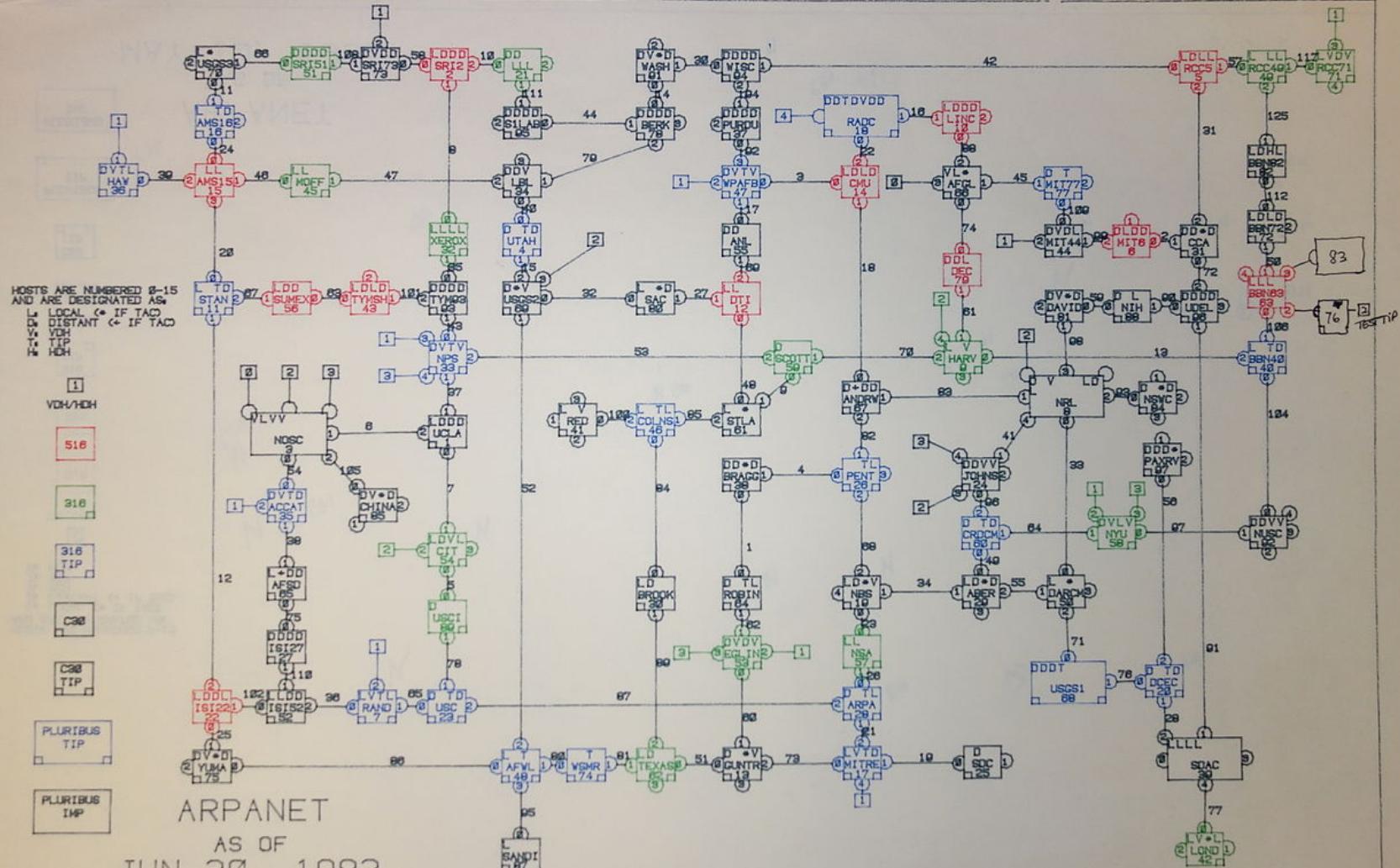


ARPANET, 1972



Internet Use 1990



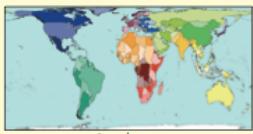
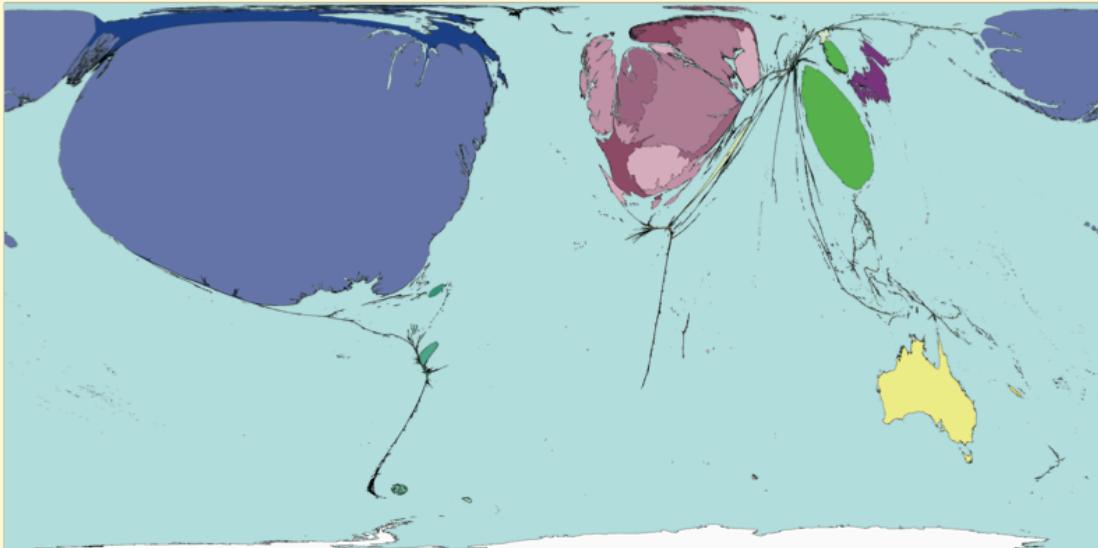
The University
of Sheffield,
Sheffield.



The Leverhulme Trust



Produced by the SASI group (Sheffield) and Mark Newman (Michigan)

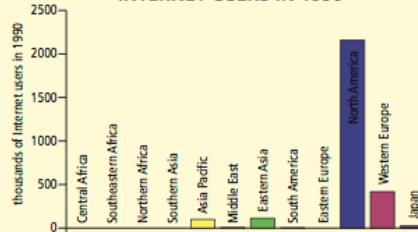


- Technical notes**
- Data are from the United Nations Development Programme's 2004 Human Development Report.
 - Only 19 territories recorded Internet users in 1990. Belgium reported no known rate, but a low level. Territories with estimated data not shown have been omitted. Where Internet access is known to exist but no data were reported, estimates were made.
 - Internet users have access to and use the Internet.
 - See website for further information.

