



How the Internet Works

Steven M. Bellovin

Department of Computer Science, Columbia University

Visiting Scholar, CLIP, Fordham University School of Law

<https://www.cs.columbia.edu/~smb>





Goals for Lawyers

- Red-titled slides summarize tentative legal conclusions
- Who knows what?
- How do they know it?
- What is the legal environment of that knowledge?
 - Private data
 - Third party doctrine
 - Wiretap Act
- Are there relevant regulatory issues?



What is the Internet Made of?

- Computers
 - Servers
 - Clients
 - Phones
 - “Things”
- Routers—specialized computers that forward “packets”
 - Packets are fragments of messages
- Links—WiFi, Ethernet, fiber, etc. The Internet was designed to run over *anything*



Fibers

- Each cable has many pairs of *strands*
- Each strand carries many *wavelengths* (aka “colors” or “lambdas”)
 - A recent trans-Pacific fiber has six pairs of strands
 - Each strand carries 100 wavelengths
 - Each wavelength has a bandwidth of 100G bps
 - Total capacity: 60 *terabits/second*
- Each wavelength can carry many different circuits
- Each Internet circuit carries packets for many different conversations



Ethernet

- Original design (1973) ran at 3M bps over coaxial cable
- In common use today, especially in enterprises: 1G bps over “twisted pair”
- Available in data centers: 100G bps over fiber
- Still recognizably the same design!



WiFi

- Used in public spaces and private residences
 - Some use in business, but wired Ethernet is more common for desktops
- Range: about 100 meters
- Security: WEP is obsolete and insecure; WPA2 is quite good—and in public, all bets are off.



A Look at Common Applications

- Web browsing
- Email
- The Cloud
- *Caution: all of this is simplified—and arguably oversimplified*

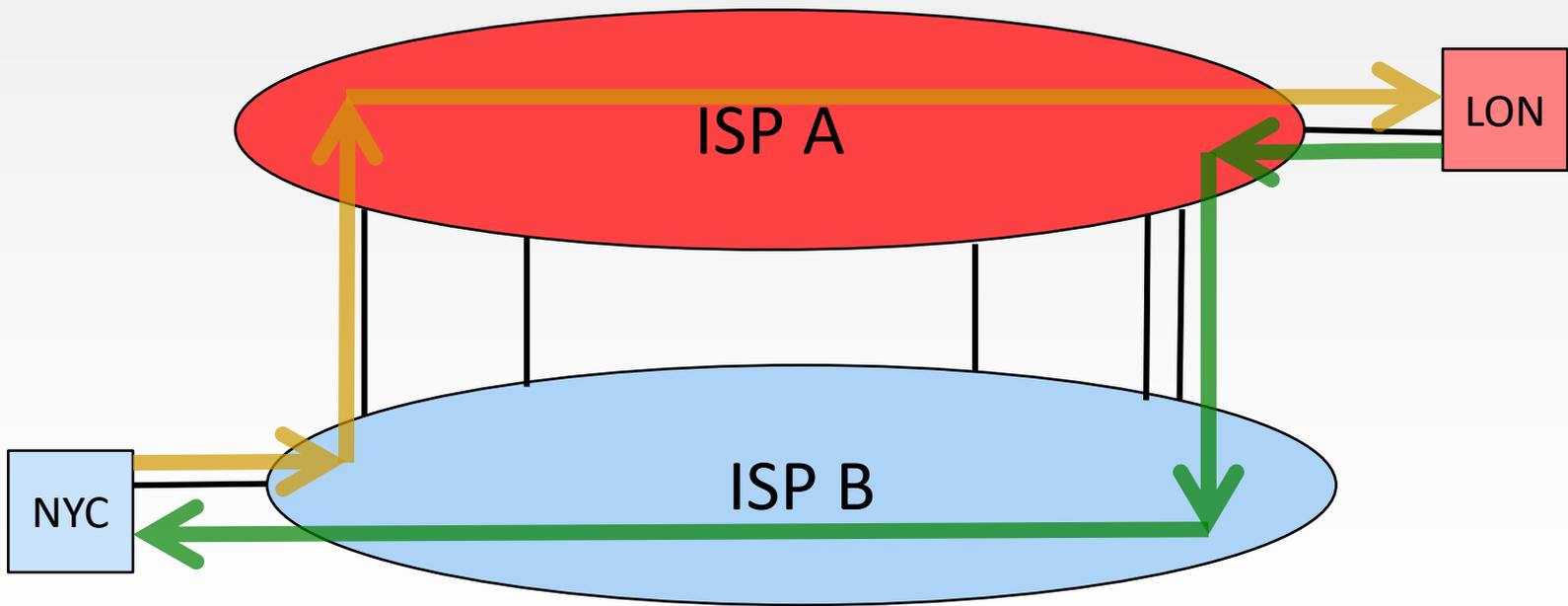


How the Web Appears to Users





The Internet Has Structure: Multiple ISPs that Interconnect at Multiple Points





Types of ISPs

- Local access
- Transit
- Servers

Some companies provide just one such service; others have more comprehensive offerings. Interconnections can be direct (especially between large ISPs) or at “exchange points”



