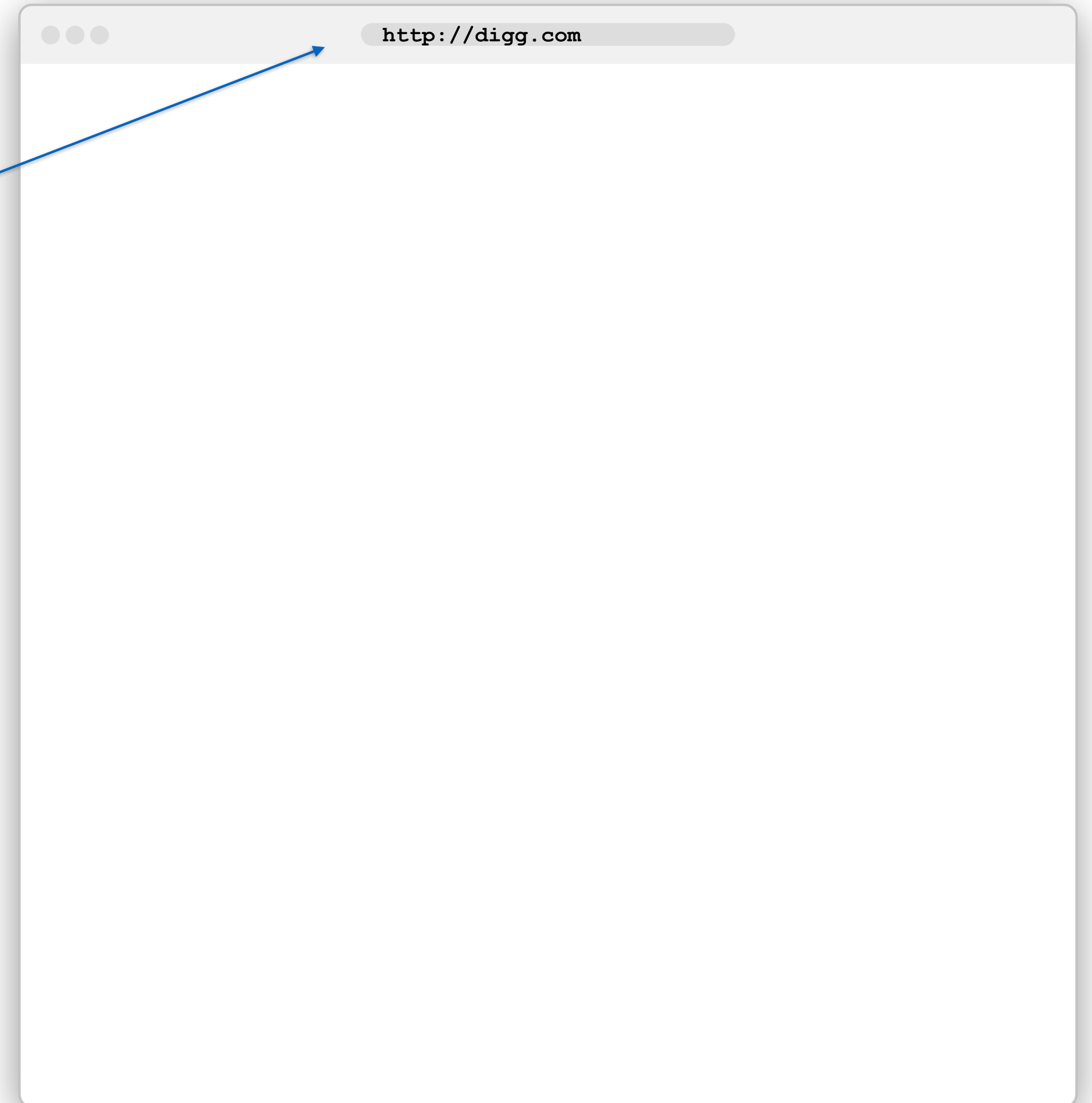


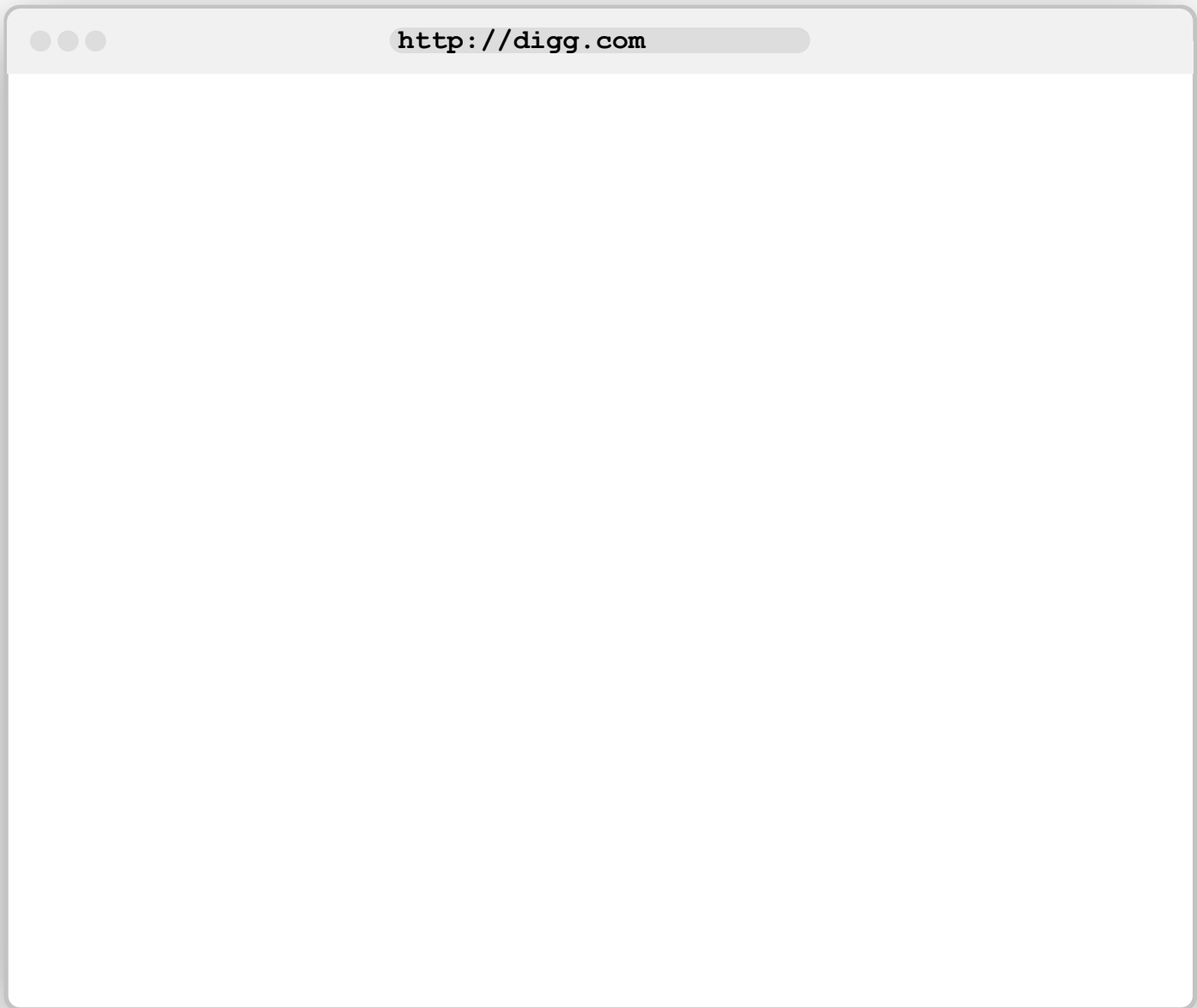
# How the Internet Works

# What Happens...

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



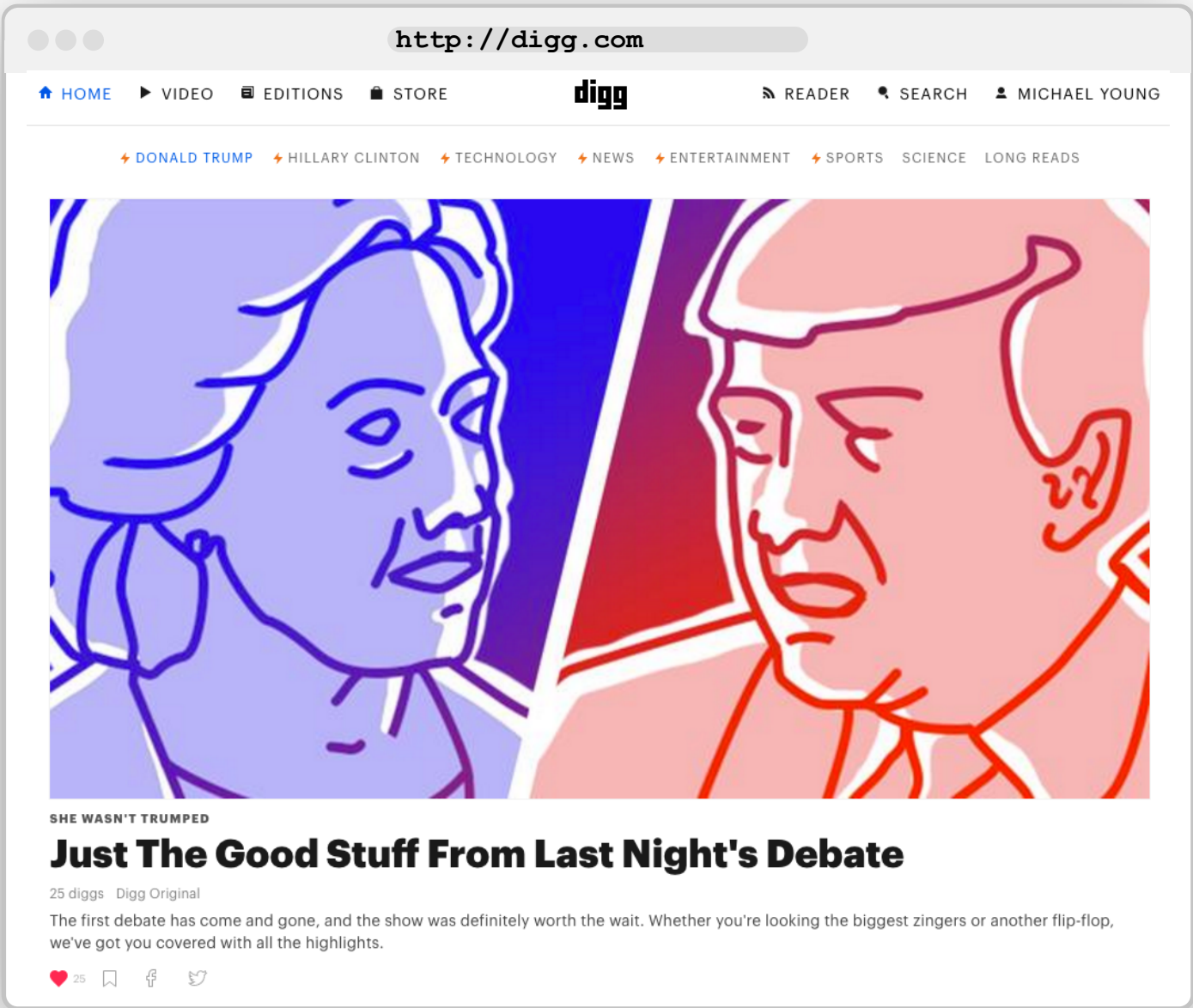
# Step 1



# Step 2

???