INTERNET USE IN 1990: ALL TERRITORIES REPORTING RATES

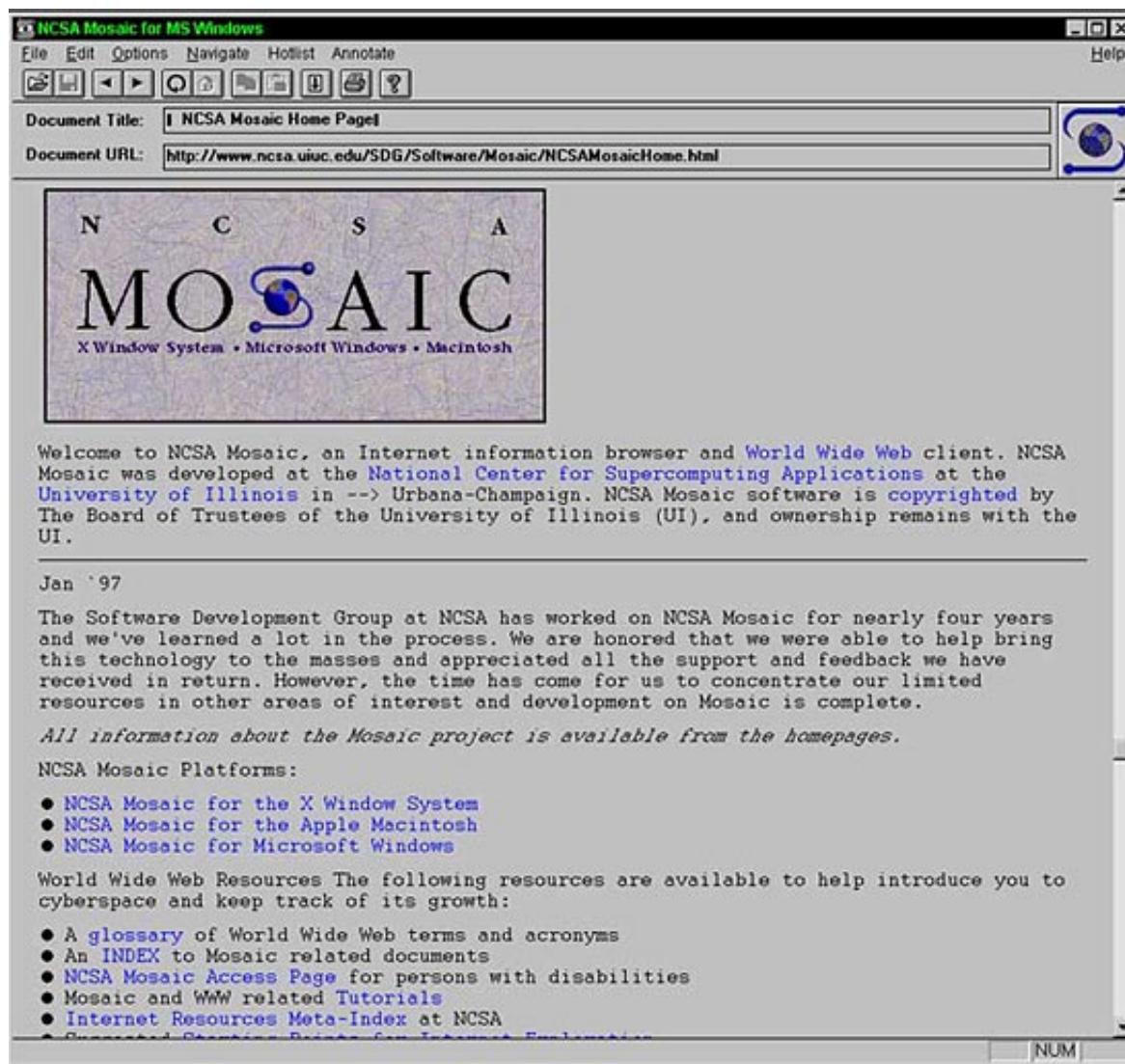
Rank	Territory	Value	Rank	Territory	Value
1	United States	8.0	12	Austria	1.3
2	Norway	7.1	17	Israel	1.1
3	Australia	5.9	18	Denmark	1.0
4	Switzerland	5.8	20	United Kingdom	0.9
5	Sweden	5.8	22	France	0.5
7	Finland	4.0	30	Republic of Korea	0.2
8	Canada	3.7	30	Japan	0.2
9	Netherlands	3.3	30	Italy	0.2
10	Germany	1.4	34	Spain	0.1

internet users per 1000 people in 1990*



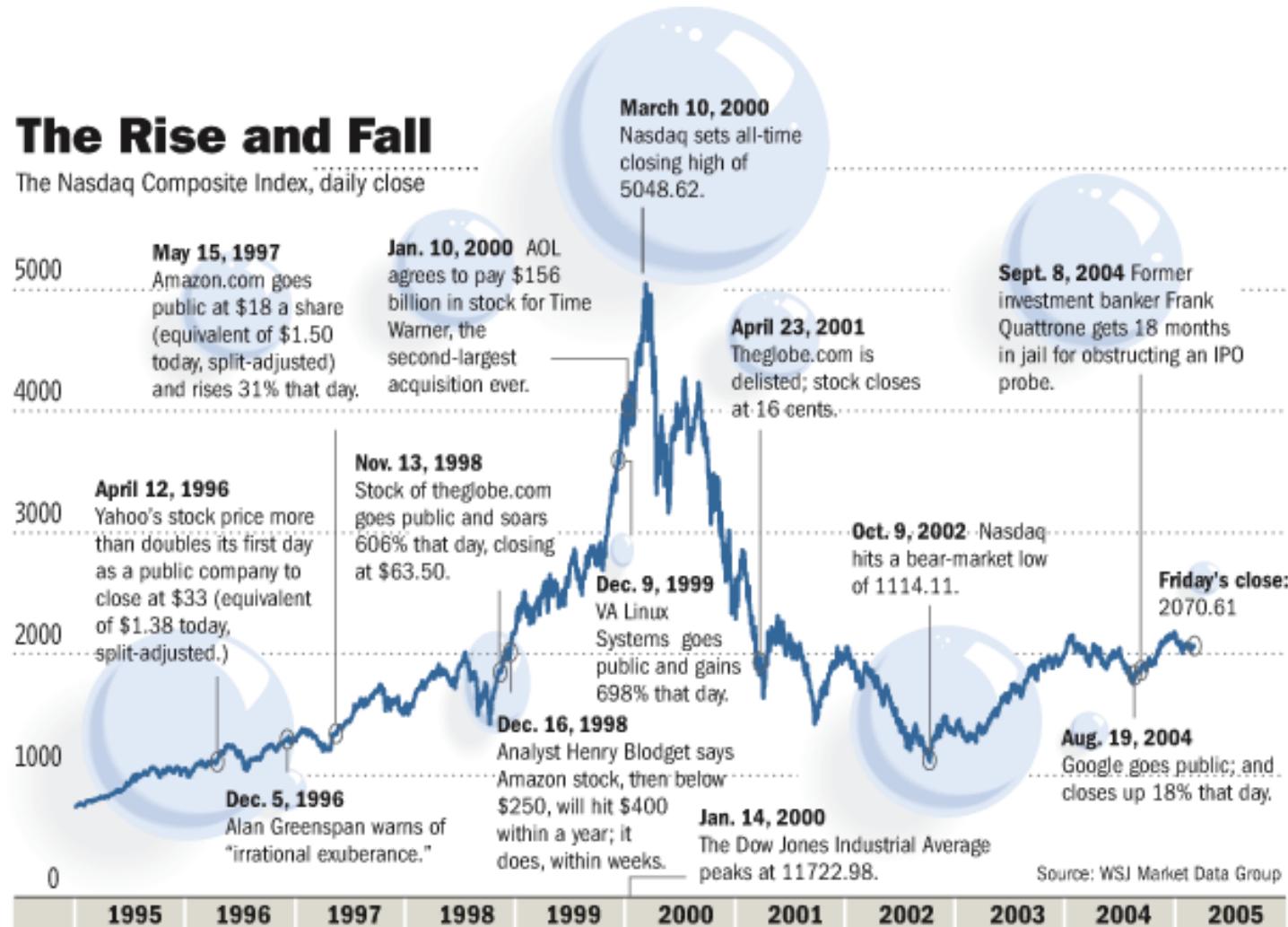
"I sit down comfortably in the university's modern computer lab and take advantage of the technology available to enter the digital world. The digital world!"

