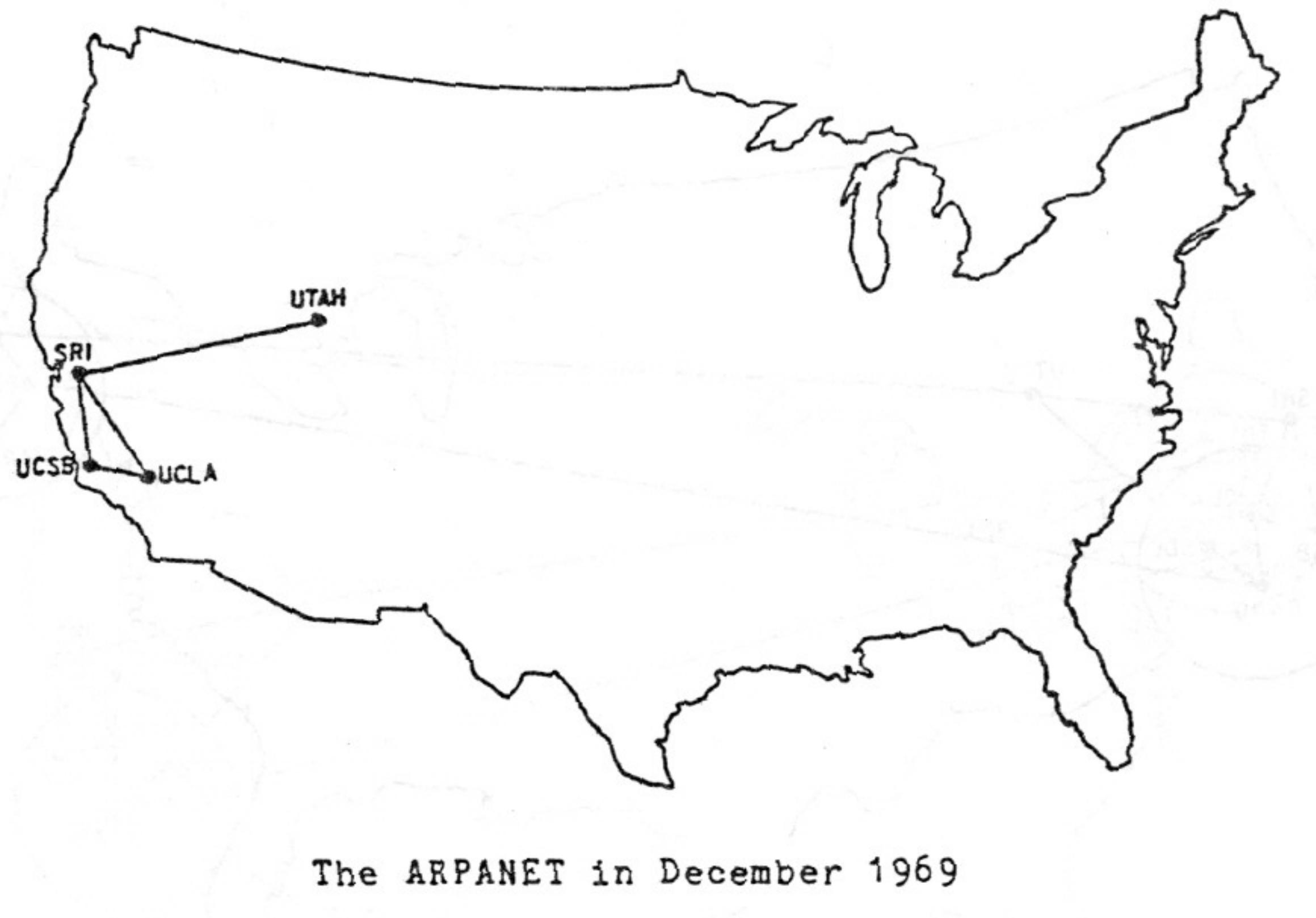
???