# Step 3

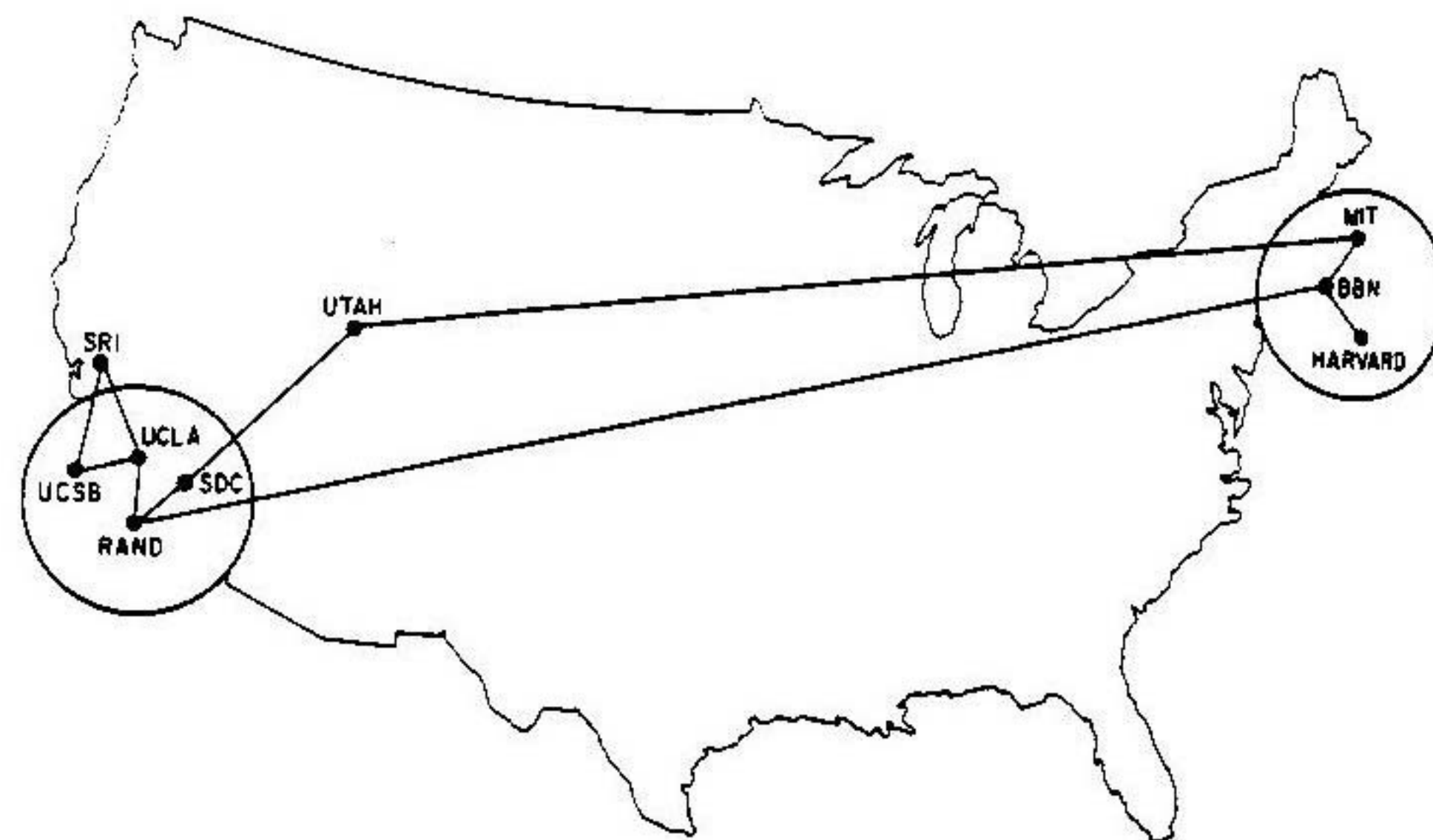


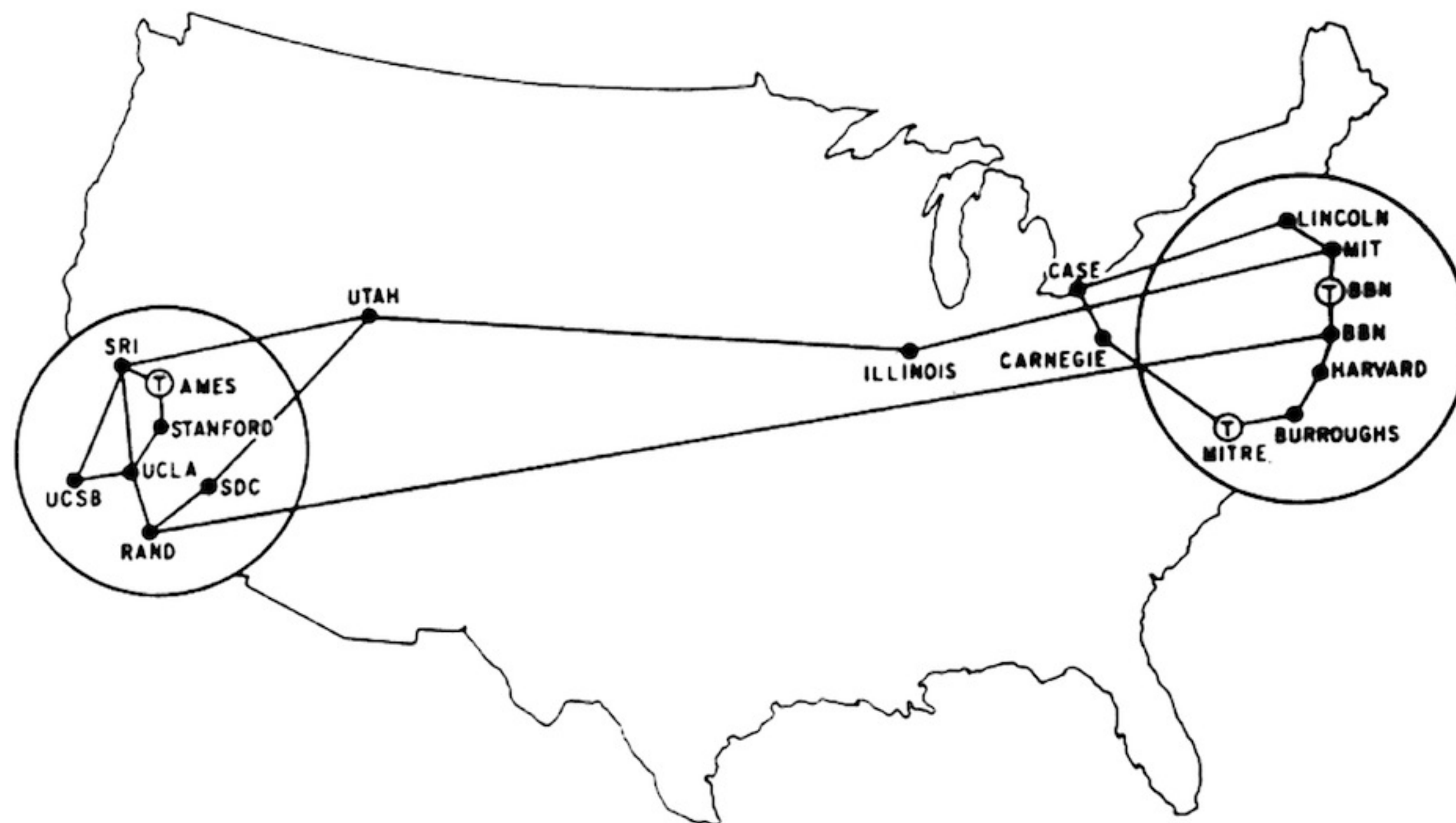
Before we start there...

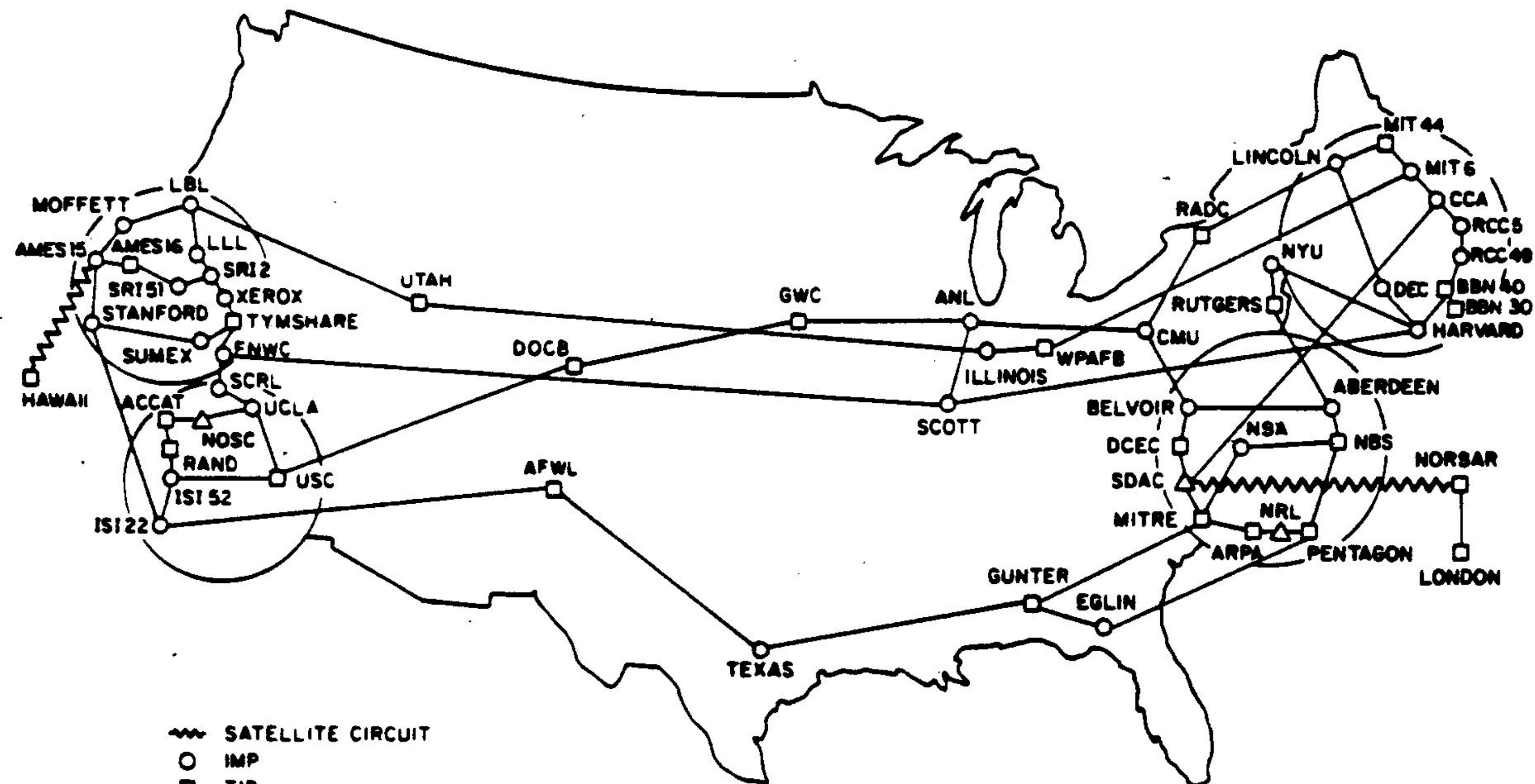
What is the **Internet**



The ARPANET in December 1969







~ SATELLITE CIRCUIT

○ IMP

□ TIP

△ PLURIBUS IMP

(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**

**CSNET MEMBERS**

- PhoneNet
- ARPANET
- ◆ X25NET
- \* Not Yet Online

**International Affiliates**

- israel\*

**CSNET**

The map displays the geographical distribution of CSNET members as of June 1, 1984. Members are categorized by network type: PhoneNet (circles), ARPANET (squares), and X25NET (diamonds). Asterisks (\*) denote members not yet online. The map includes a legend for CSNET members and international affiliates, a list of international affiliates (Israel\*), and the CSNET logo. A circular inset provides a detailed view of the New England area, showing members like umass, umass-eee, wang-inst, digital, brandeis, umass-boston, northeastern, csnet-relay, mit-mc, csnet-sh, csnet-cic, mitre, unh, and ulowell\*.