Gabriela Tôrres Barbosa, 2006

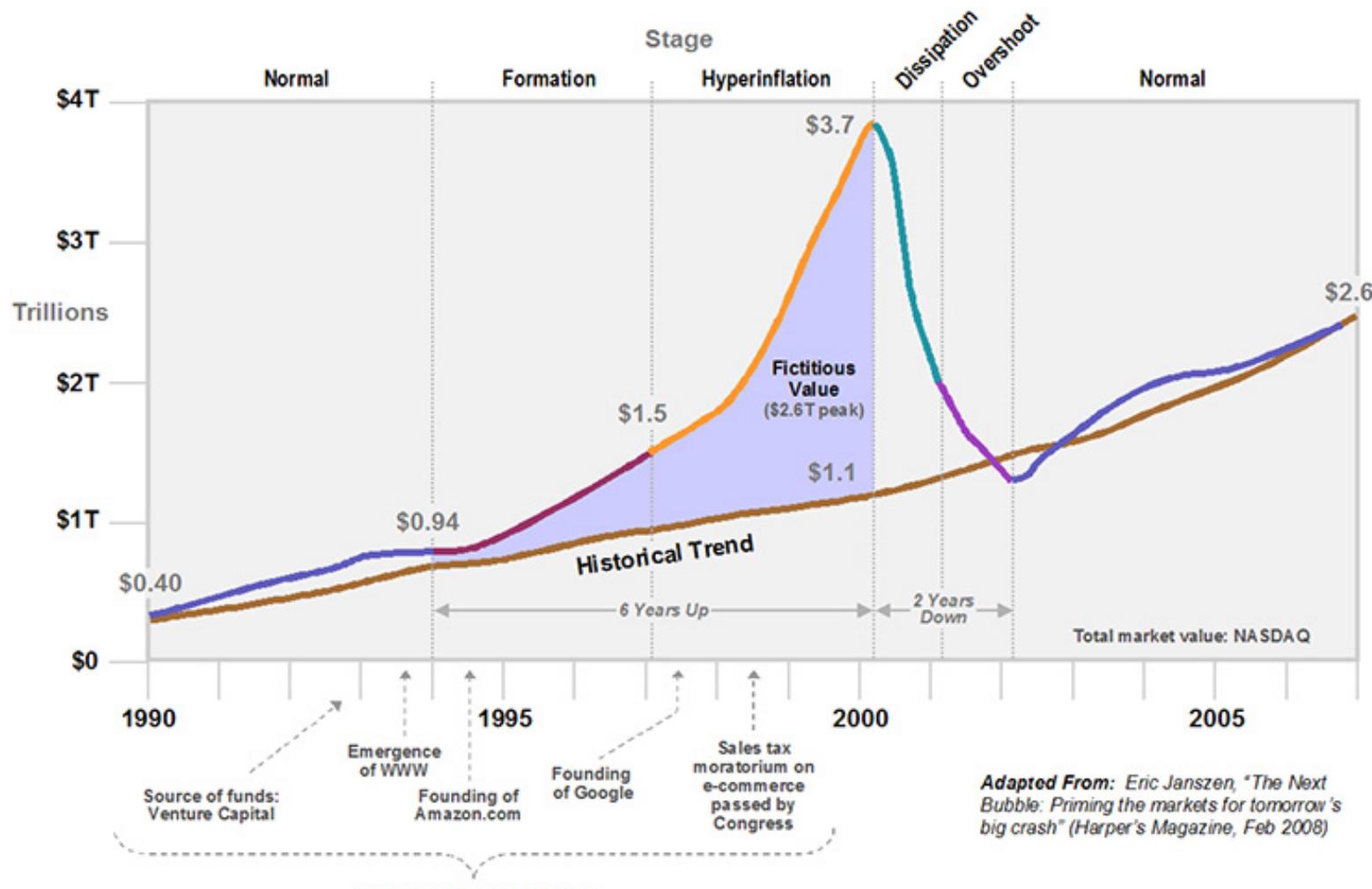


The Rise and Fall

The Nasdaq Composite Index, daily close

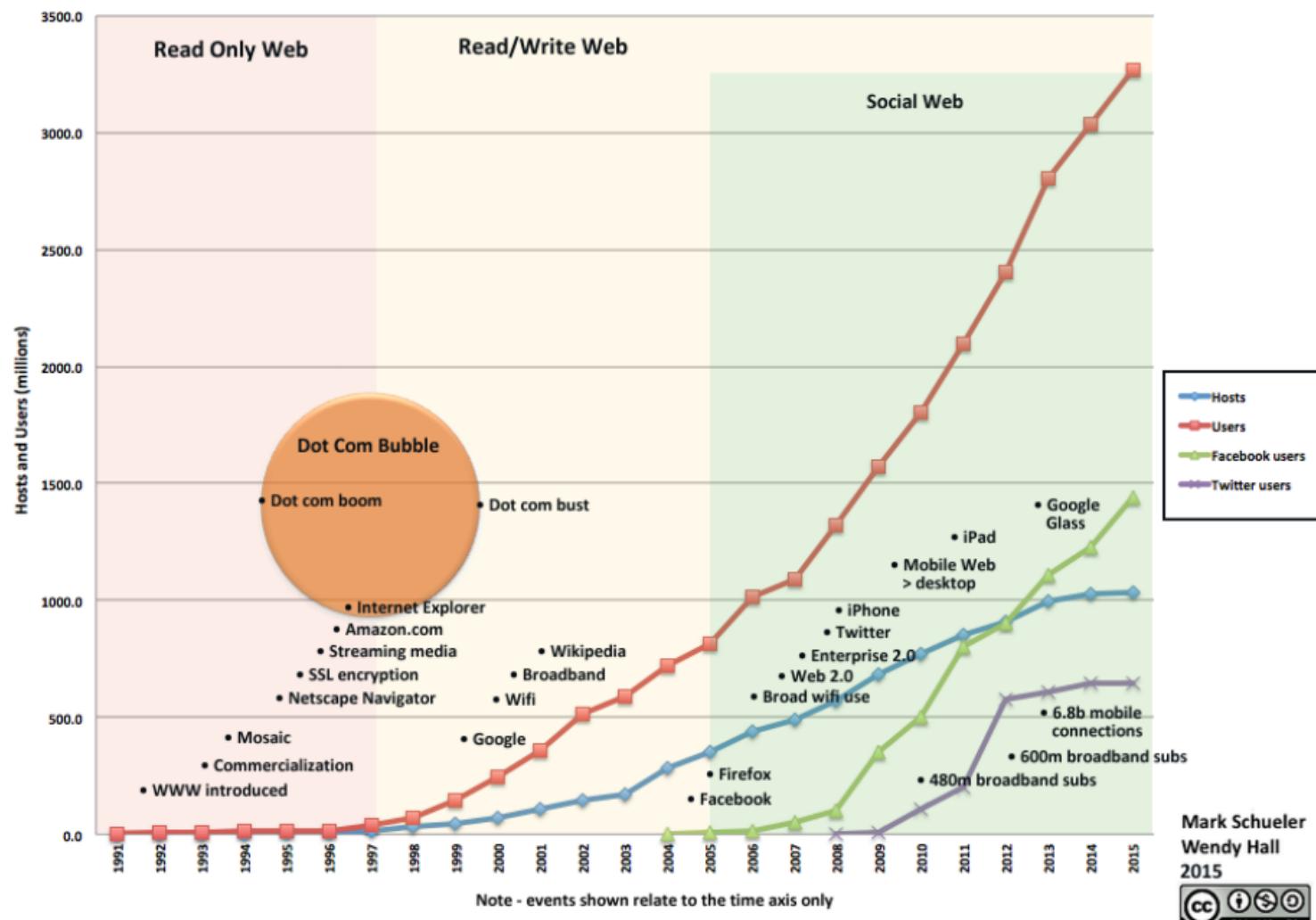


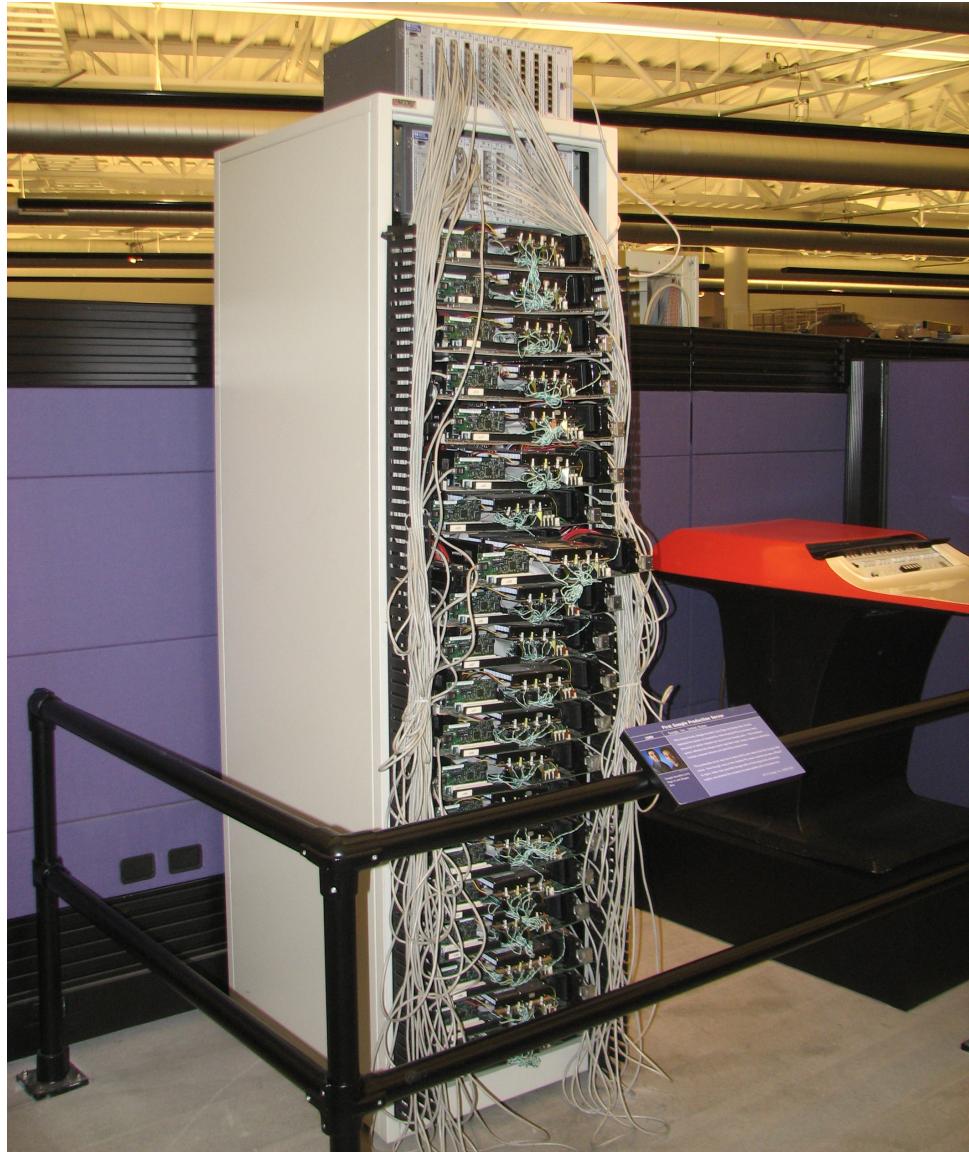