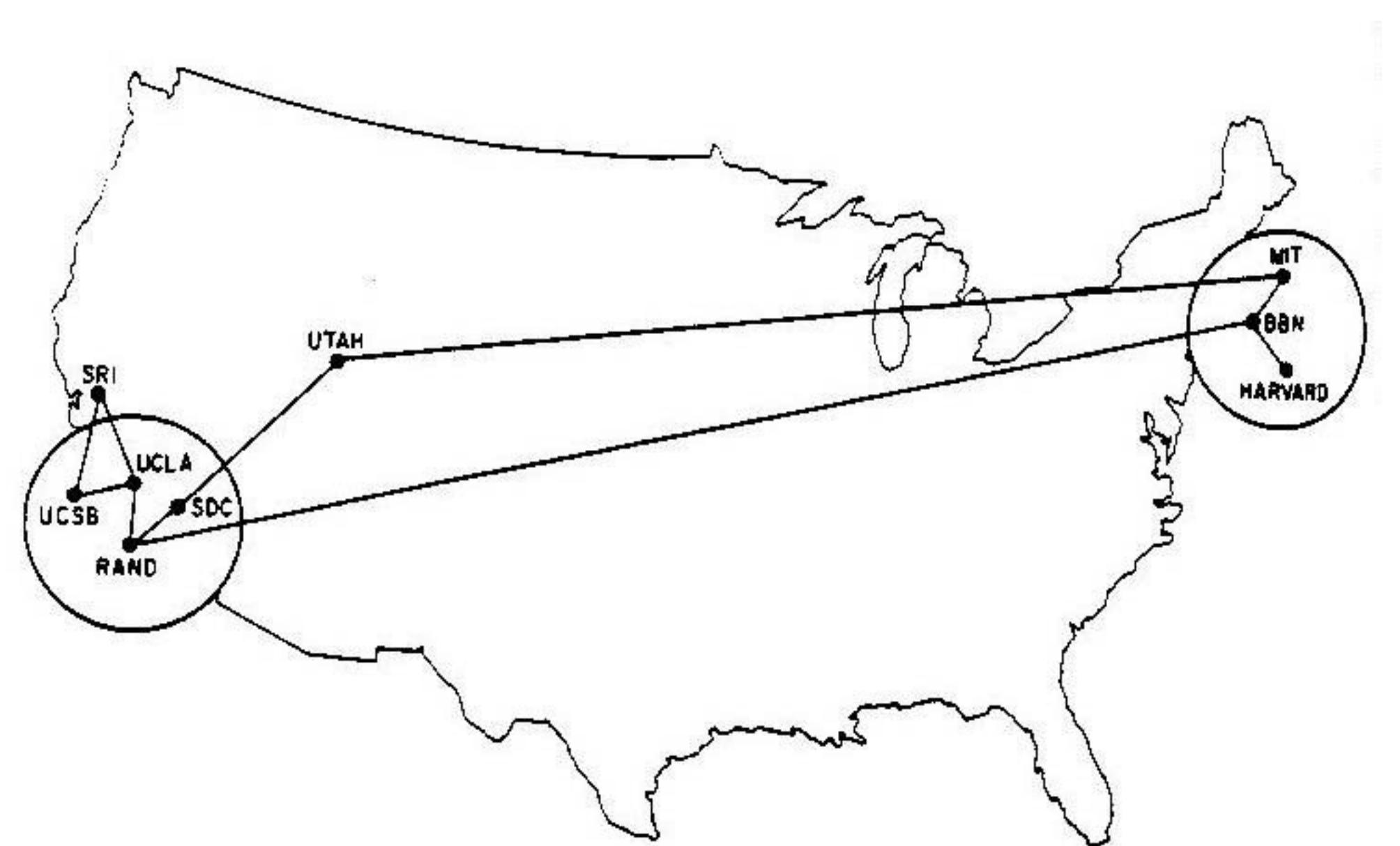


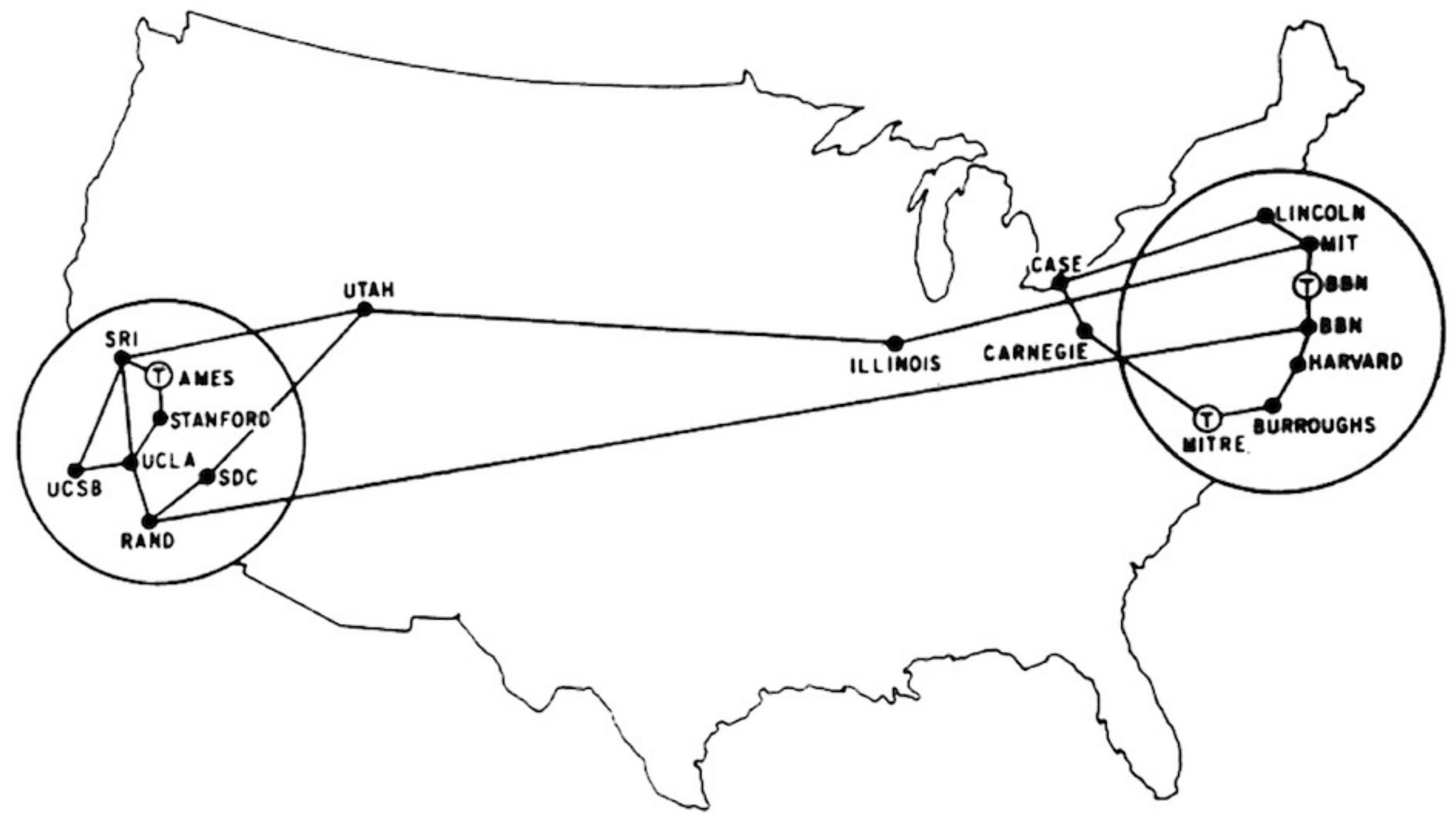
# Step 3

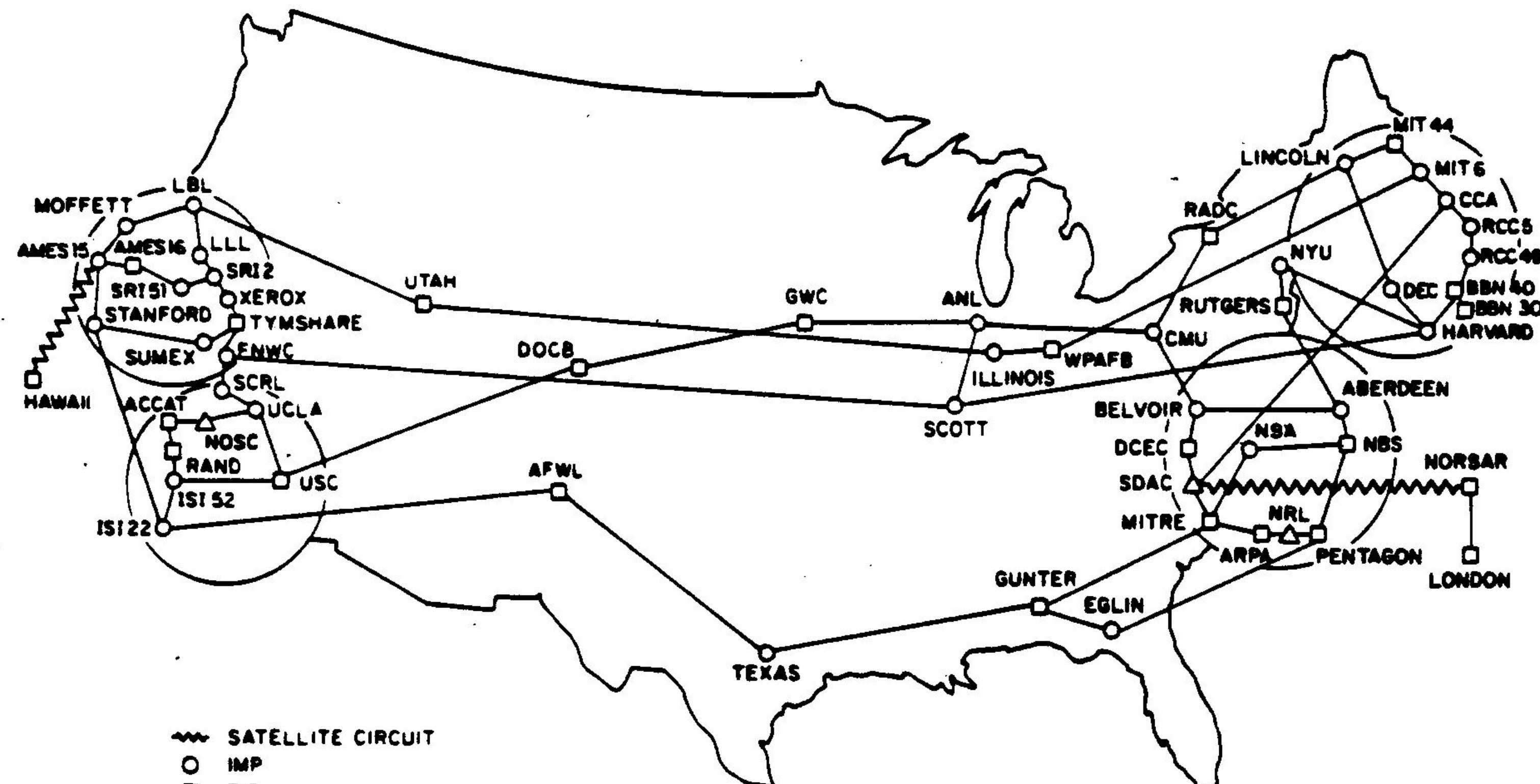
Before we start there...

What is the **Internet**





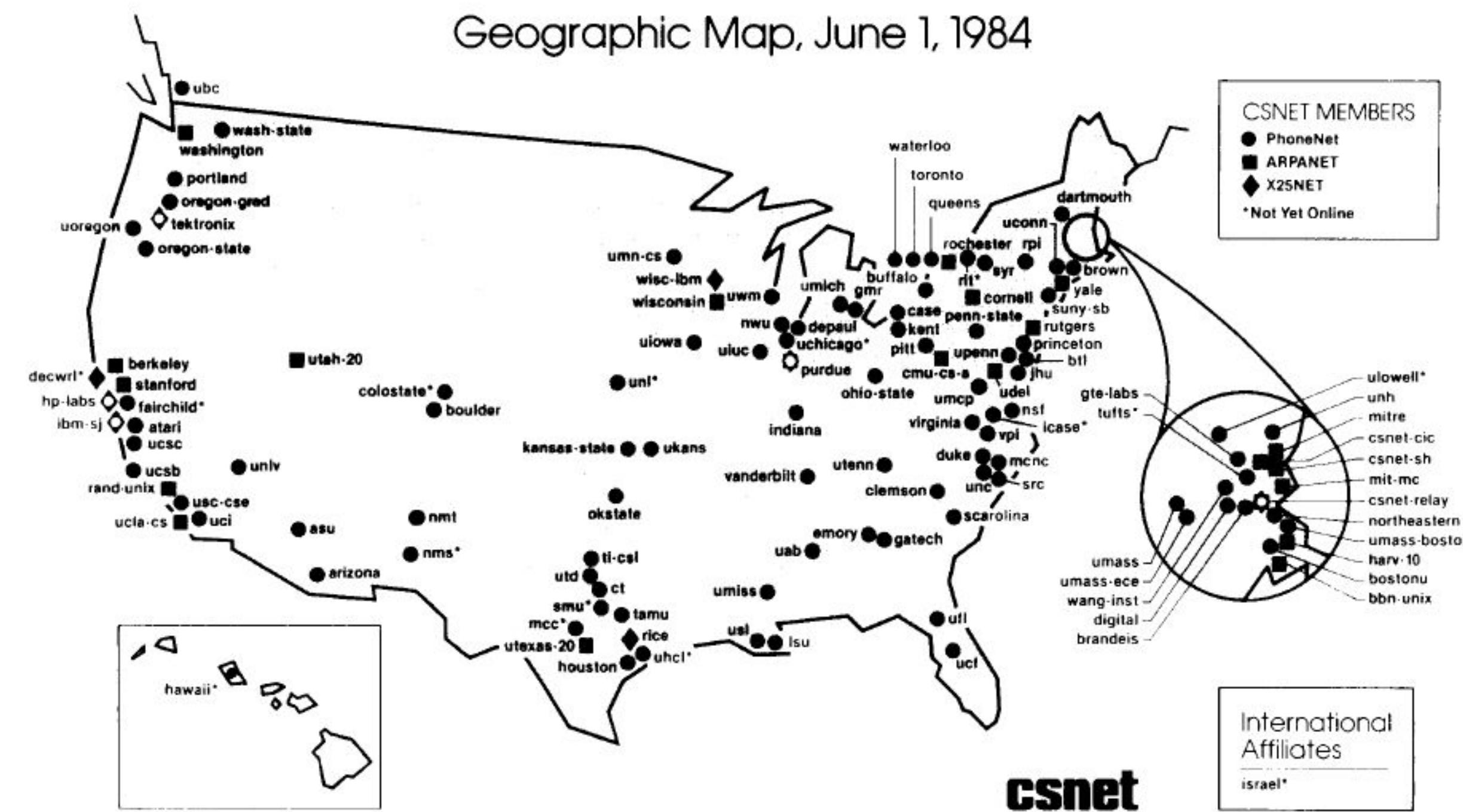




(NOTE: THIS MAP DOES NOT SHOW ARPA'S EXPERIMENTAL  
SATELLITE CONNECTIONS)

NAMES SHOWN ARE IMP NAMES, NOT (NECESSARILY) HOST NAMES

Geographic Map, June 1, 1984



# Enter the Magic of **HTTP** (HyperText Transfer Protocol)

[Tim Berners-Lee, 1989](#)

HTTP is a protocol that allows “clients” (browsers) to request hypertext documents from “servers”

# Why Even Do This?

[“Intended Uses” from Tim Berners-Lee](#)

General reference data - encyclopaedia, etc.

Completely centralized publishing - online help, documentation, tutorial etc

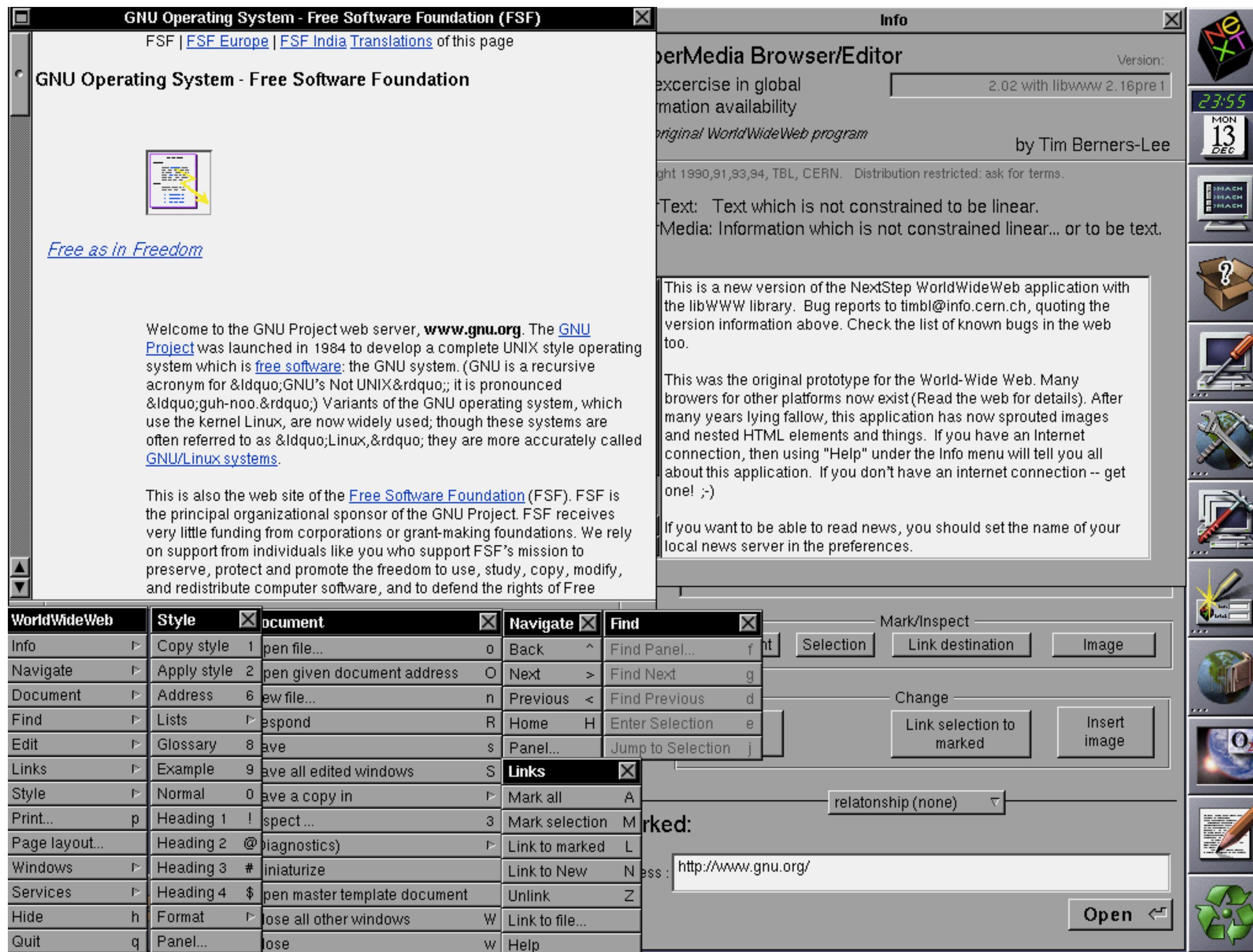
More or less centralized dissemination of news which has a limited life