● PhoneNet

■ ARPANET

◆ X25NET

\* Not Yet Online

## International Affiliates

israel\*

# 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

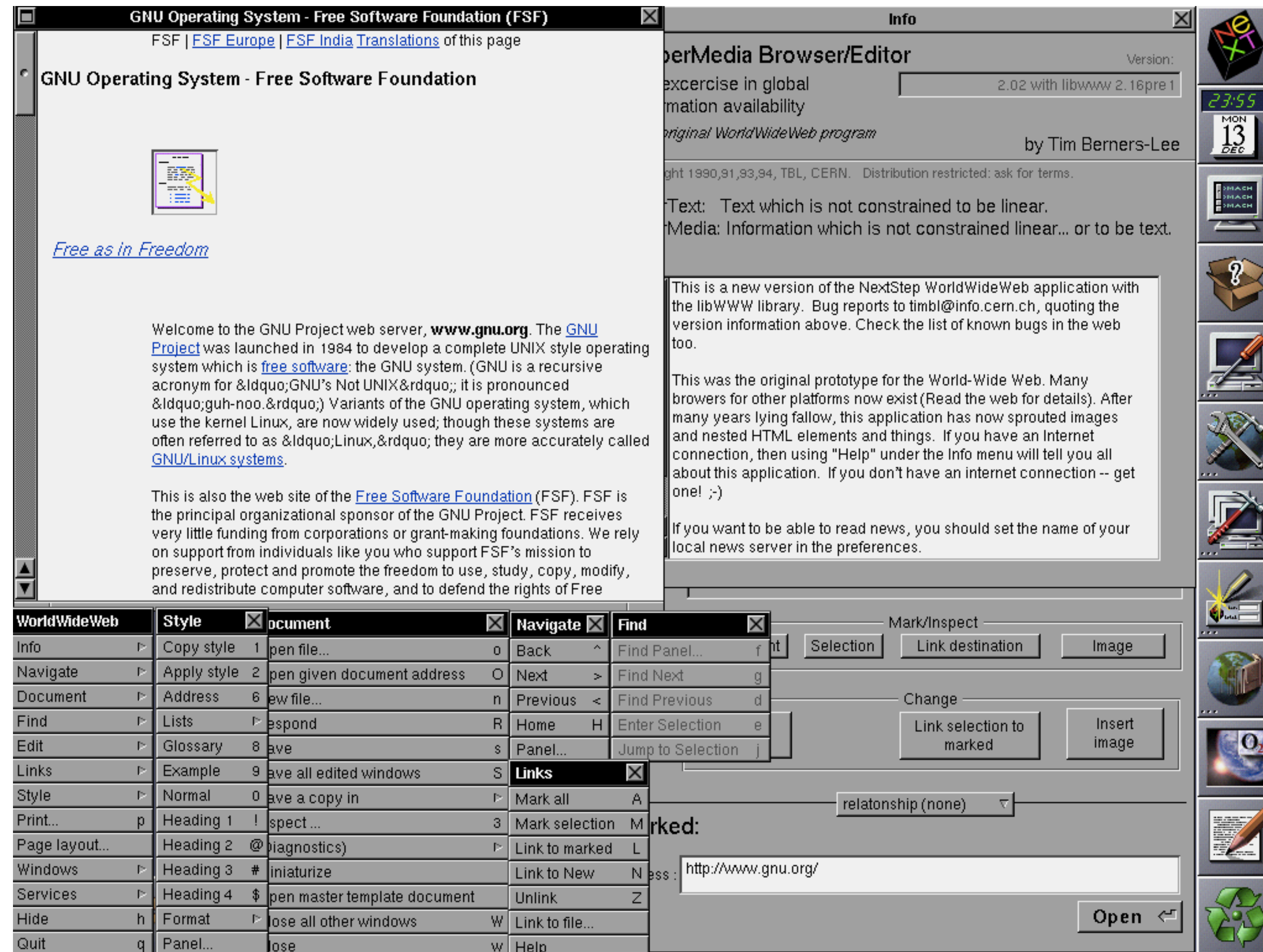
More or less centralized dissemination of news which has a limited life

Collaborative authoring

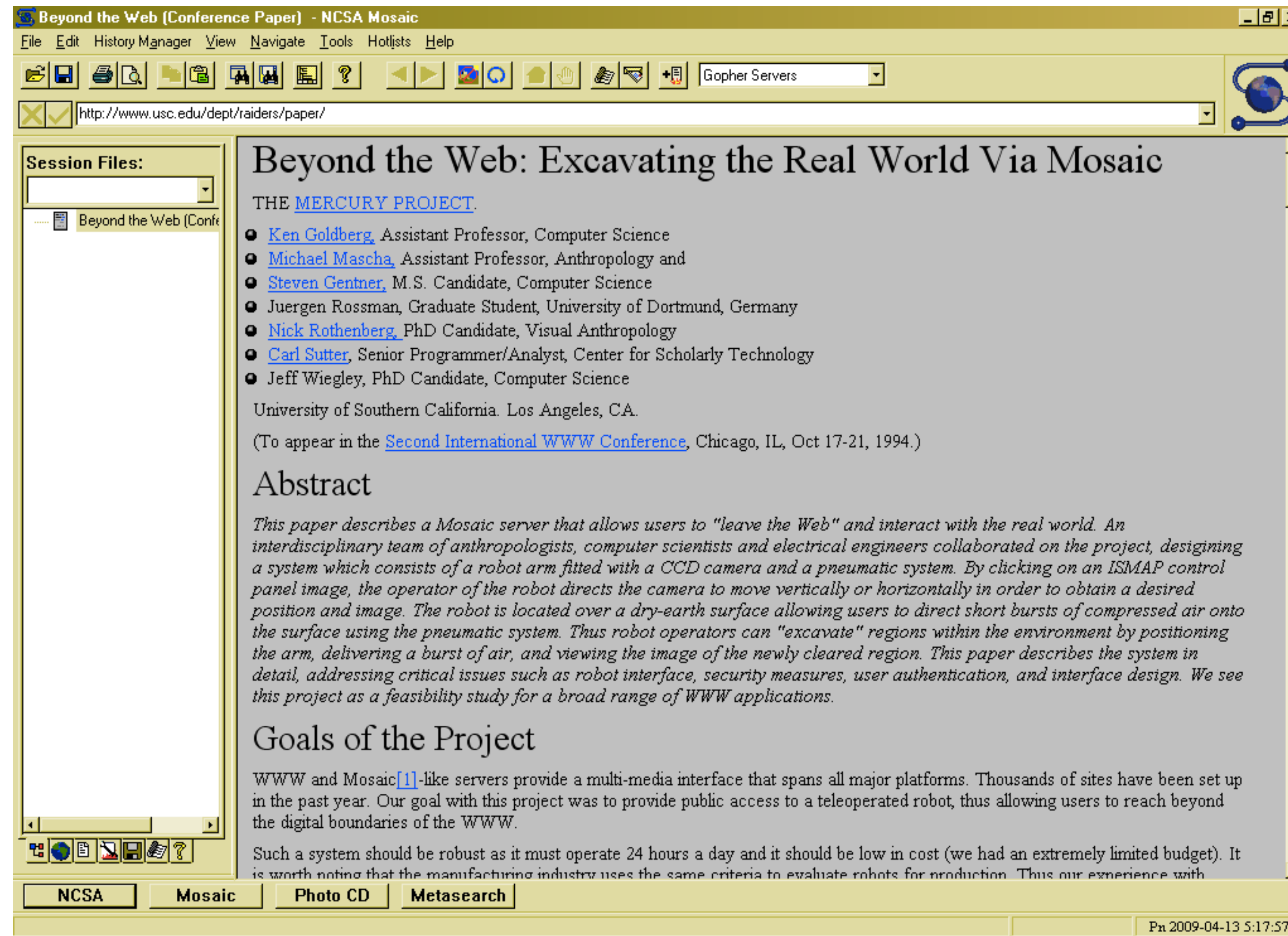
Collaborative design of something other than the hypertext itself