Dot.com Technology Bubble: 1994-2002



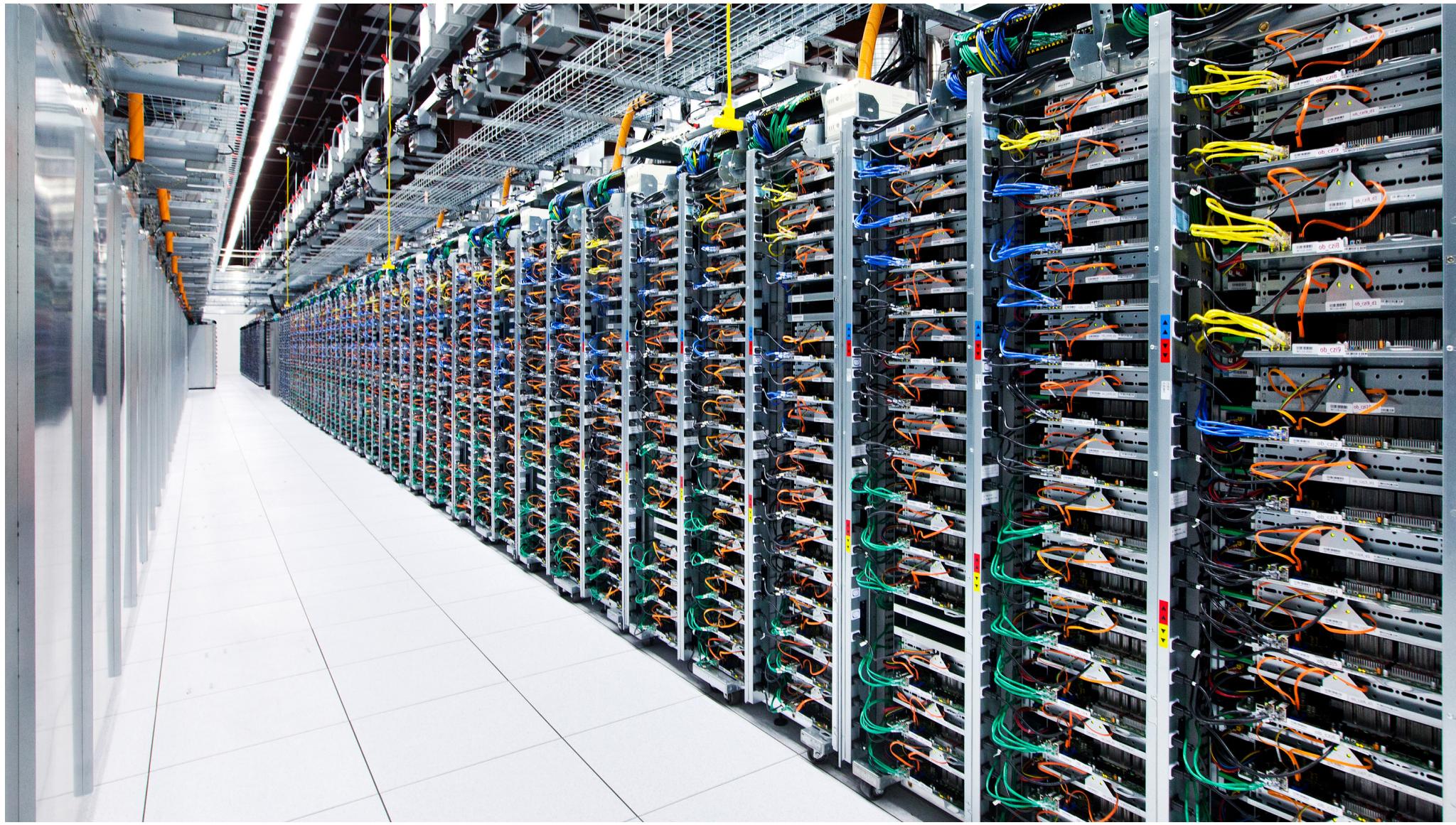
Kampas Research: www.kampasresearch.com

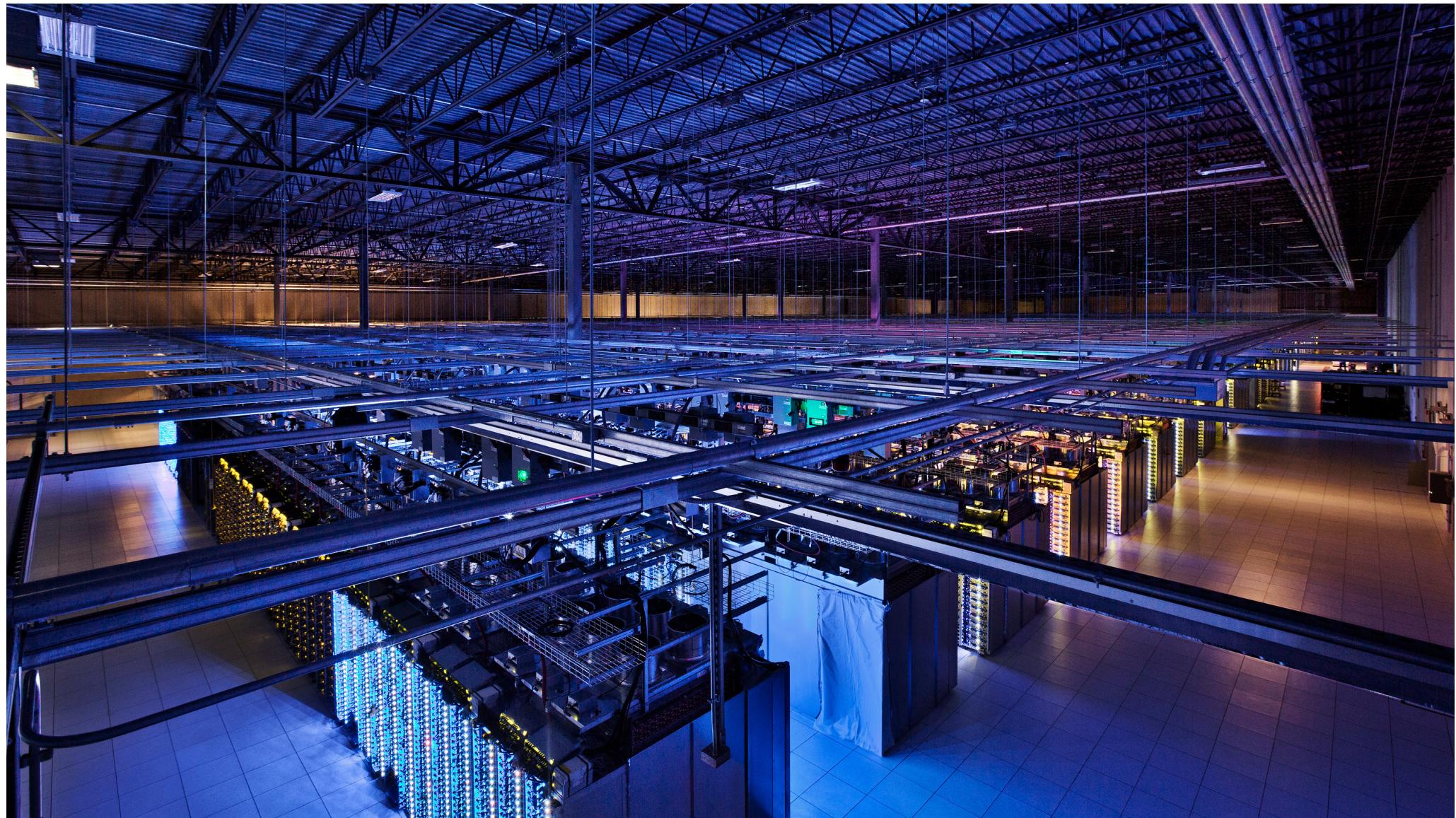
Internet Growth - Usage Phases - Tech Events