Collaborative authoring

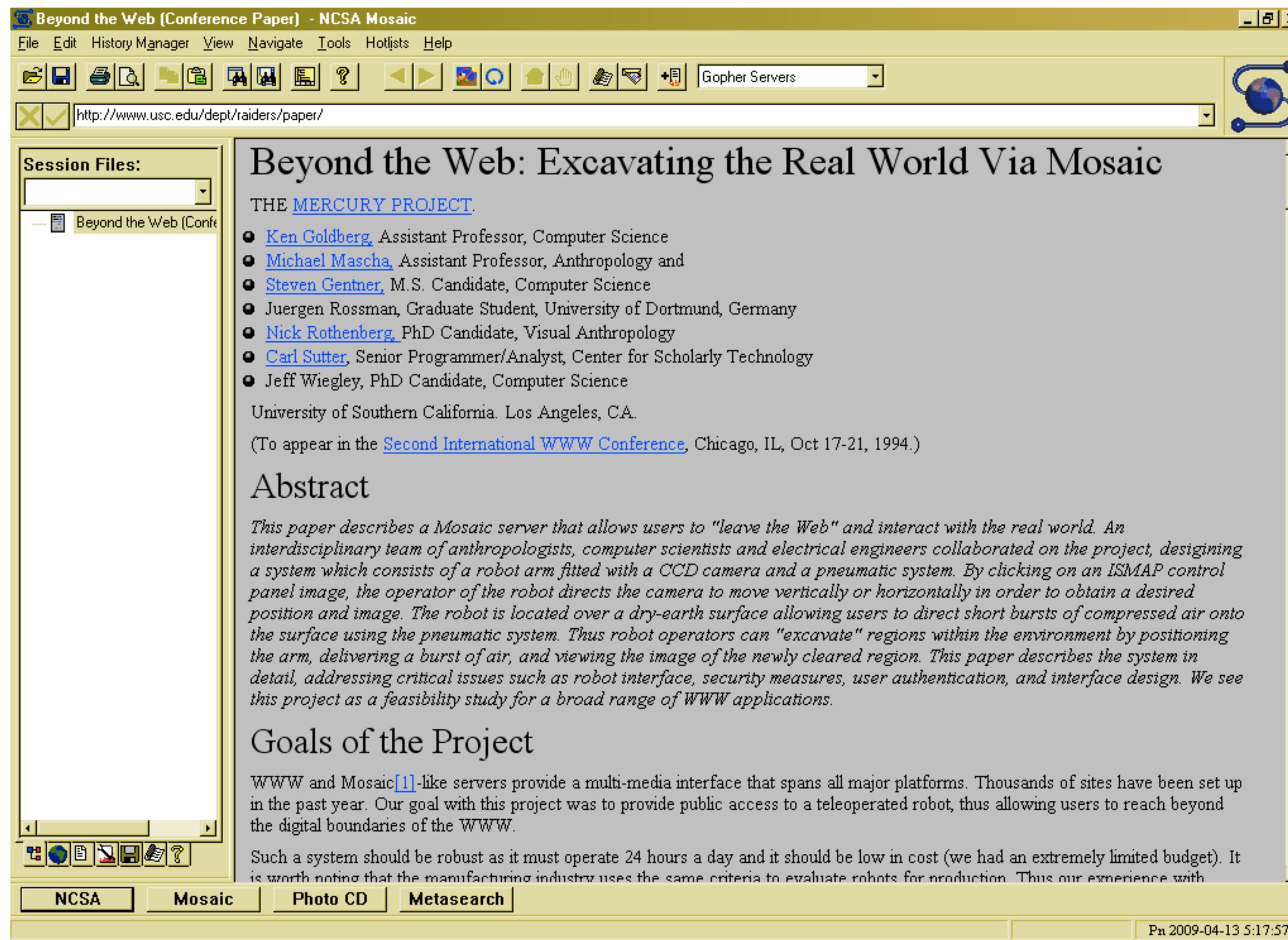
Collaborative design of something other than the hypertext itself

Personal notebook

<https://www.w3.org/DesignIssues/Uses.html>



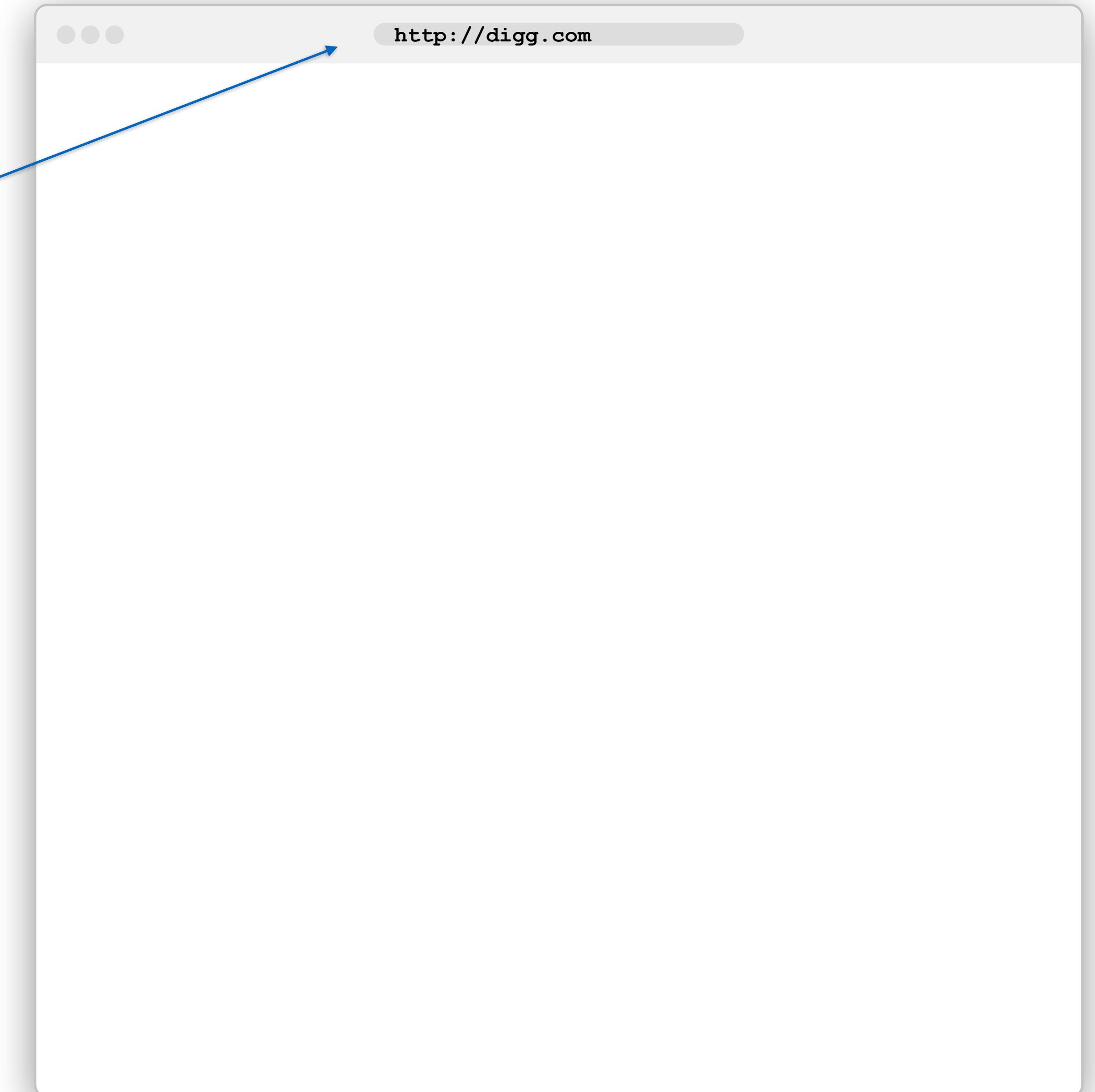
# WorldWideWeb 1990



Mosaic 1993

# What Happens...

...when you type this in to your browser?







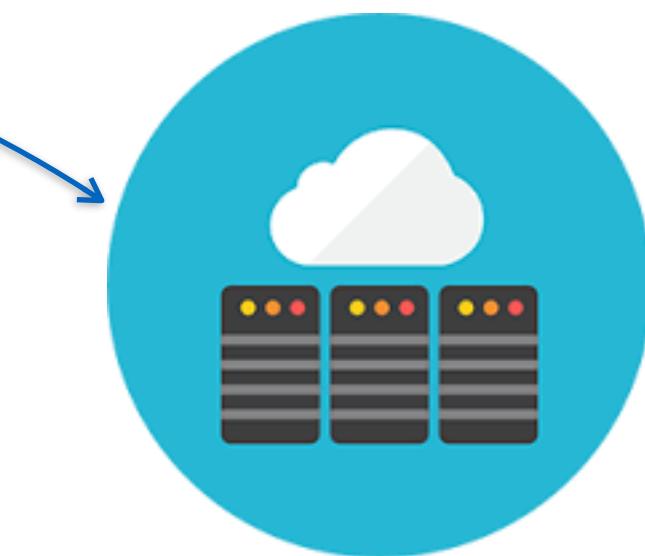


## Domain Name System (DNS)

google.com	74.125.22.113
digg.com	50.18.185.231
yahoo.com	206.190.36.45
nytimes.com	170.149.159.130

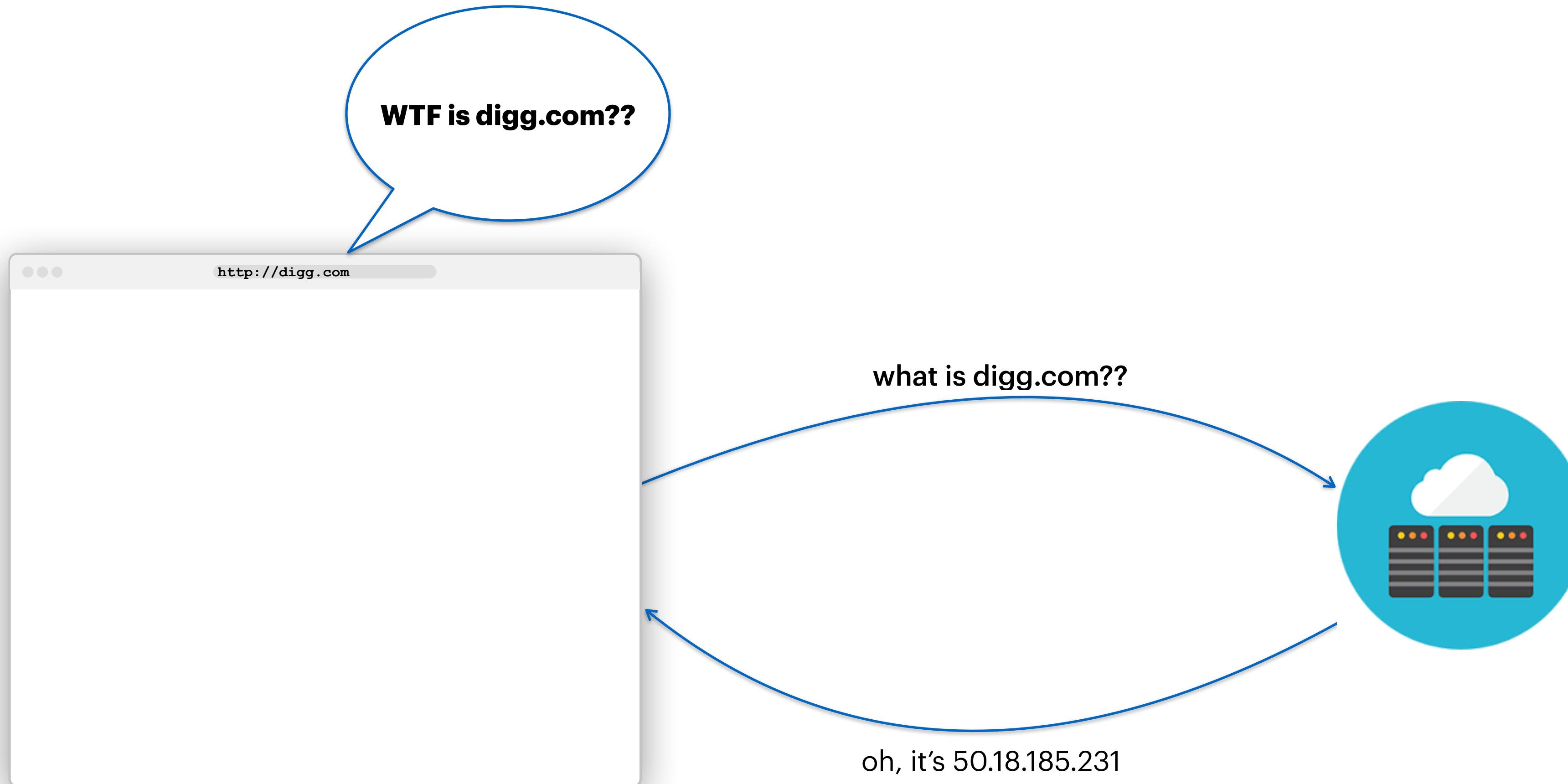


what is digg.com??