Personal notebook

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



WorldWideWeb 1990

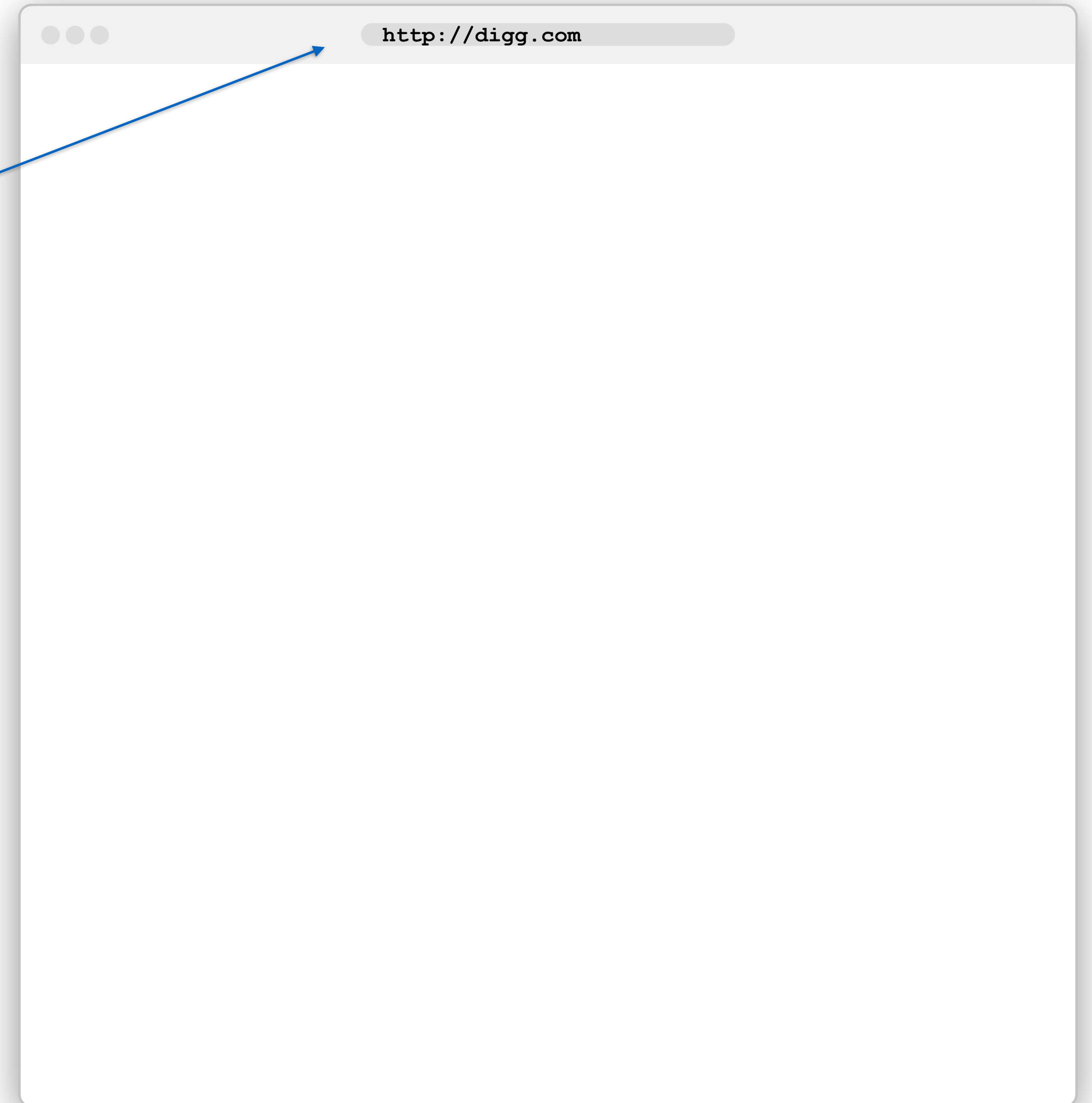


Mosaic **1993**



# What Happens...

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



WTF is digg.com??

http://digg.com

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

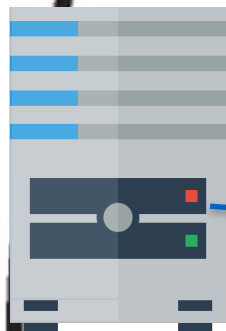
oh, it's 50.18.185.231

**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"**

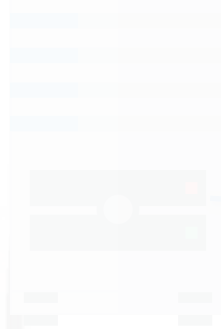
50.18.185.231

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

<http://digg.com>

# The HTTP **Request**

50.18.185.231  
aka digg.com

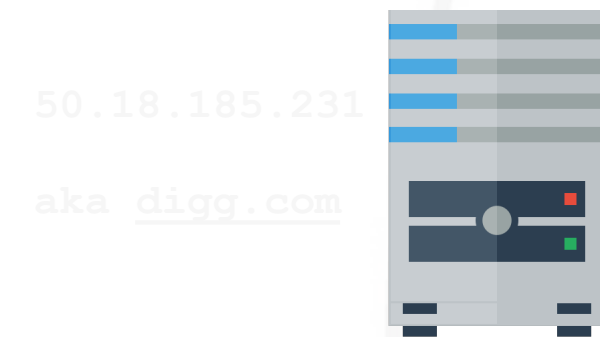


Mike: "Hey Digg, it's me Mike, can I get the homepage?"