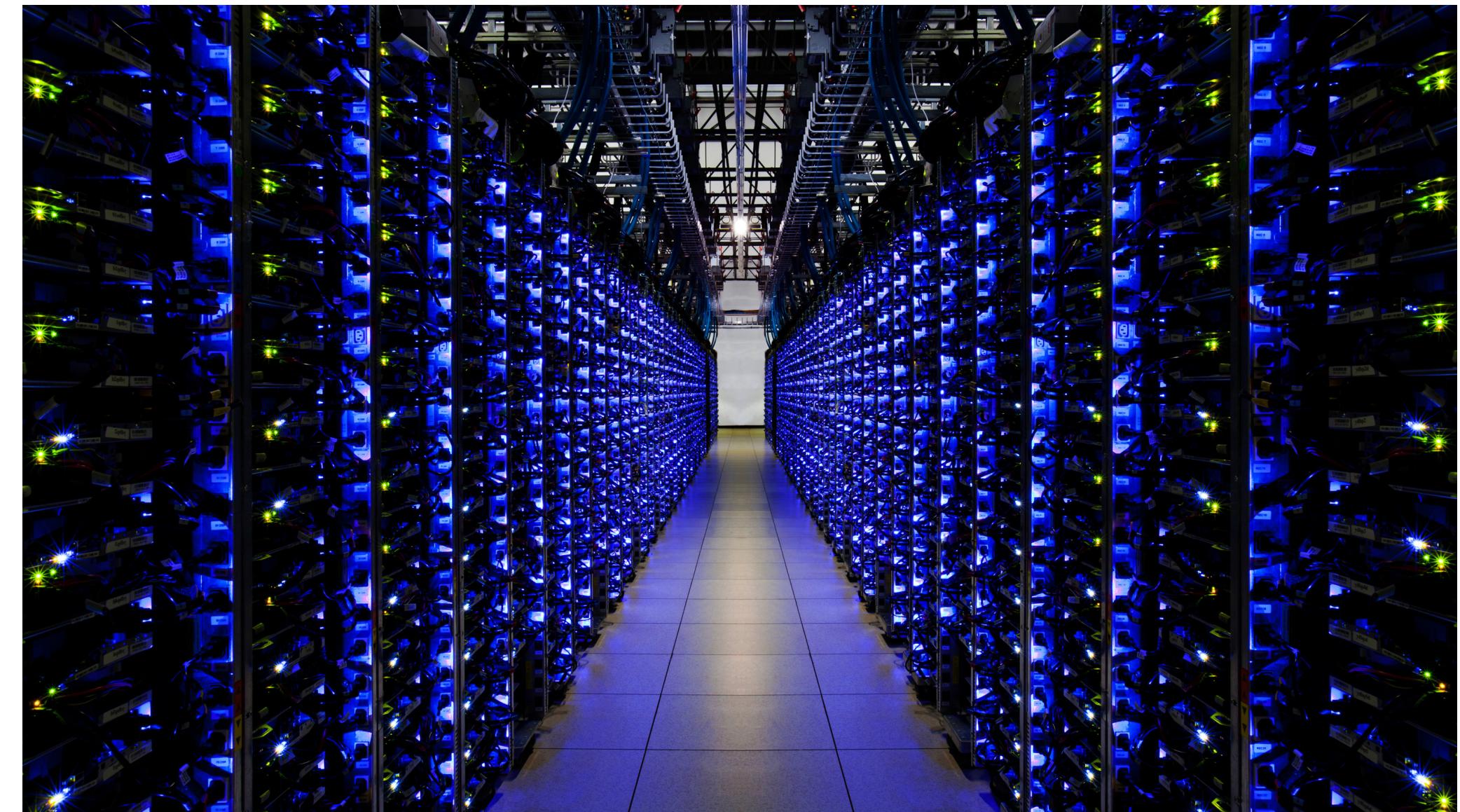


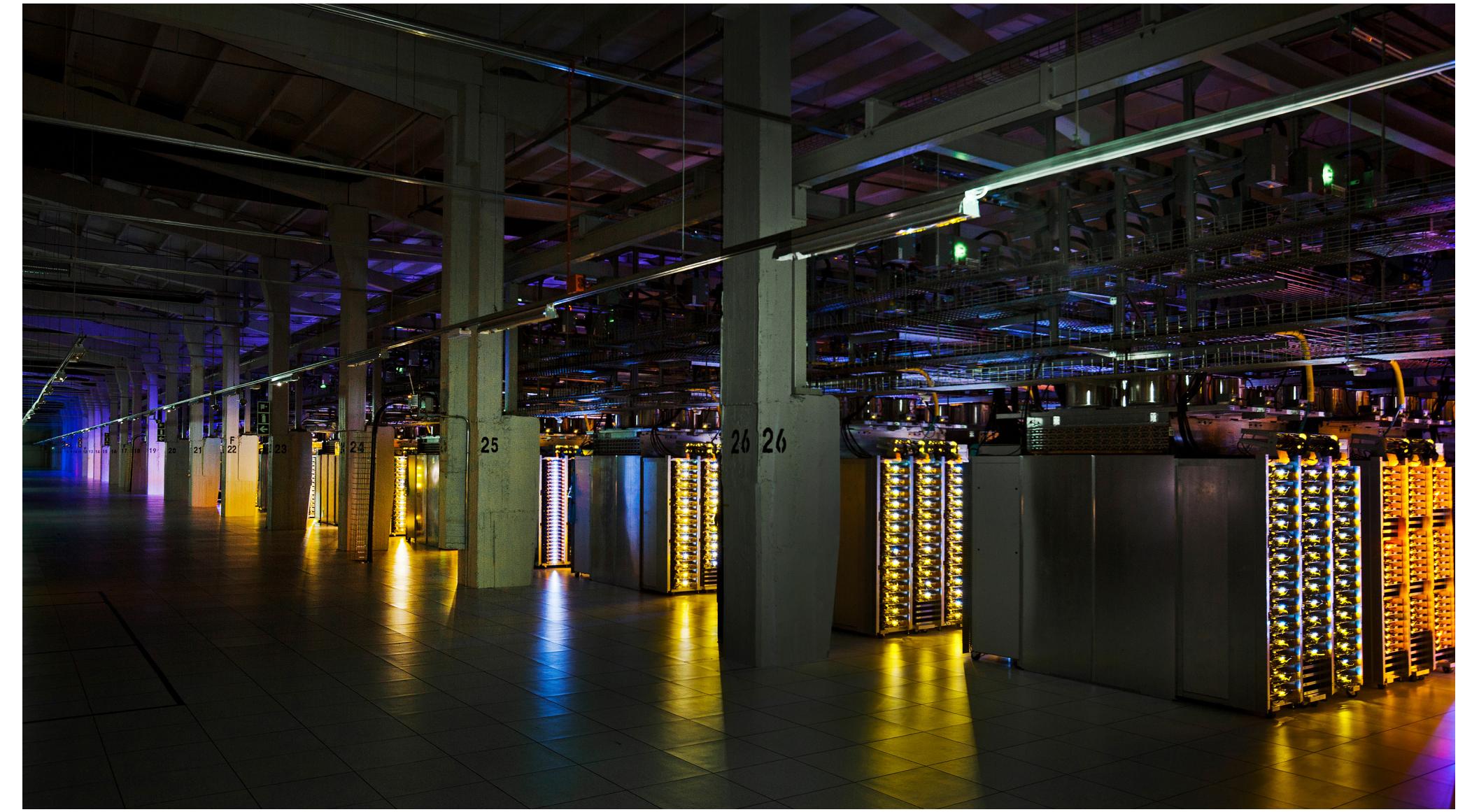


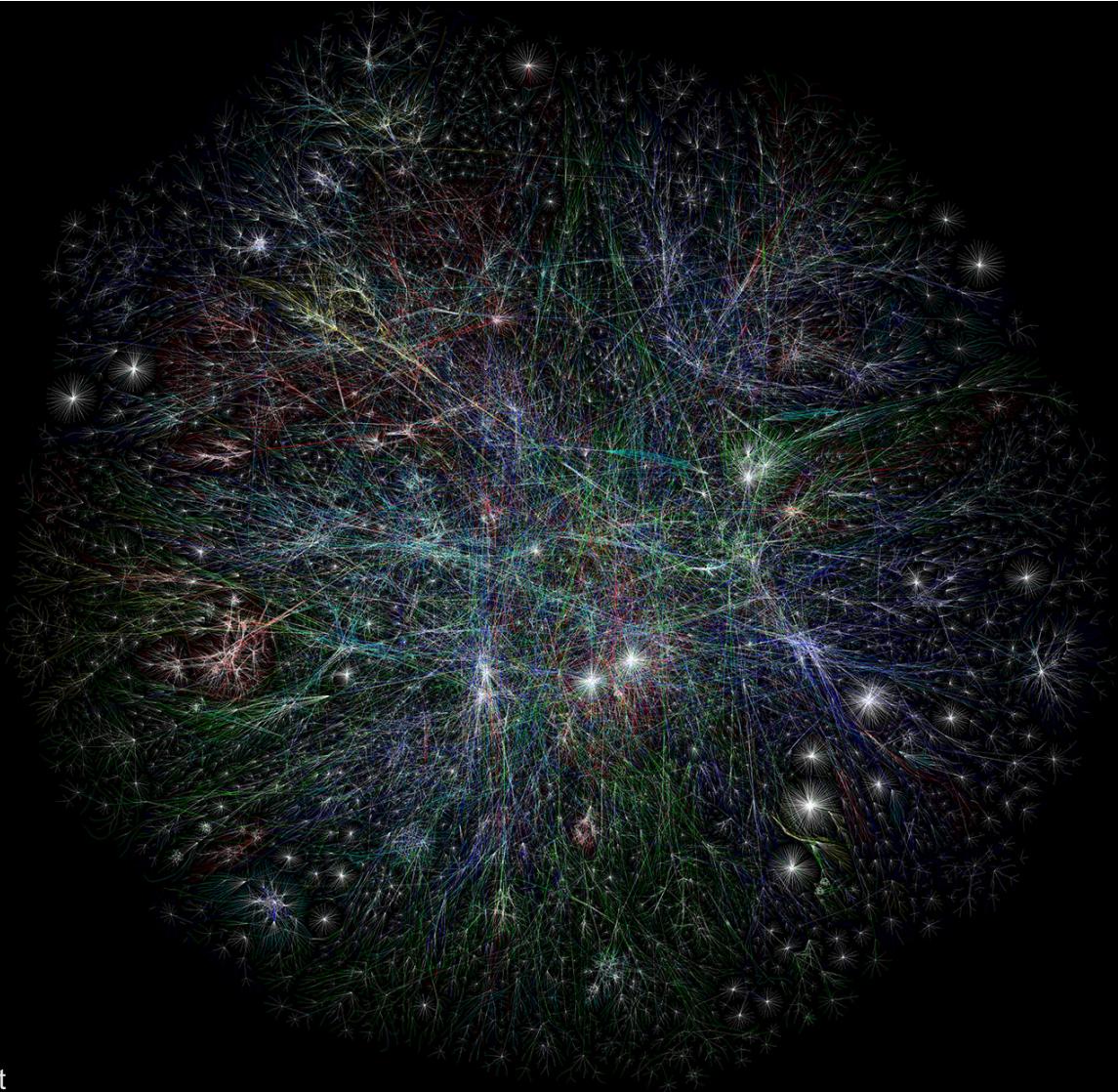
Google's first server, 1999
Computer History Museum,
Mountain View, California