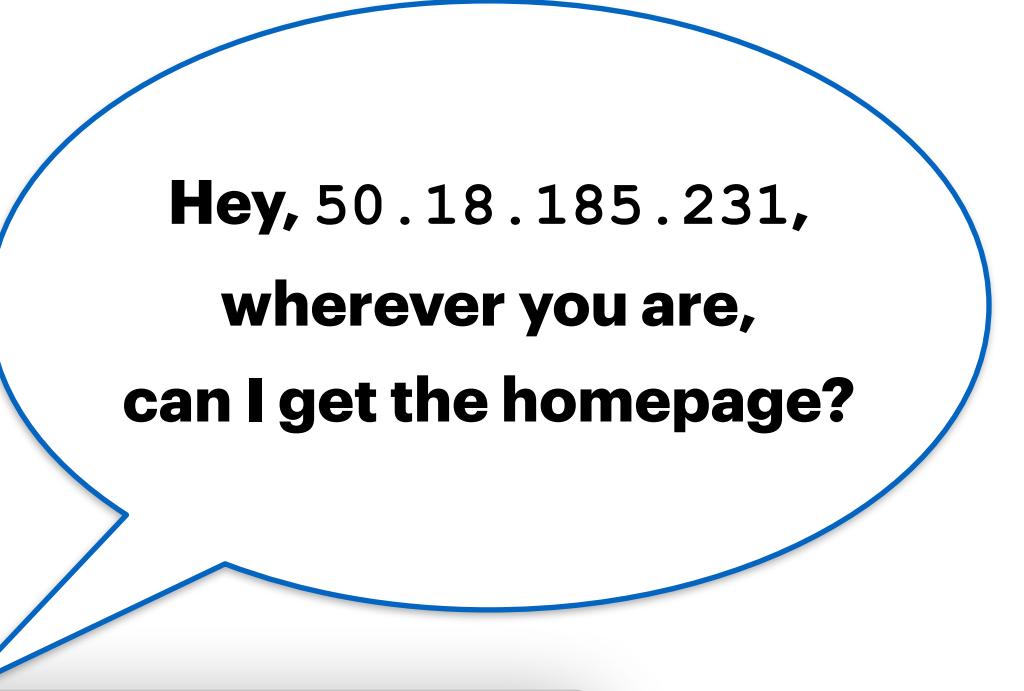


### Domain Name System (DNS)

google.com	74.125.22.113
digg.com	50.18.185.231
yahoo.com	206.190.36.45
nytimes.com	170.149.159.130

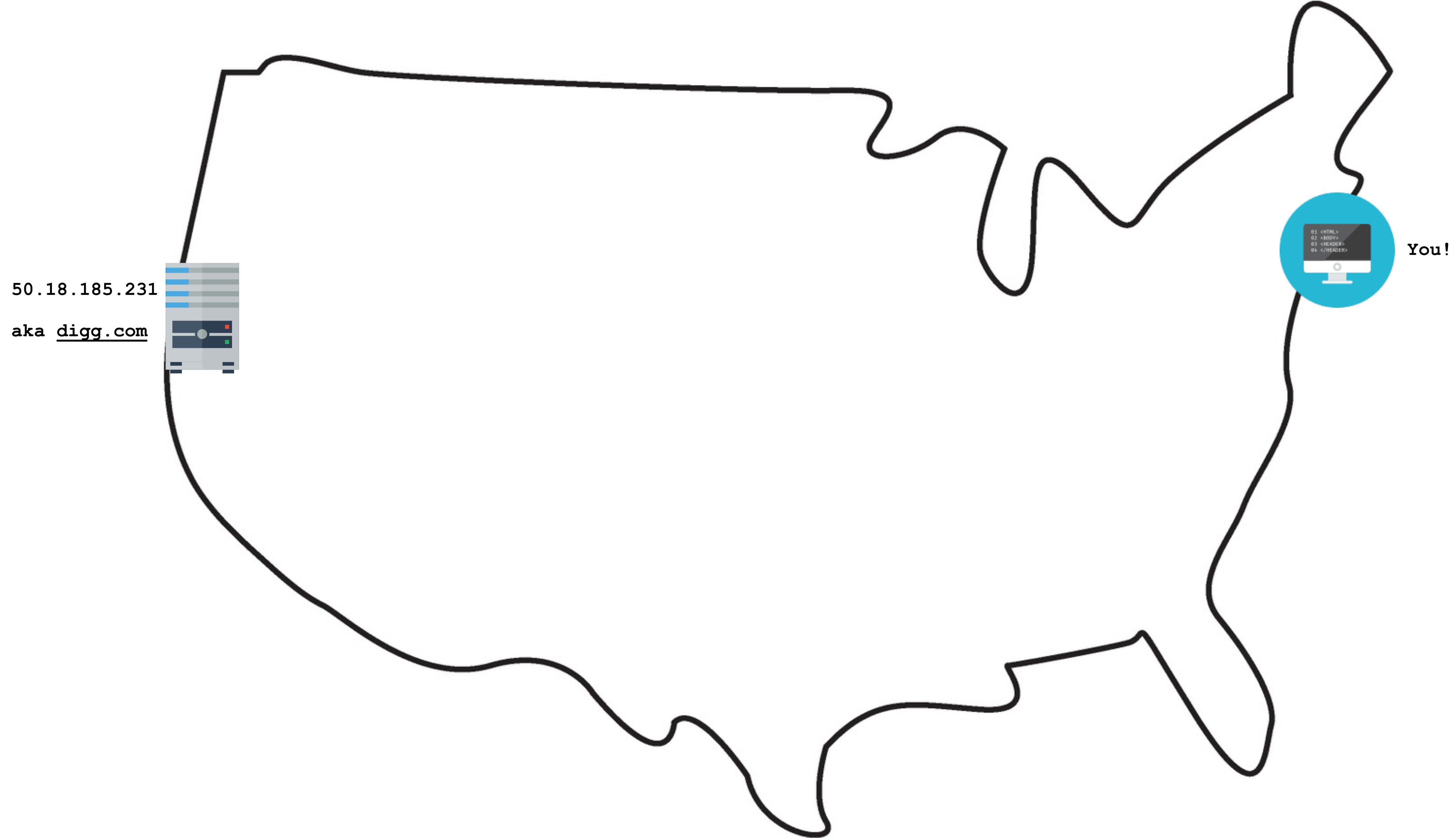


google.com	74.125.22.113
digg.com	50.18.185.231
yahoo.com	206.190.36.45
nytimes.com	170.149.159.130

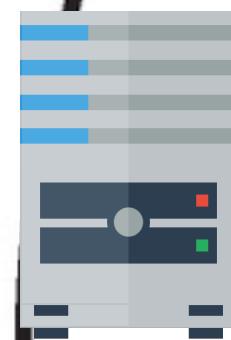


**Hey, 50.18.185.231,  
wherever you are,  
can I get the homepage?**



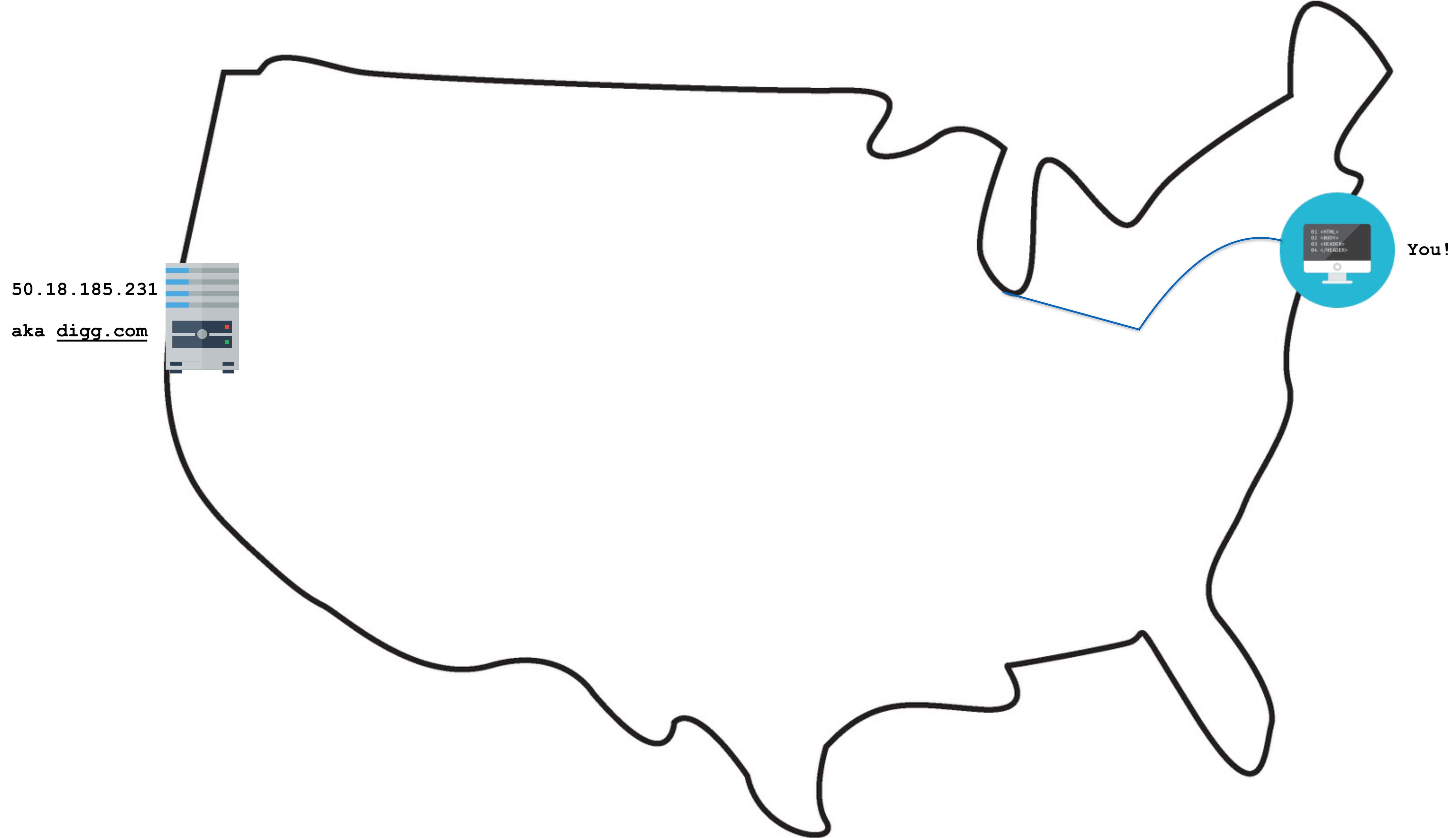


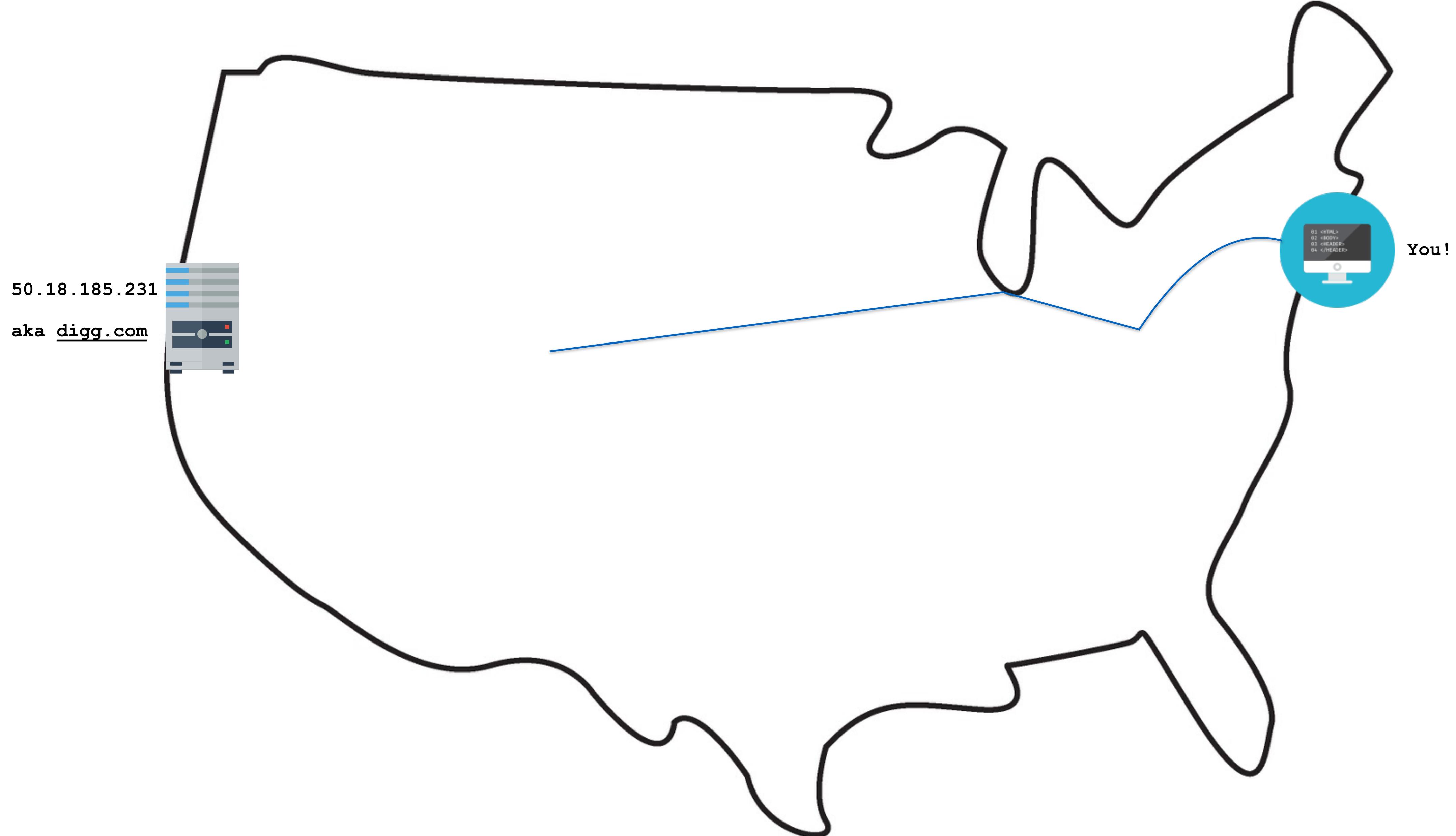
50.18.185.231  
aka [digg.com](#)