<http://digg.com>

# The HTTP **Response**



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



<http://digg.com>

# The HTTP Request

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) Chrome/53.0.2785.116

**Cookie:** username=myoung; likes=long\_walks\_on\_the\_beach; ssn=111-22-3456;



http://digg.com

# The HTTP Response

**HTTP/1.1 200 OK**

**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>

50.18.185.231

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

<http://digg.com>

# The HTTP Response

**HTTP/1.1 404 Not Found**

**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>
```

50.18.185.231

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

<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">

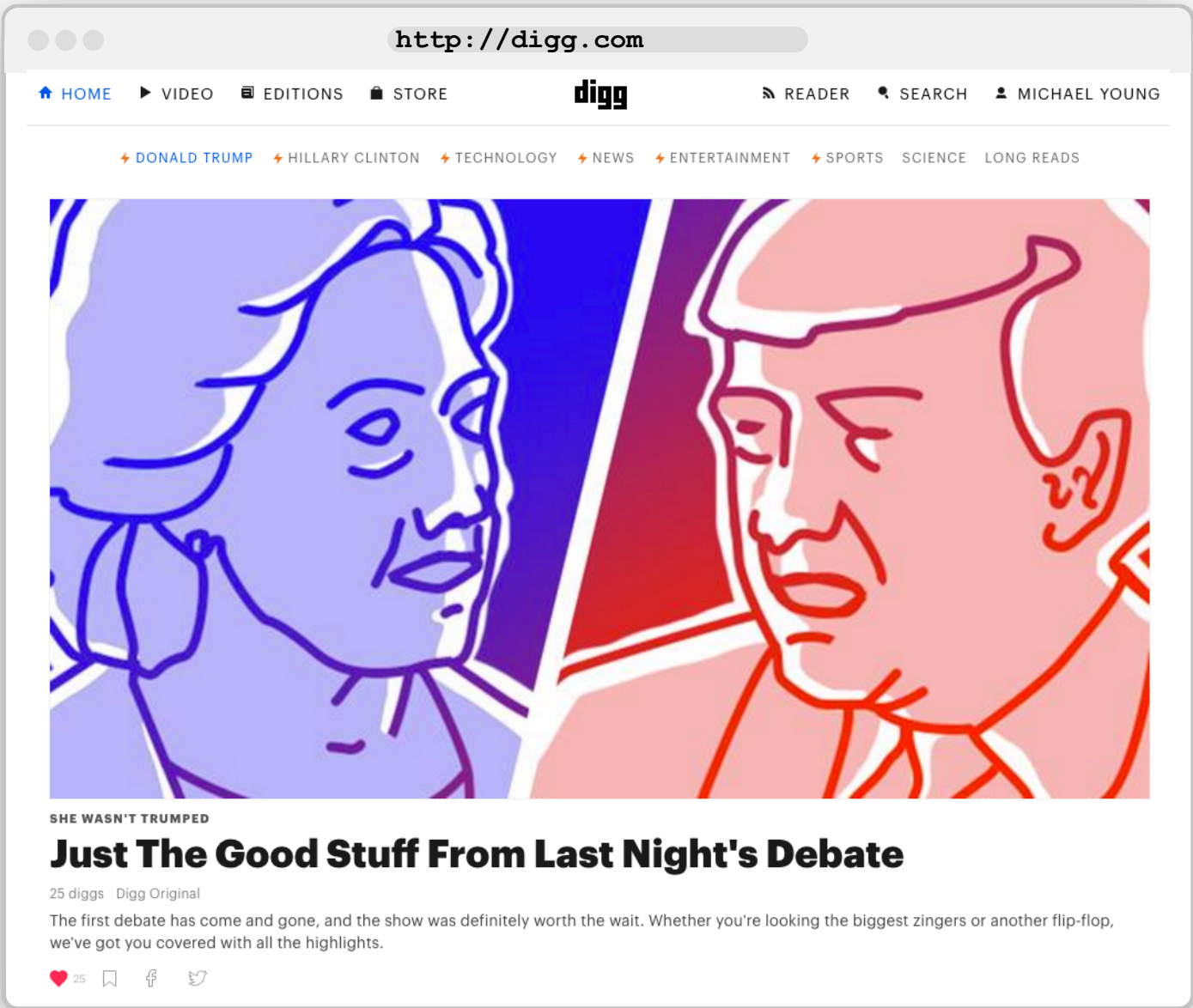
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>

<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**

# <head>

```
<!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">

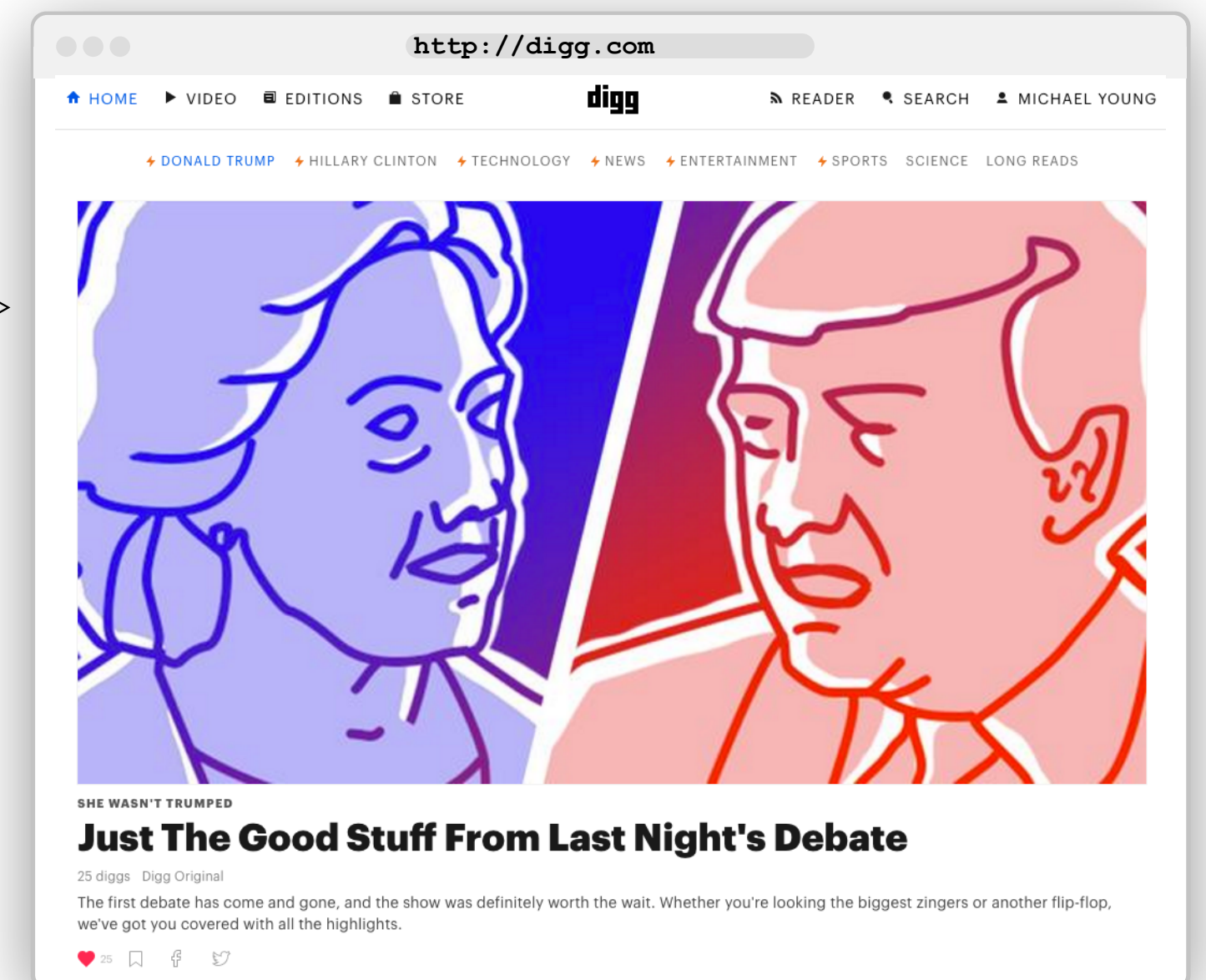
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>