Barrett Lyon / The Opte Project

TCP/IP

TCP: Transmission Control Protocol

IP: Internet Protocol

IP Address

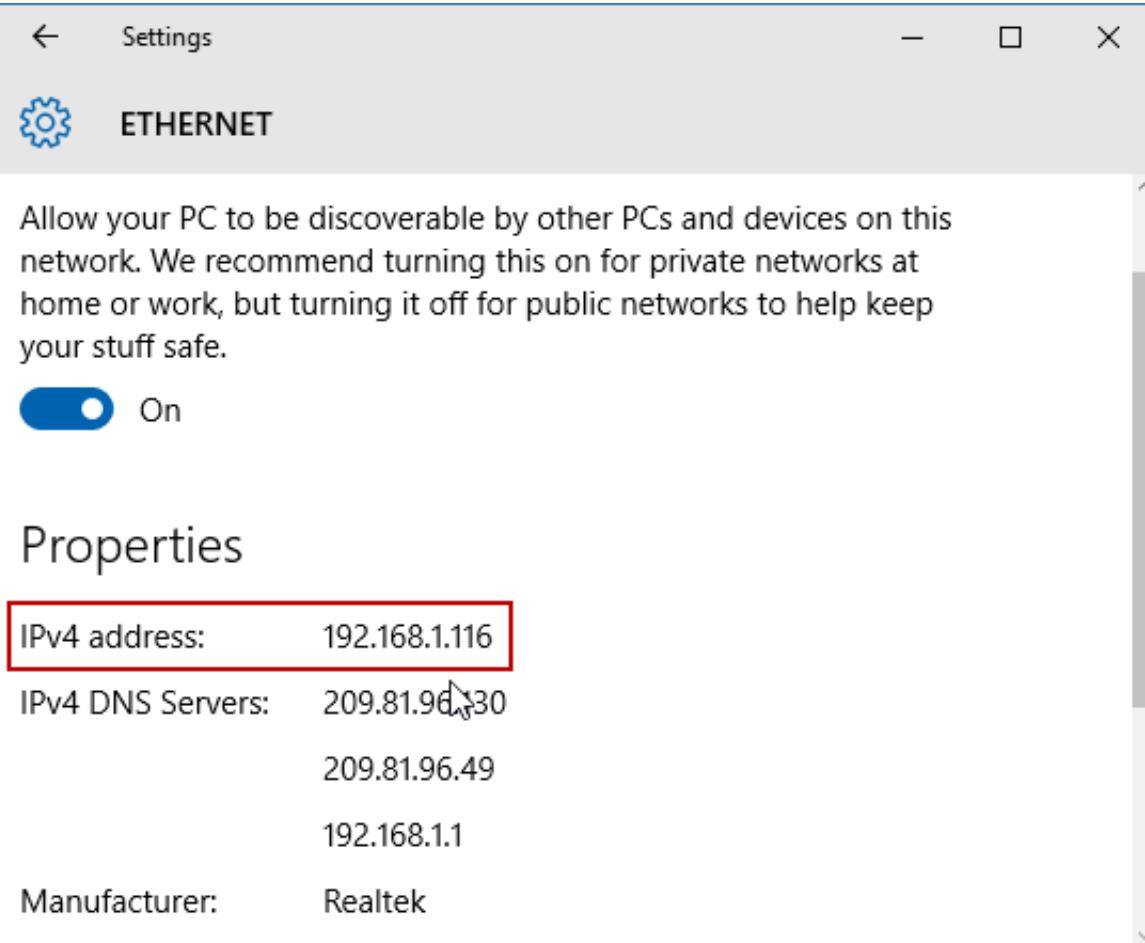
e.g.,

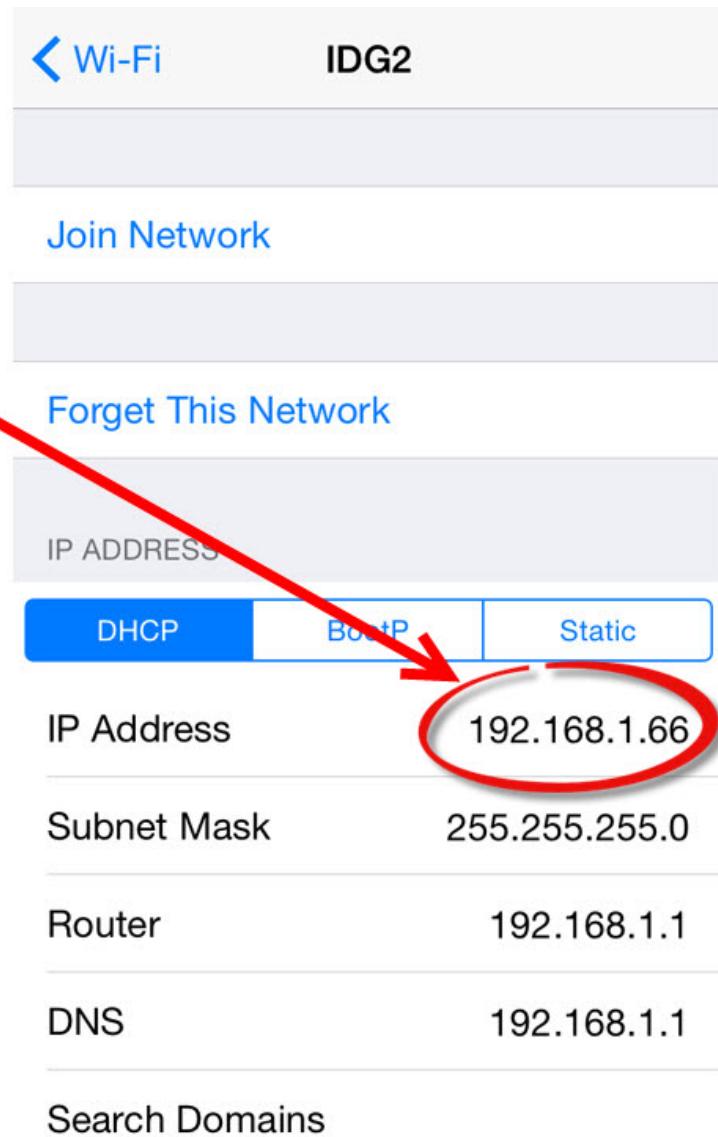
IPv4:

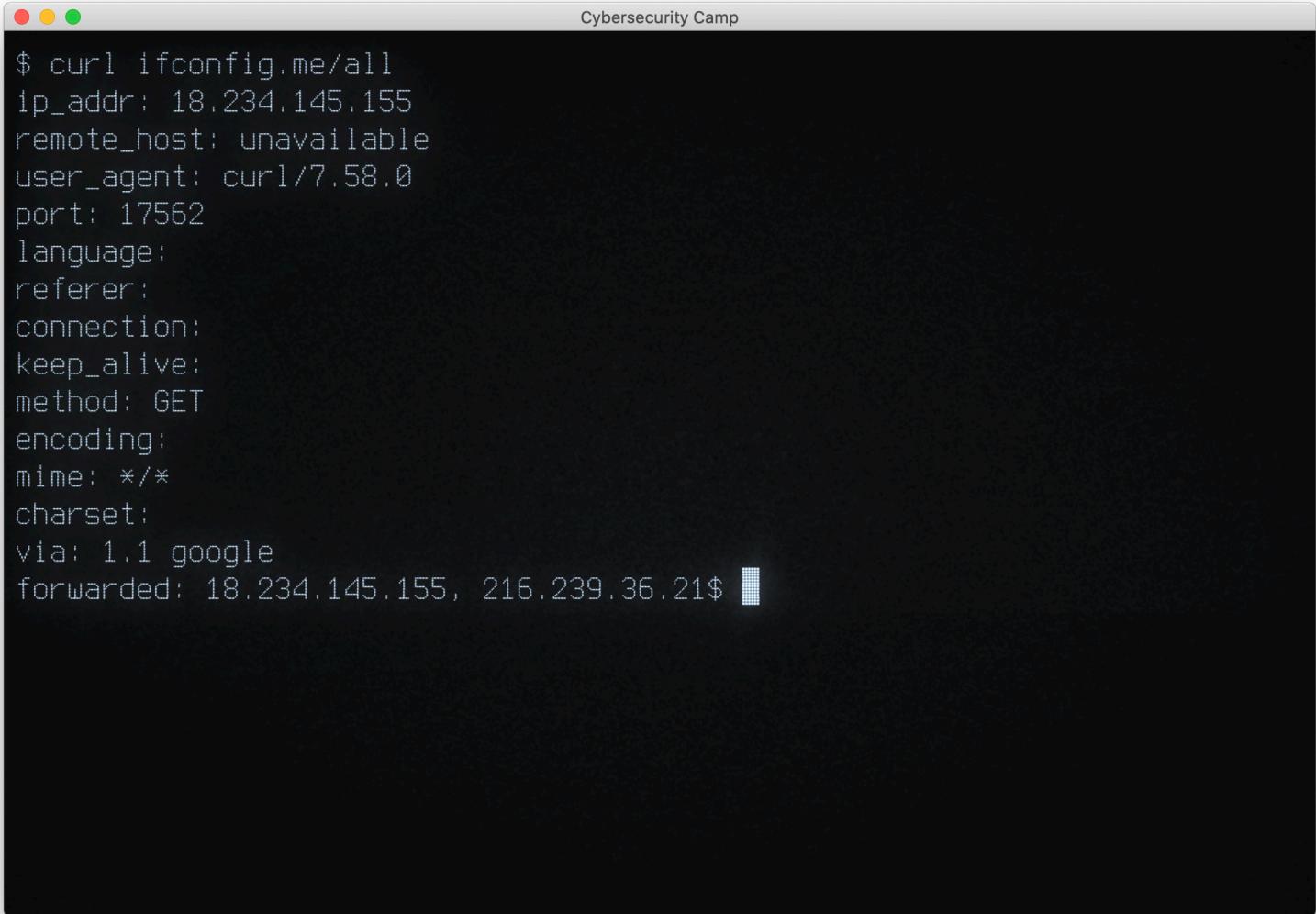
99.176.29.172

IPv6:

2602:306:3b01:dac0:110a:1555:9a19:7de4







A screenshot of a terminal window titled "Cybersecurity Camp". The window has a dark background and light-colored text. It displays the output of a curl command. The output includes various headers such as ip_addr, remote_host, user_agent, port, language, referer, connection, keep_alive, method, encoding, mime, charset, via, and forwarded.

```
$ curl ifconfig.me/all
ip_addr: 18.234.145.155
remote_host: unavailable
user_agent: curl/7.58.0
port: 17562
language:
referer:
connection:
keep_alive:
method: GET
encoding:
mime: */*
charset:
via: 1.1 google
forwarded: 18.234.145.155, 216.239.36.21$
```

Private IP Addresses

RFC1918 name	IP address range	number of addresses	largest CIDR block (subnet mask)	host id size	mask bits	<i>classful</i> description <small>[Note 1]</small>
24-bit block	10.0.0.0 – 10.255.255.255	16,777,216	10.0.0.0/8 (255.0.0.0)	24 bits	8 bits	single class A network
20-bit block	172.16.0.0 – 172.31.255.255	1,048,576	172.16.0.0/12 (255.240.0.0)	20 bits	12 bits	16 contiguous class B networks
16-bit block	192.168.0.0 – 192.168.255.255	65,536	192.168.0.0/16 (255.255.0.0)	16 bits	16 bits	256 contiguous class C networks

Plus 127.0.0.1, “localhost”

Amazon AWS IPs

Region	IP address range
US East (Ohio) (us-east-2)	52.15.247.160/27
US East (N. Virginia) (us-east-1)	52.23.63.224/27
US West (Oregon) (us-west-2)	54.70.204.128/27
EU (Ireland) (eu-west-1)	52.210.255.224/27
Asia Pacific (Singapore)	13.229.254.0/27
Asia Pacific (Sydney)	54.153.249.96/27
Asia Pacific (Tokyo)	13.113.244.32/27

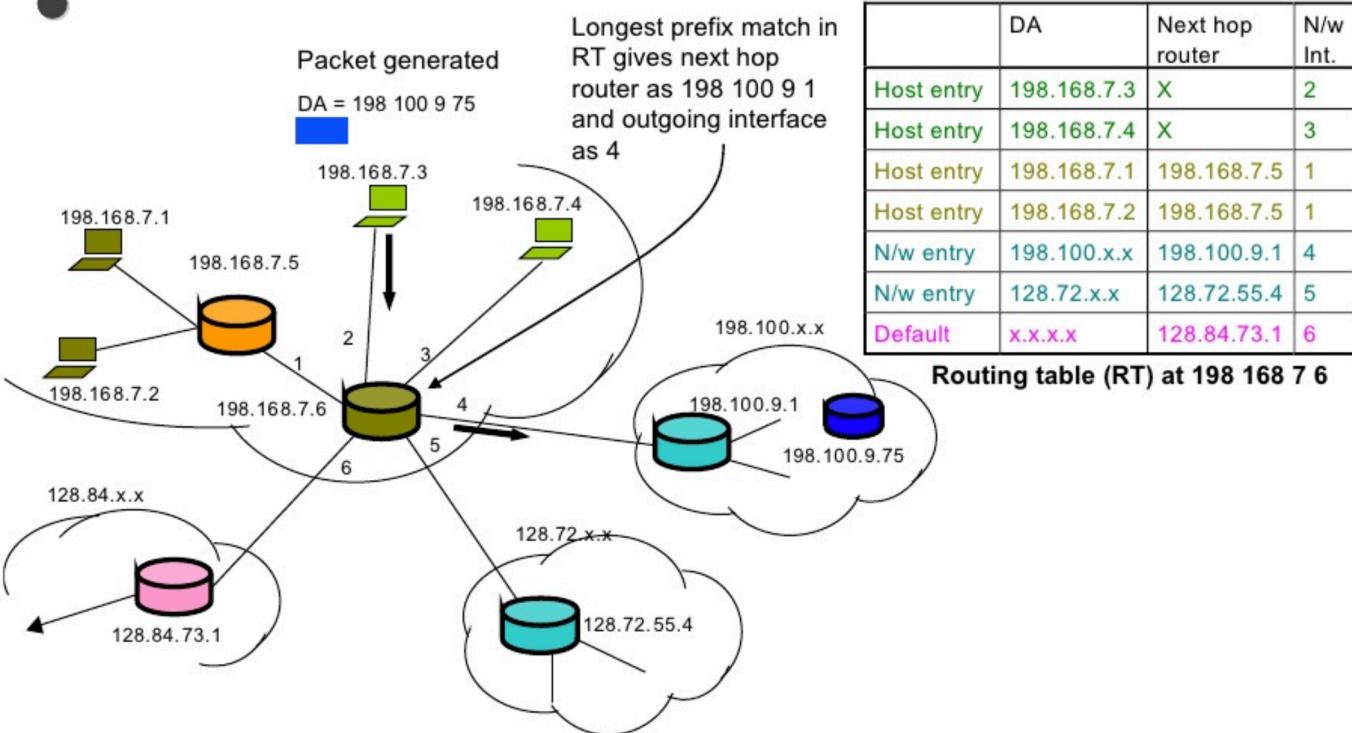
Google Cloud Platform

<https://gist.github.com/n0531m/f3714f6ad6ef738a3b0a>

Microsoft Azure

<https://www.microsoft.com/en-us/download/details.aspx?id=56519>

Routing process at a router



- How do routers build their routing tables?
- By exchanging information with each other using routing protocols

IPv4 Route Table

Active Routes:

Network	Destination	Netmask	Gateway	Interface	Metric
0.0.0.0	0.0.0.0	0.0.0.0	10.0.0.1	10.0.0.75	35
10.0.0.0	255.255.255.0		On-link	10.0.0.75	291
10.0.0.75	255.255.255.255		On-link	10.0.0.75	291
10.0.0.255	255.255.255.255		On-link	10.0.0.75	291
127.0.0.0	255.0.0.0		On-link	127.0.0.1	331
127.0.0.1	255.255.255.255		On-link	127.0.0.1	331
127.255.255.255	255.255.255.255		On-link	127.0.0.1	331
192.168.56.0	255.255.255.0		On-link	192.168.56.1	281
192.168.56.1	255.255.255.255		On-link	192.168.56.1	281
192.168.56.255	255.255.255.255		On-link	192.168.56.1	281
224.0.0.0	240.0.0.0		On-link	127.0.0.1	331
224.0.0.0	240.0.0.0		On-link	192.168.56.1	281
224.0.0.0	240.0.0.0		On-link	10.0.0.75	291
255.255.255.255	255.255.255.255		On-link	127.0.0.1	331