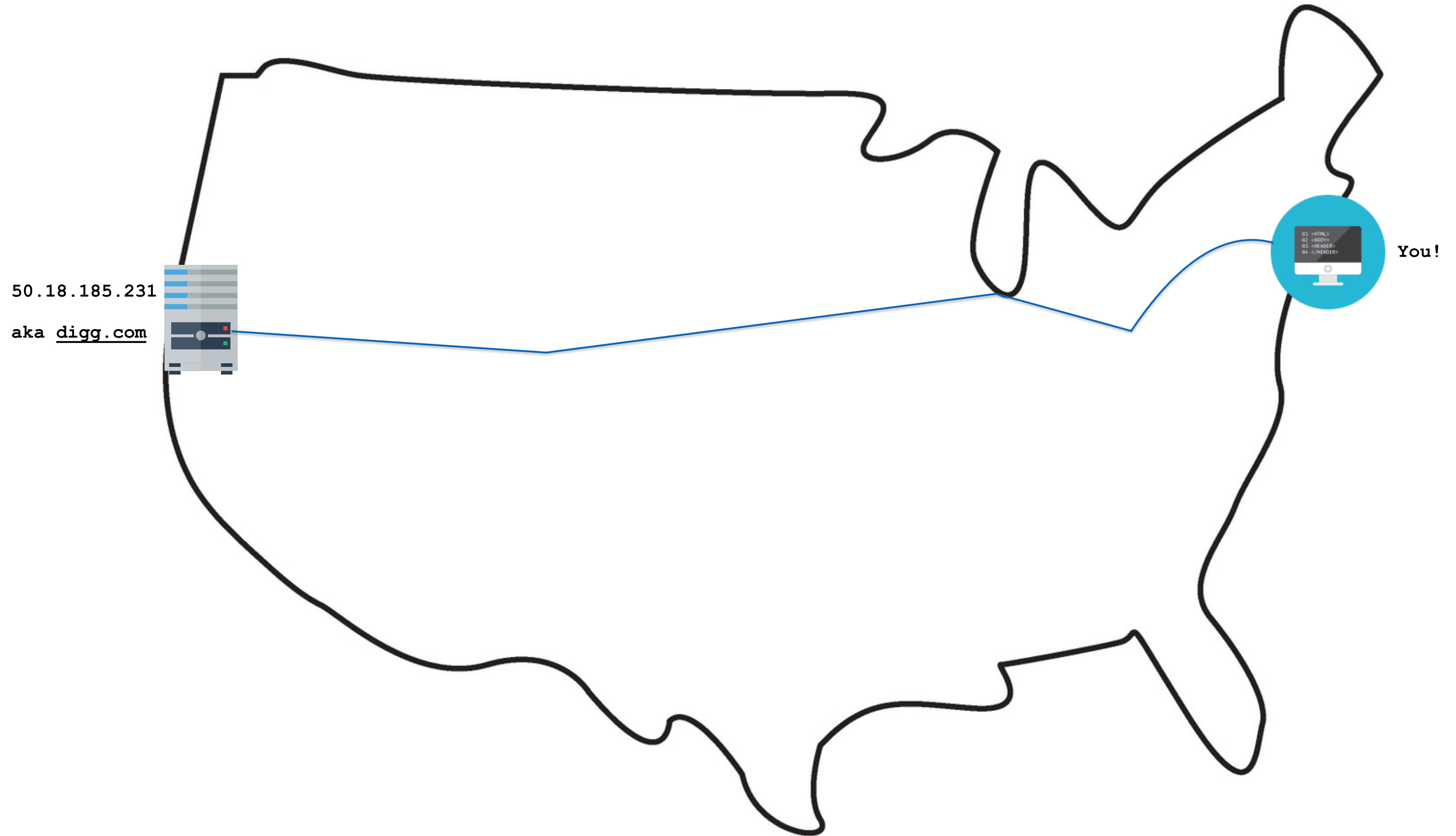


You!









# Remember **HTTP**? (HyperText Transfer Protocol)

Tim Berners-Lee, 1989

HTTP is a protocol that allows “clients” (browsers) to request hypertext documents from “servers”

# The HTTP Request



http://digg.com

50.18.185.231  
aka [digg.com](http://digg.com)

Mark: "Hey Digg, it's me Mark, can I get the homepage?"

# The HTTP **Response**



50.18.185.231  
aka [digg.com](http://digg.com)

Digg: "Ok Mark, sure, here you go!"  
(sends back the homepage HTML)

<http://digg.com>

# The HTTP Request



http://digg.com

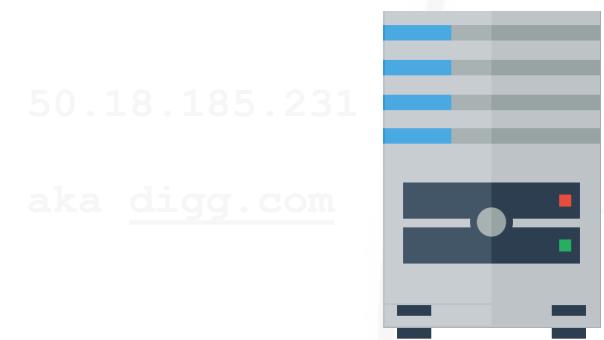
50.18.185.231 GET / HTTP/1.1

aka digg.com

**Host:** digg.com  
**Accept:** text/html  
**Accept-Encoding:** gzip  
**Connection:** Keep-Alive  
**User-Agent:** Mozilla/5.0 (Macintosh; Intel Mac OS X 10\_11\_3) AppleWebKit/53.0.2785.116  
**Cookie:** username=myoung; user\_id=123456;

# The HTTP Response

HTTP/1.1 200 OK



50.18.185.231  
aka digg.com

**Content-Type:** text/html; charset=UTF-8  
**Date:** Tue, 27 Sep 2016 18:34:06 GMT  
**Server:** TornadoServer/2.3  
**Set-Cookie:** preferred\_view=desktop; Path=/  
**Content-Length:** 230330  
**Connection:** keep-alive

```
<!DOCTYPE html>
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="http://static.digg.com/homepage.css" type="text/css"
media="screen" />
</head>

<body class="homepage">
[a lot more HTML goes here :-)]

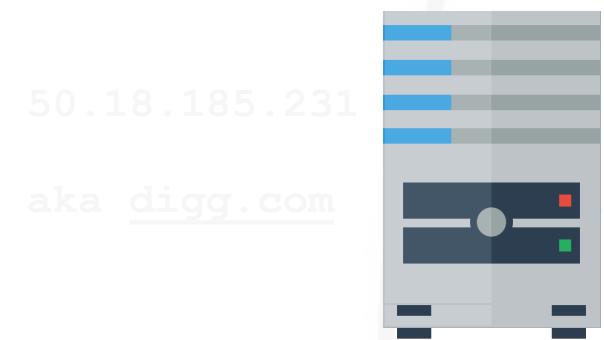
<script src="http://static.digg.com/frontpage.js"></script>

<!-- built with love by amateurs! -->
</body>
</html>
```

http://digg.com

# The HTTP Response

## HTTP/1.1 404 Not Found



50.18.185.231  
aka [digg.com](http://digg.com)

**Content-Type:** text/html; charset=UTF-8  
**Date:** Tue, 27 Sep 2016 18:34:06 GMT  
**Server:** TornadoServer/2.3  
**Set-Cookie:** preferred\_view=desktop; Path=/  
**Content-Length:** 230330  
**Connection:** keep-alive

```
<!DOCTYPE html>
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="http://static.digg.com/homepage.css" type="text/css"
media="screen" />
</head>

<body class="homepage">
[a lot more HTML goes here :-)]

<script src="http://static.digg.com/frontpage.js"></script>

<!-- built with love by amateurs! -->
</body>
</html>
```

<http://digg.com>

# Now What !?!

```
<!DOCTYPE html>
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="http://static.digg.com/homepage.css" type="text/css" media="screen"/>
</head>

<body class="homepage">

<a href="http://digg.com/2016/debate-recap-trump-clinton-video">

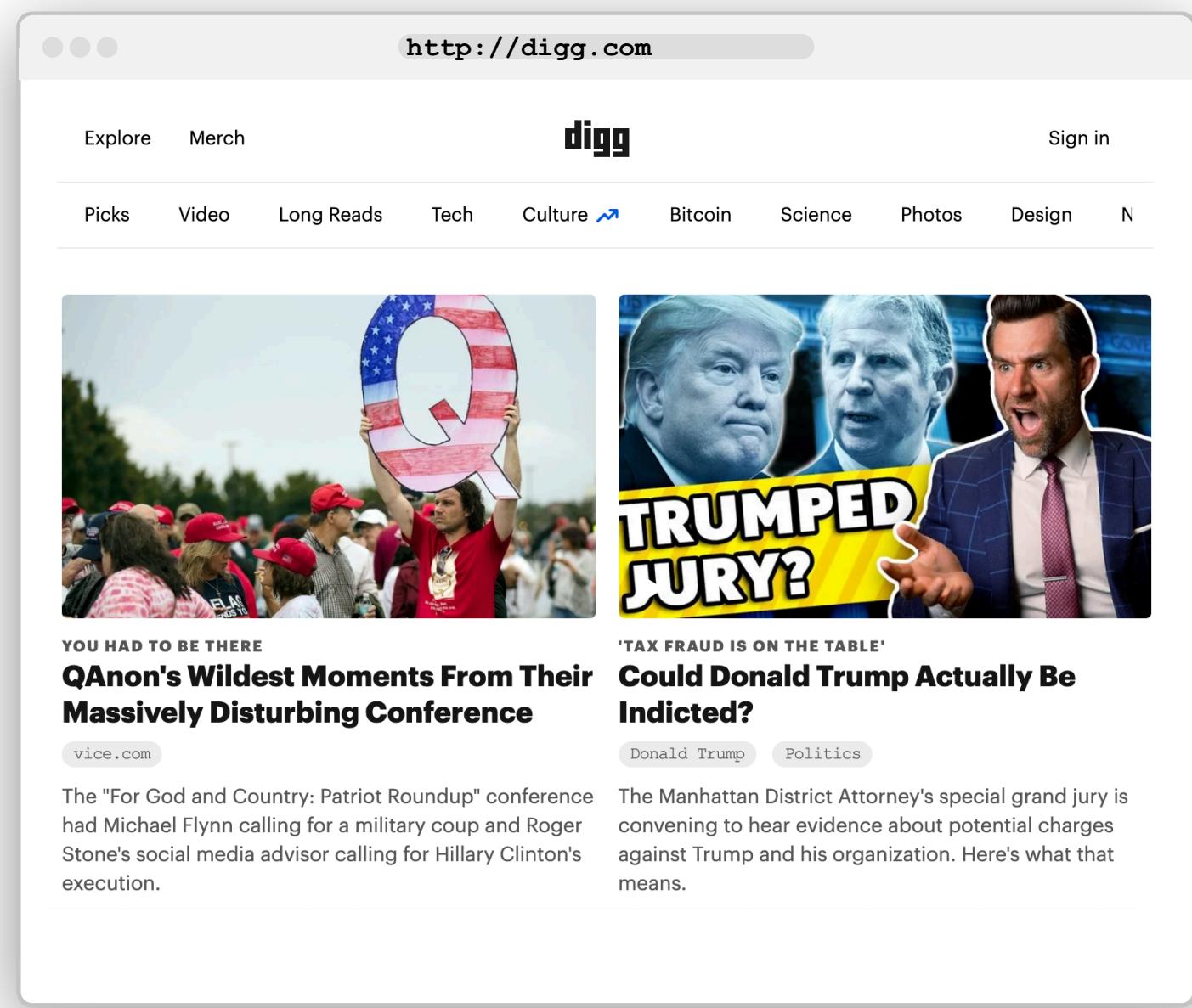
</a>

<div class="digg-story__content">
<header class="digg-story__header">
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>
<h2 itemprop="headline" class="digg-story__title">
<a class="digg-story__title" href="http://digg.com/2016/debate-recap-trump-clinton-video">
Just The Good Stuff From Last Night's Debate
</a>
</h2>

<div class="digg-story__metadata">
<span class="digg-story__metadata-diggs">
<span class="js--digg-count">33</span>
<span class="js--digg-label">diggs</span>
</span>

<script src="http://static.digg.com/frontpage.js"></script>

<!-- built with love by amateurs! -->
</body>
</html>
```