<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>
```



<body>

```
<!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">
```

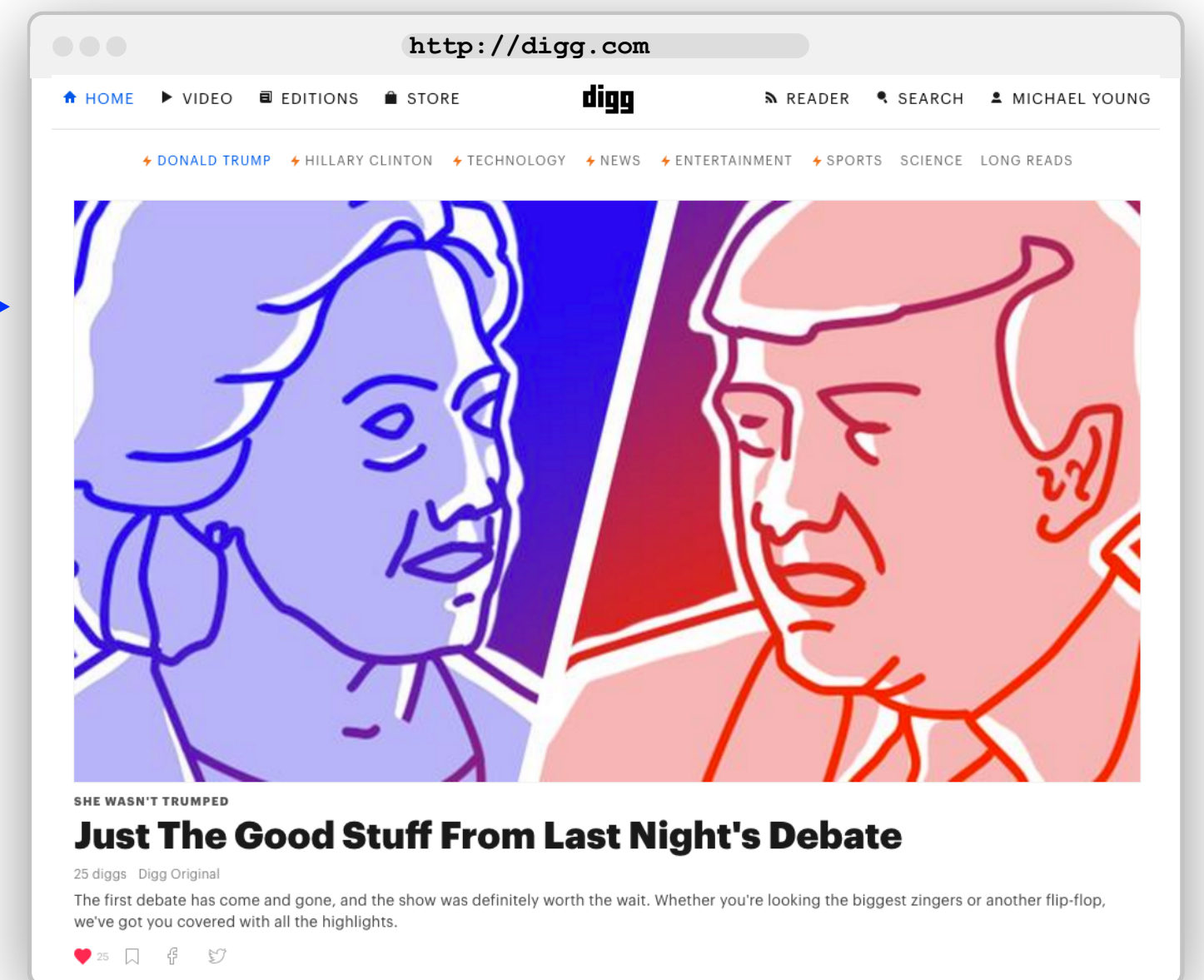
```
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>
```

```
<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>
```





# Styling

```
<!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">

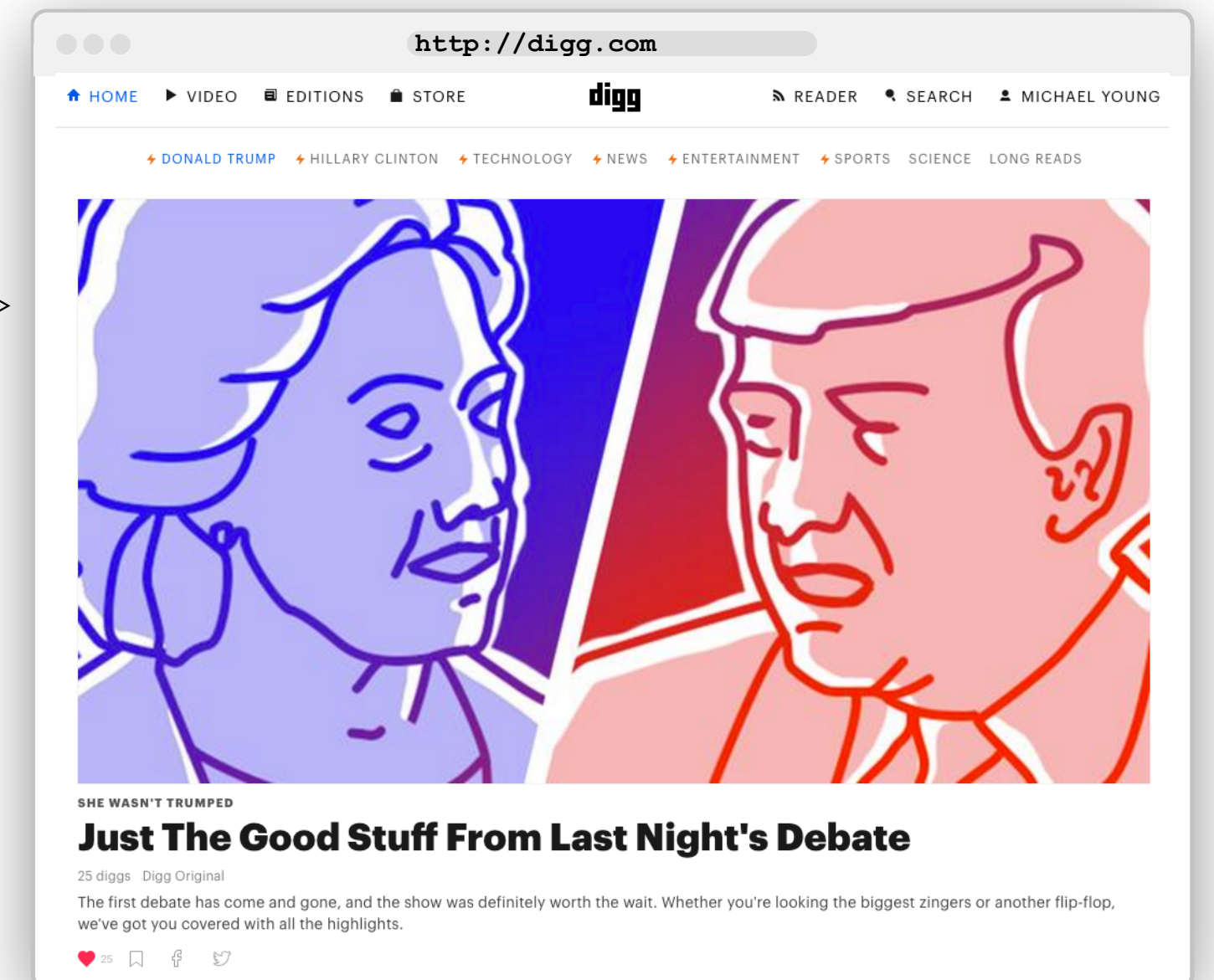
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>