**HTTP = HyperText Transfer Protocol**

**HTML = HyperText Markup Language**

# <head>

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="https://styleguide.digg.com/digg.css?v=1624084550">
</head>

<body class=" tailwind">

<article itemtype="http://schema.org/Article" data-id="1099277" class="fp-vertical-story mb-2 md:mb-0">
 <a class="block relative" href="https://digg.com/vice-news/link/q-anon-s-wildest-moments...">
   <picture>
     
   </picture>
 </a>

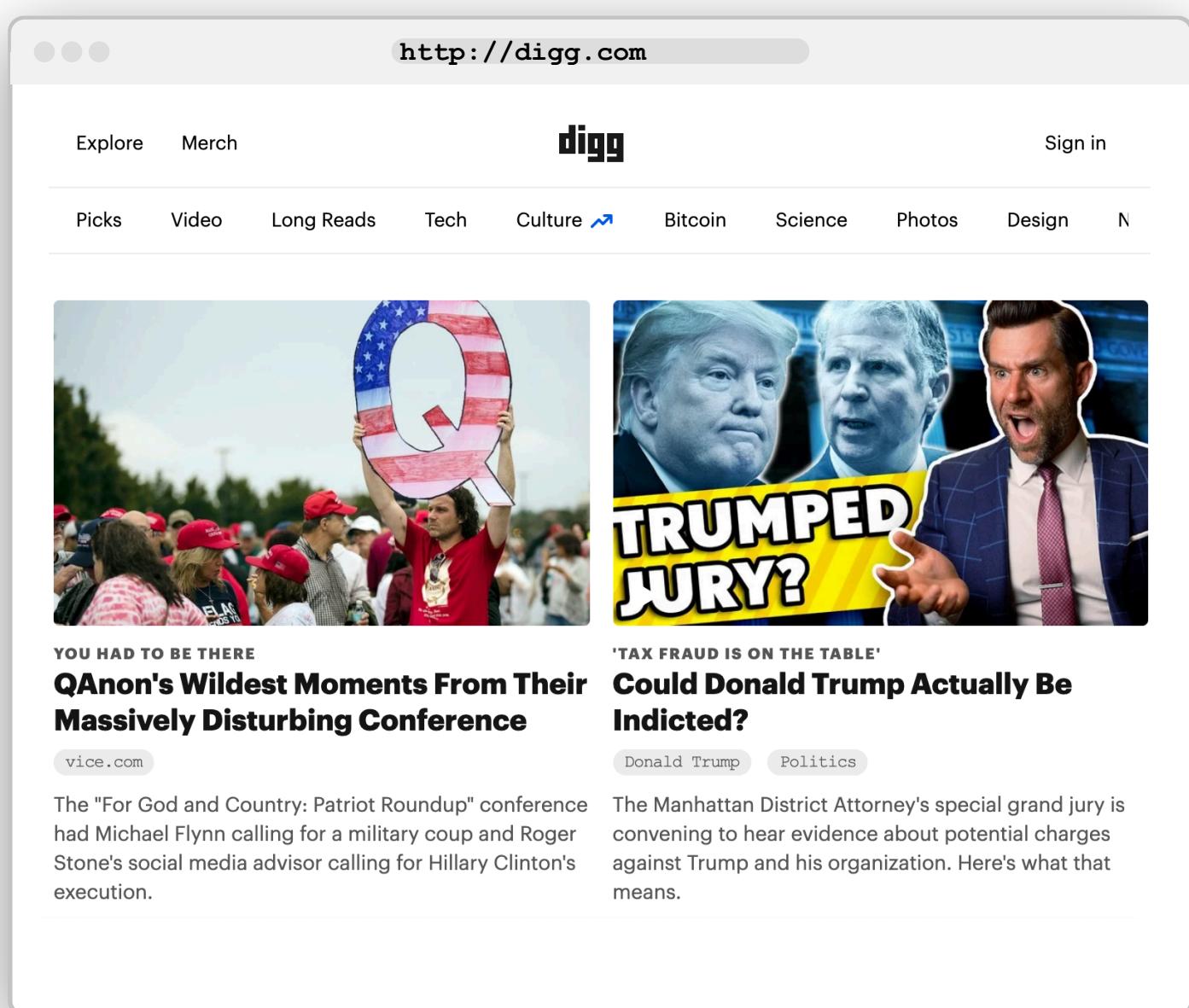
 <header>
   <div itemprop="alternativeHeadline" class="alternativeHeadline mr-4 mt-3 block ..." style="color:">
     YOU HAD TO BE THERE
   </div>

   <a target="_blank" class="font-bold text-xl..." href="https://digg.com/vice-news/link/q-anon-s...">
     <h2 itemprop="headline" class="headline">
       QAnon's Wildest Moments From Their Massively Disturbing Conference
     </h2>
   </a>
 </header>

 <div itemprop="description" class="description text-sm text-digg-gray lg:block mt-2">
   <p>The "For God and Country: Patriot Roundup" conference had Michael Flynn calling for a military coup and Roger Stone's social media advisor calling for Hillary Clinton's execution.</p>
 </div>
</article>

<script async src="https://static.chartbeat.com/js/chartbeat_mab.js"></script>

</body>
</html>
```



# <body>

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="https://styleguide.digg.com/digg.css?v=1624084550">
</head>

<body class=" tailwind">

<article itemtype="http://schema.org/Article" data-id="1099277" class="fp-vertical-story mb-2 md:mb-0">
  <a class="block relative" href="https://digg.com/vice-news/link/q-anon-s-wildest-moments...">
    <picture>
      
    </picture>
  </a>

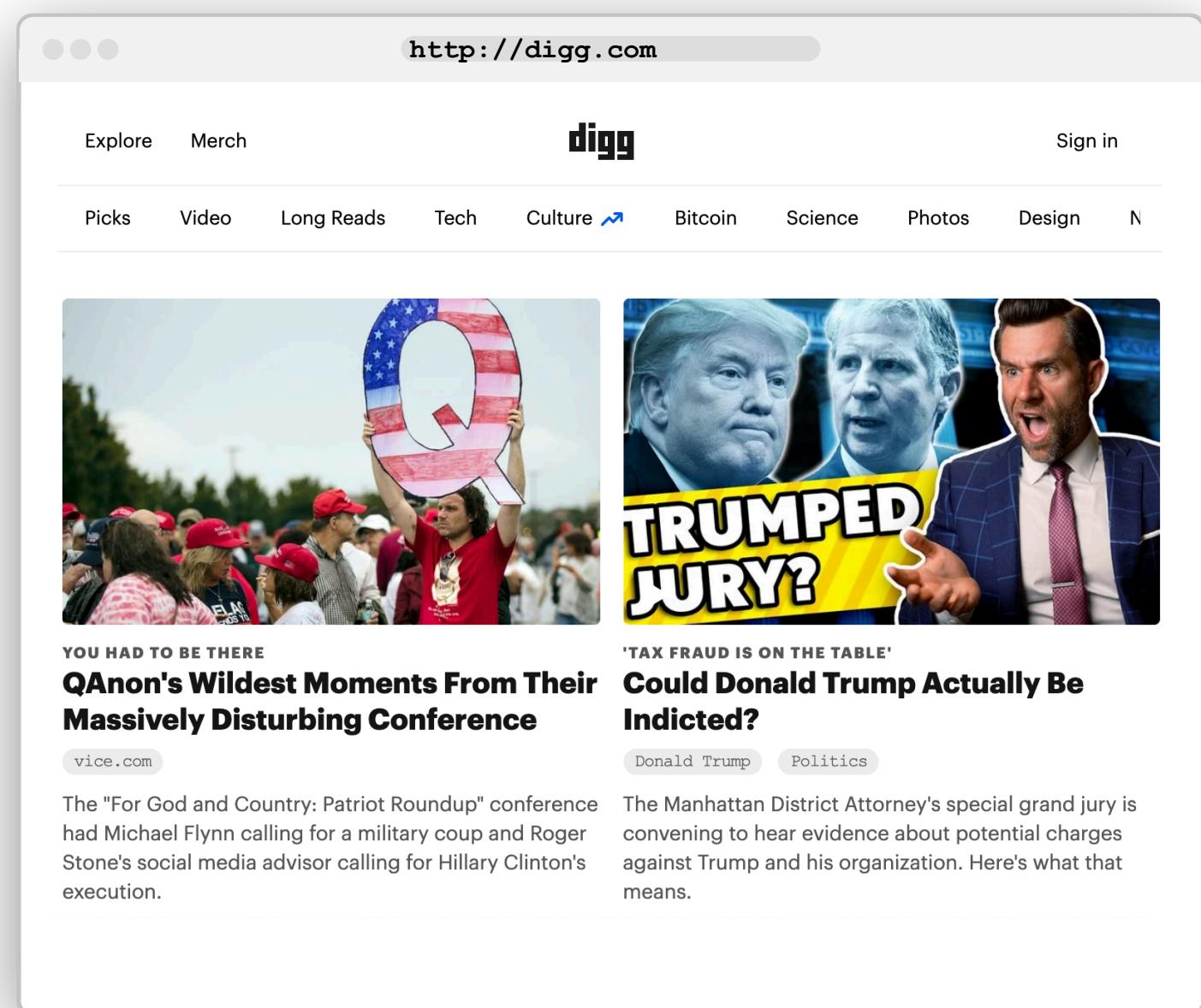
  <header>
    <div itemprop="alternativeHeadline" class="alternativeHeadline mr-4 mt-3 block ..." style="color:">
      YOU HAD TO BE THERE
    </div>

    <a target="_blank" class="font-bold text-xl..." href="https://digg.com/vice-news/link/q-anon-s..." itemprop="url" rel="bookmark noopener" aria-label="Opens a new window">
      <h2 itemprop="headline" class="headline">
        QAnon's Wildest Moments From Their Massively Disturbing Conference
      </h2>
    </a>
  </header>

  <div itemprop="description" class="description text-sm text-digg-gray lg:block mt-2">
    <p>The "For God and Country: Patriot Roundup" conference had Michael Flynn calling for a military coup and Roger Stone's social media advisor calling for Hillary Clinton's execution.</p>
  </div>
</article>

<script async src="https://static.chartbeat.com/js/chartbeat_mab.js"></script>

</body>
</html>
```



# Styling

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="https://styleguide.digg.com/digg.css?v=1624084550">
</head>

<body class="tailwind">

<article itemtype="http://schema.org/Article" data-id="1099277" class="fp-vertical-story mb-2 md:mb-0">
  <a class="block relative" href="https://digg.com/vice-news/link/q-anon-s-wildest-moments...">
    <picture>
      