<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>
```



# Images

```
<!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">

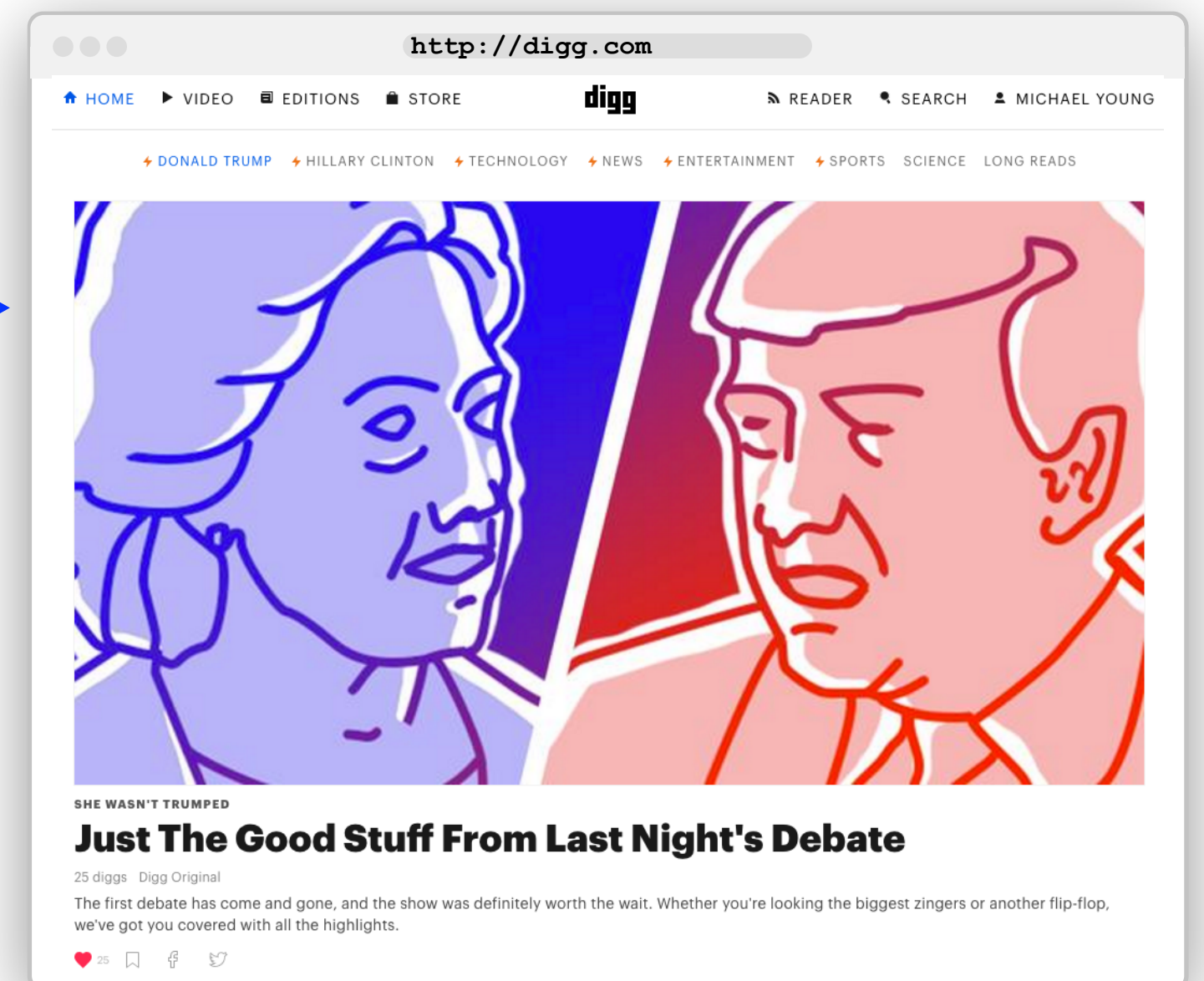
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>

<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>
```





# JavaScript

```
<!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">

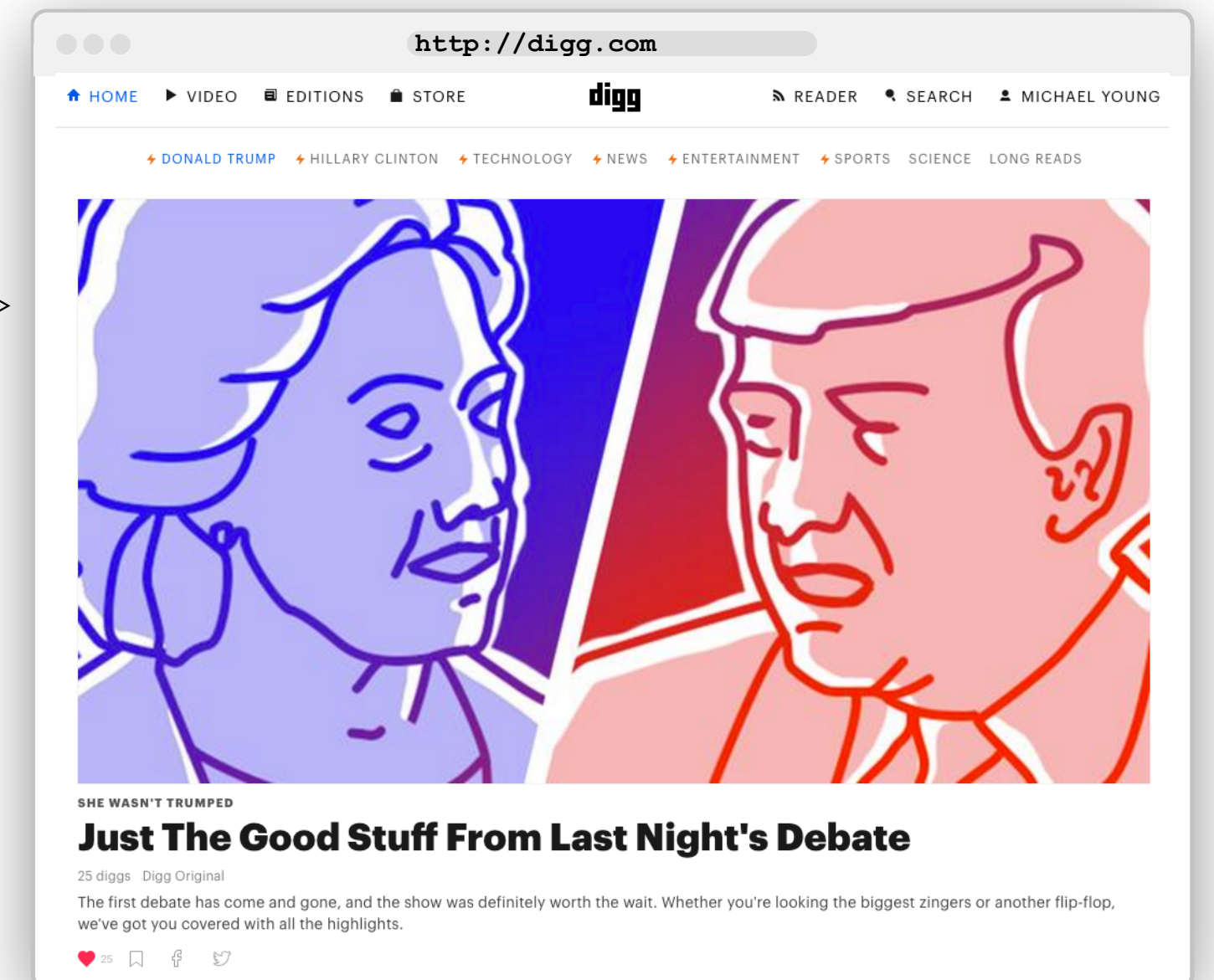
<div class="digg-story__kicker">SHE WASN'T TRUMPED</div>

<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>
```



# 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?"

**Server** (aka 50.18.171.253): Sure, here you go: <sends back a big pile of HTML>

**Browser:** Thanks. Ok, this is where the magic happens (renders the page)

**You:** 100

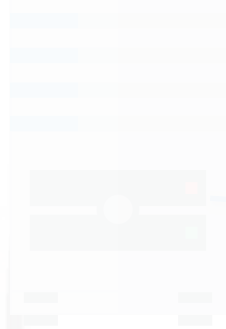
50.18.185.231

aka digg.com

<http://digg.com>

## Bonus Points / **Trivia:**

50.18.185.231  
aka digg.com



What would Tim Berners-Lee change about the URL?

**http://digg.com**



http://digg.com