    </picture>
  </a>

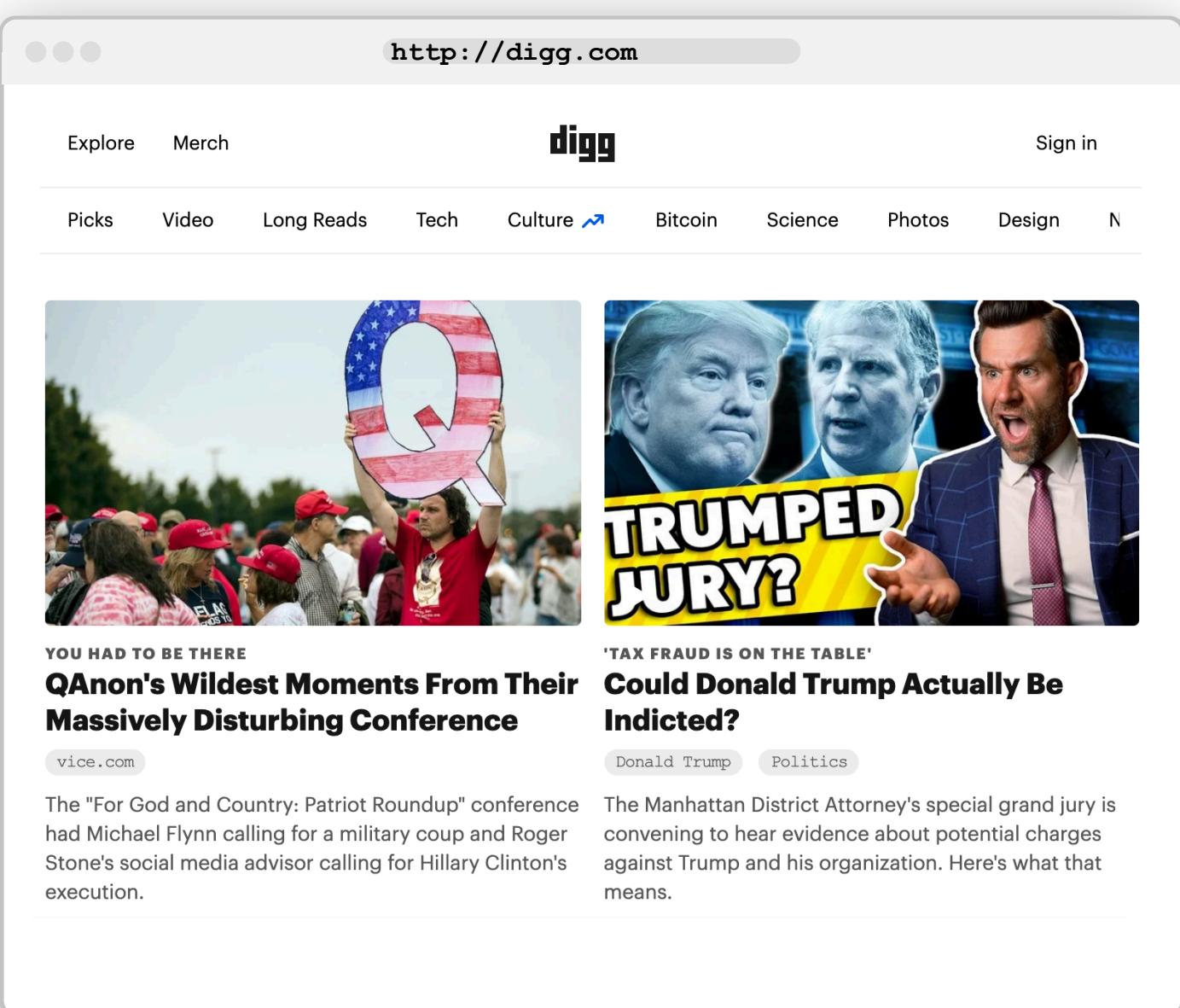
  <header>
    <div itemprop="alternativeHeadline" class="alternativeHeadline mr-4 mt-3 block ..." style="color:">
      YOU HAD TO BE THERE
    </div>

    <a target="_blank" class="font-bold text-xl..." href="https://digg.com/vice-news/link/q-anon-s...">
      <h2 itemprop="headline" class="headline">
        QAnon's Wildest Moments From Their Massively Disturbing Conference
      </h2>
    </a>
  </header>

  <div itemprop="description" class="description text-sm text-digg-gray lg:block mt-2">
    <p>The "For God and Country: Patriot Roundup" conference had Michael Flynn calling for a military coup and Roger Stone's social media advisor calling for Hillary Clinton's execution.</p>
  </div>
</article>

<script async src="https://static.chartbeat.com/js/chartbeat_mab.js"></script>

</body>
</html>
```



# Images

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="https://styleguide.digg.com/digg.css?v=1624084550">
</head>

<body class="tailwind">

<article itemtype="http://schema.org/Article" data-id="1099277" class="fp-vertical-story mb-2 md:mb-0">
 <a class="block relative" href="https://digg.com/vice-news/link/q-anon-s-wildest-moments...">
   <picture>
     
   </picture>
 </a>

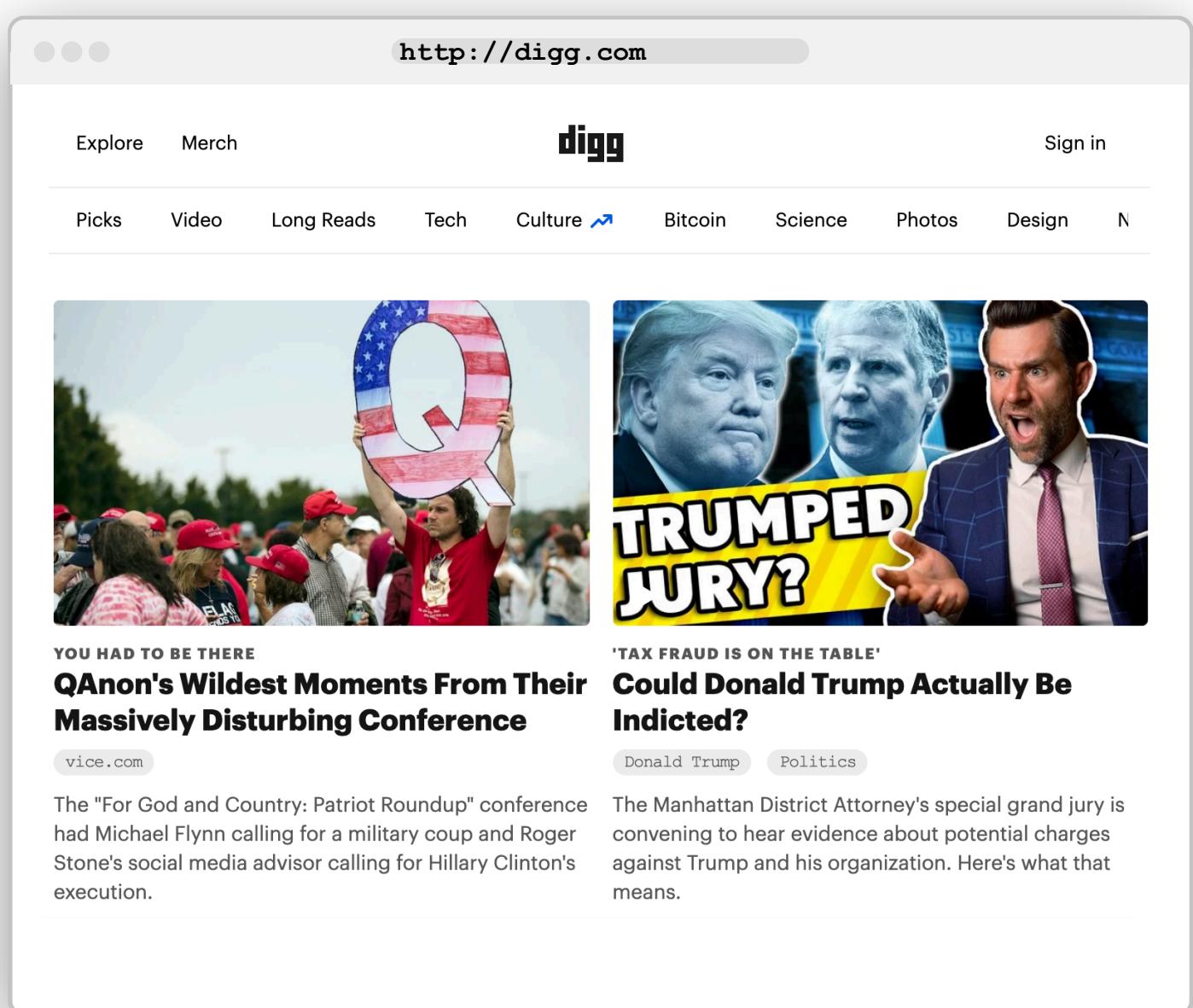
 <header>
   <div itemprop="alternativeHeadline" class="alternativeHeadline mr-4 mt-3 block ..." style="color:">
     YOU HAD TO BE THERE
   </div>

   <a target="_blank" class="font-bold text-xl..." href="https://digg.com/vice-news/link/q-anon-s...">
     <h2 itemprop="headline" class="headline">
       QAnon's Wildest Moments From Their Massively Disturbing Conference
     </h2>
   </a>
 </header>

 <div itemprop="description" class="description text-sm text-digg-gray lg:block mt-2">
   <p>The "For God and Country: Patriot Roundup" conference had Michael Flynn calling for a military coup and Roger Stone's social media advisor calling for Hillary Clinton's execution.</p>
 </div>
 </article>

<script async src="https://static.chartbeat.com/js/chartbeat_mab.js"></script>

</body>
</html>
```



# JavaScript

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Digg - What the Internet is talking about right now</title>
<link rel="stylesheet" href="https://styleguide.digg.com/digg.css?v=1624084550">
</head>

<body class="tailwind">

<article itemtype="http://schema.org/Article" data-id="1099277" class="fp-vertical-story mb-2 md:mb-0">
  <a class="block relative" href="https://digg.com/vice-news/link/q-anon-s-wildest-moments...">
    <picture>
      
    </picture>
  </a>

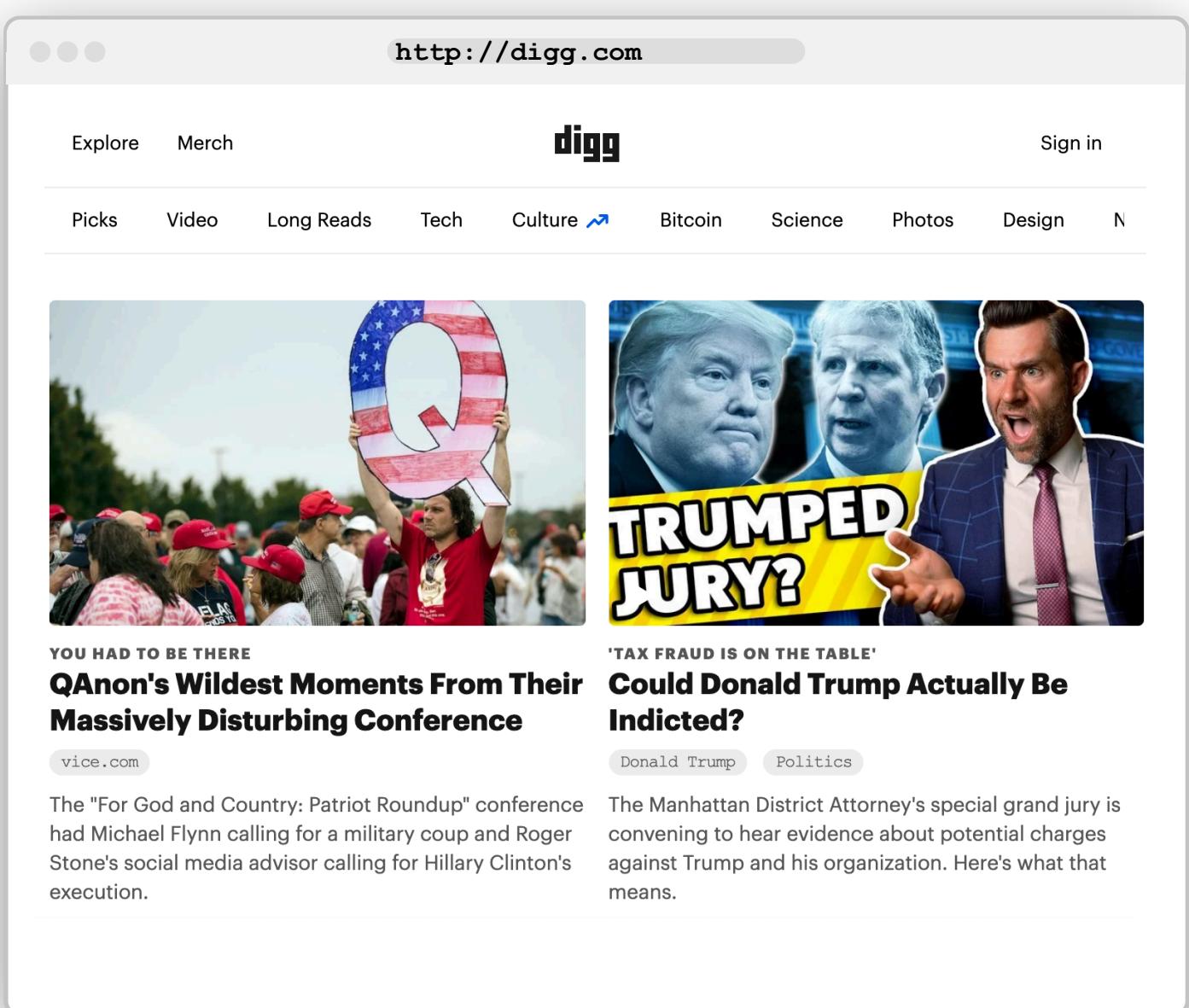
  <header>
    <div itemprop="alternativeHeadline" class="alternativeHeadline mr-4 mt-3 block ..." style="color:">
      YOU HAD TO BE THERE
    </div>

    <a target="_blank" class="font-bold text-xl..." href="https://digg.com/vice-news/link/q-anon-s...">
      <h2 itemprop="headline" class="headline">
        QAnon's Wildest Moments From Their Massively Disturbing Conference
      </h2>
    </a>
  </header>

  <div itemprop="description" class="description text-sm text-digg-gray lg:block mt-2">
    <p>The "For God and Country: Patriot Roundup" conference had Michael Flynn calling for a military coup and Roger Stone's social media advisor calling for Hillary Clinton's execution.</p>
  </div>
</article>

<script async src="https://static.chartbeat.com/js/chartbeat_mab.js"></script>

</body>
</html>
```



# To **Recap**



# To **Recap**



# To Recap

**You:** type digg.com in to your browser

50.18.185.231  
aka digg.com

http://digg.com

# To Recap

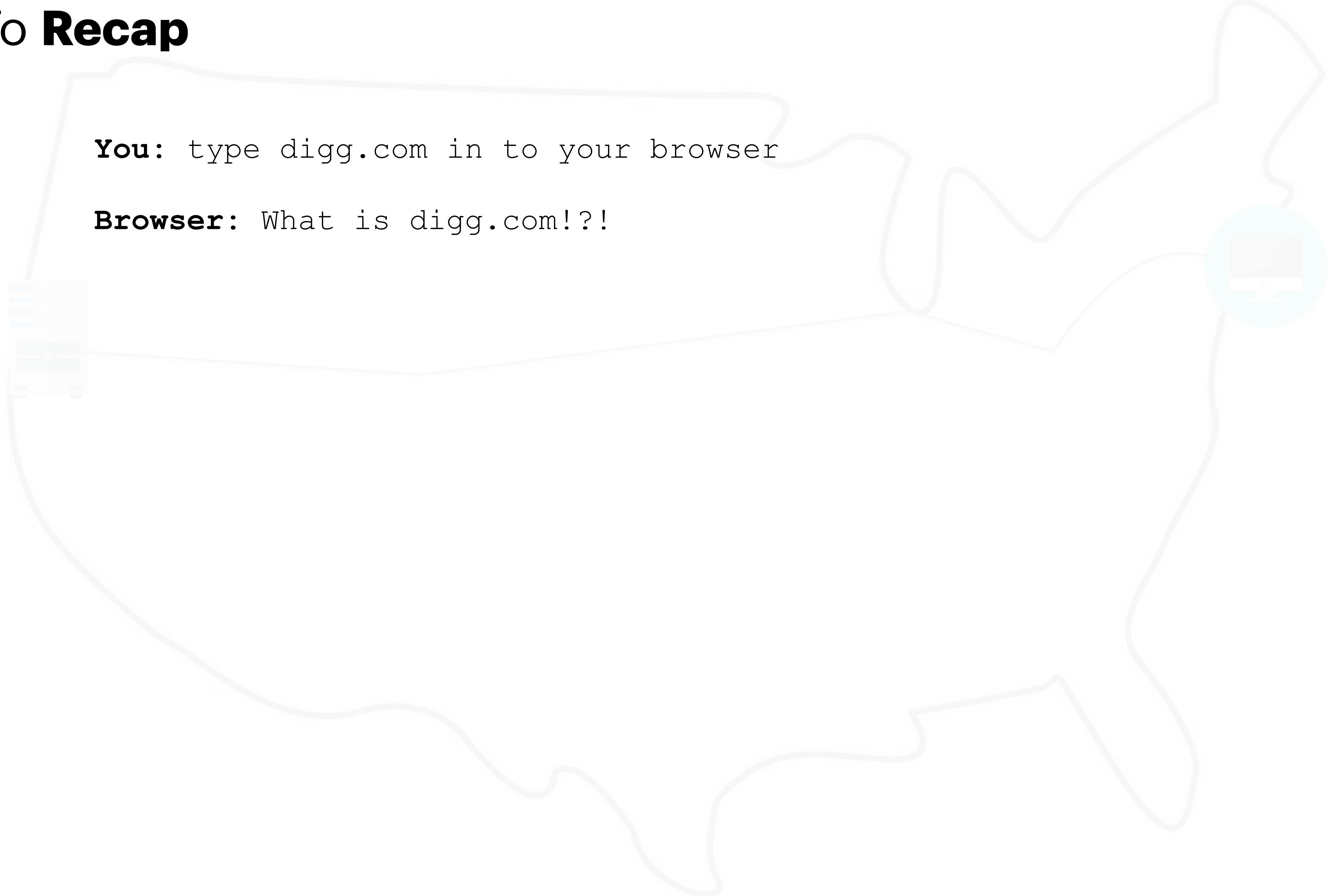
**You:** type digg.com in to your browser

50.18.185.231  
aka digg.com

http://digg.com

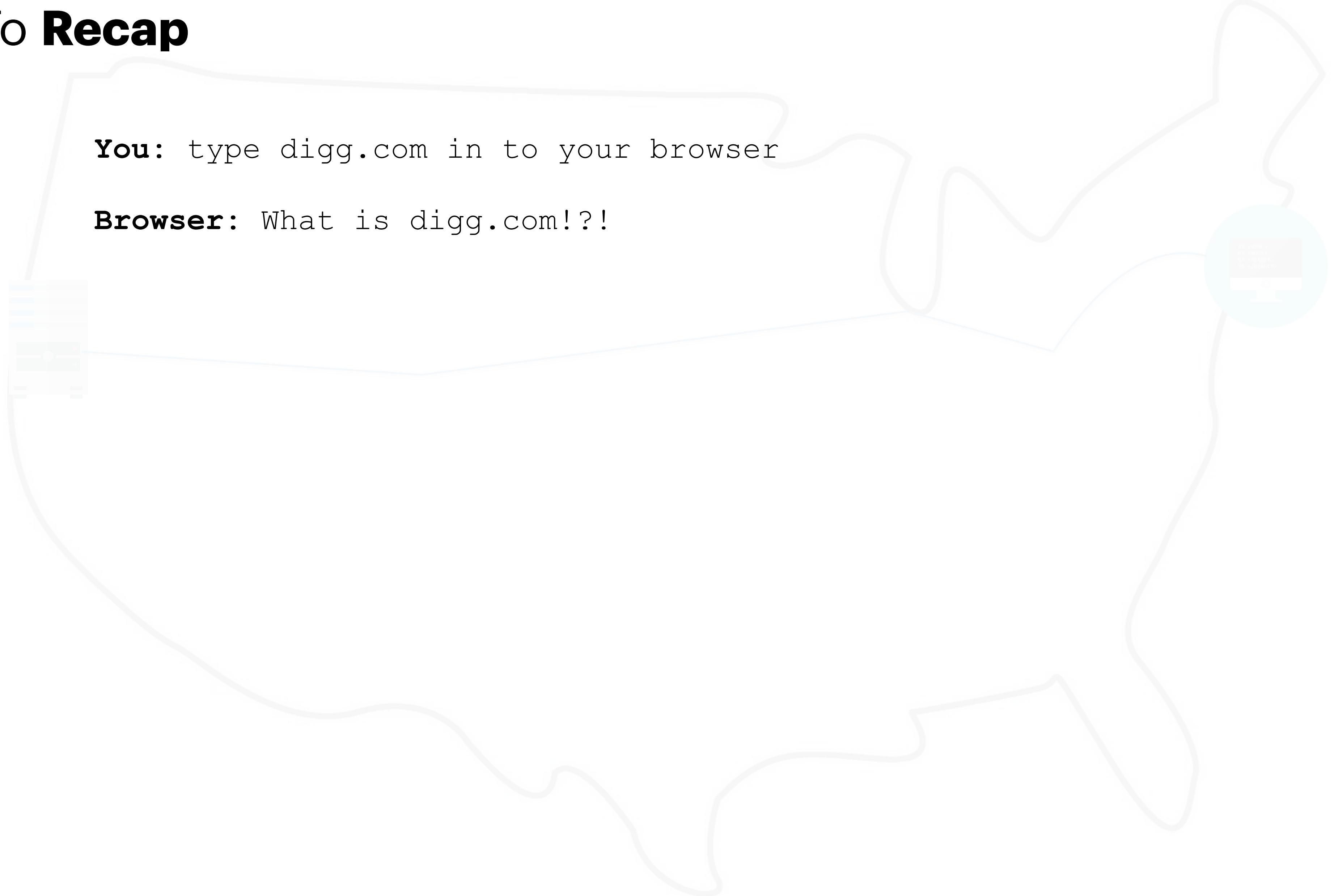
# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!  
A diagram illustrating a network connection. On the left, a computer monitor displays "50.18.185.231" and "aka digg.com". A line connects this to a central cloud-like shape. From the cloud, a line goes to a smartphone icon on the right. The smartphone icon has a blue circular background with a white "digg.com" logo and the URL "http://digg.com" written below it.

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!  
A diagram illustrating a network connection. On the left, a computer monitor displays "50.18.185.231" and "aka digg.com". A line connects this to a central cloud-like shape. From the cloud, a line goes to a smartphone icon on the right. The smartphone icon has a blue circular background with a white "digg.com" logo and the URL "http://digg.com" written below it.

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

50.18.185.231  
aka digg.com

<http://digg.com>

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

50.18.185.231  
aka digg.com

<http://digg.com>

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

50.18.185.231

aka digg.com

**Browser:** Sweet, thanks DNS.

<http://digg.com>

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

50.18.185.231

aka digg.com

**Browser:** Sweet, thanks DNS.

<http://digg.com>

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

**Browser:** Sweet, thanks DNS.

**Browser:** Takes x-country road trip to 50.18171.253 and asks,

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

**Browser:** Sweet, thanks DNS.

**Browser:** Takes x-country road trip to 50.18171.253 and asks,  
"Can I get that homepage of yours?"

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!?

**DNS:** I've got this! digg.com is over at 50.18.171.253

**Browser:** Sweet, thanks DNS.

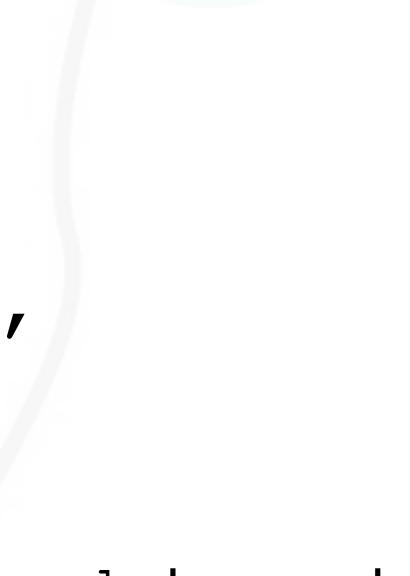
**Browser:** Takes x-country road trip to 50.18171.253 and asks,  
"Can I get that homepage of yours?"

# To Recap

**You:** type digg.com in to your browser

**Browser:** What is digg.com!?!  


**DNS:** I've got this! digg.com is over at 50.18.171.253  
50.18.185.231

**Browser:** Sweet, thanks DNS.  


**Browser:** Takes x-country road trip to 50.18171.253 and asks,  
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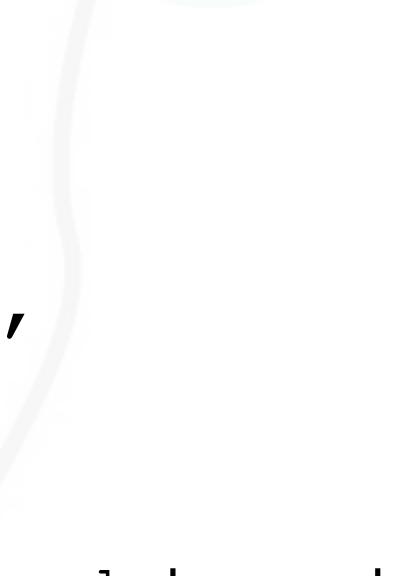
**Server (aka 50.18.171.253):** Sure, here you go: <sends back a big pile of HTML>  


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