Local Access ISPs

- Provide “last mile” service to customers, both consumer and small business
- Common technologies: cable TV wires (e.g., Spectrum), fiber (e.g., Verizon FIOS), cellular phones (e.g., AT&T Wirelss), phone lines via DSL, sometimes WiFi (e.g., LinkNYC), even satellite (e.g., HughesNet)
- These companies often, but not always, offer other services, such as email accounts and domain name server (DNS) resolution, but these are *not* related to offering local connectivity
- Local access ISPs provide “eyeballs”



Transit Providers

- Connect different ISPs
- Almost always by fiber; sometimes by some form of radio
- Some own their own fiber; others lease high-bandwidth circuits from telcos



Server ISPs

- Last mile connectivity, but for larger businesses
- Generally use fiber
 - Again, sometimes owned, sometimes via leased circuit
- Provide “content” for the “eyeballs”

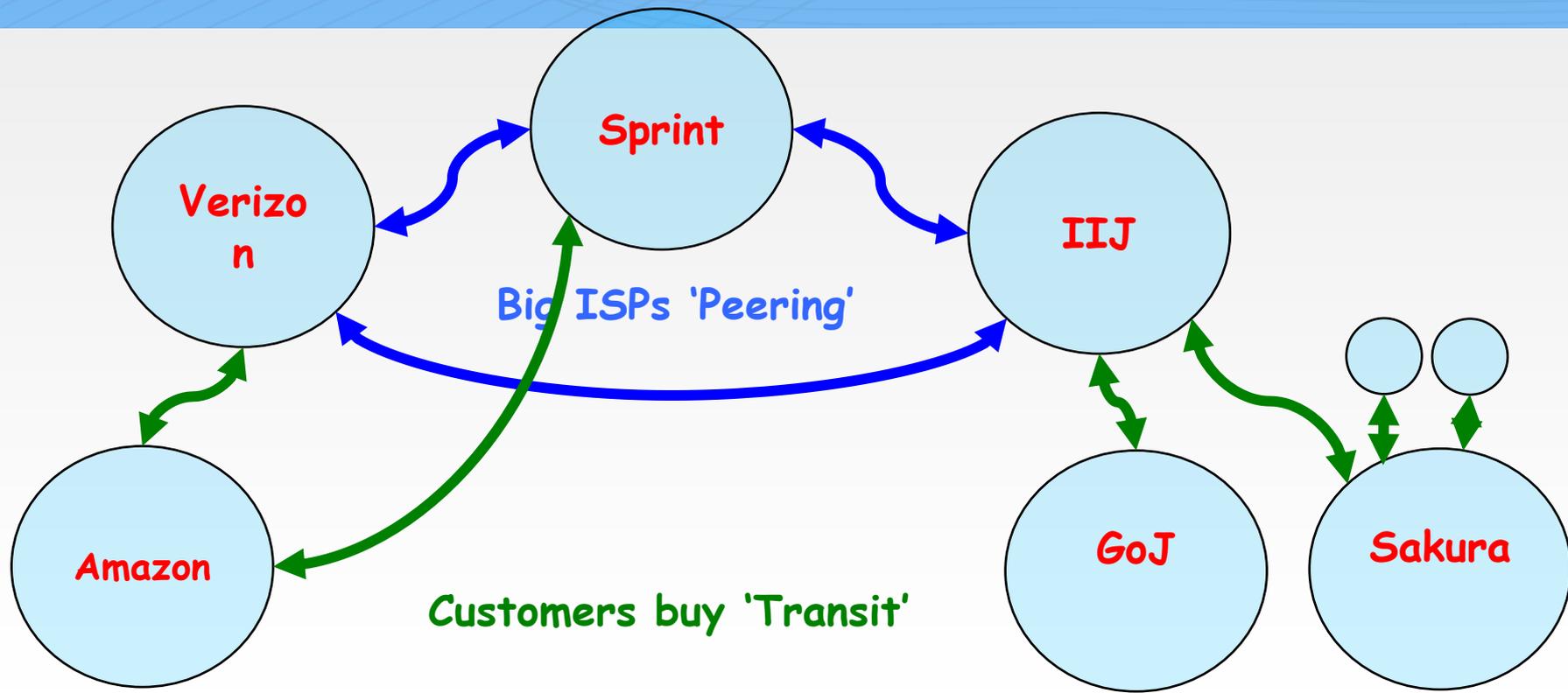


Wiretapping the Internet

- Tapping the “backbone” is very difficult—the forward and reverse directions of a conversation generally follow different paths
- Consequence: wiretap orders should be served on edge providers, e.g., the local access providers



Routing Between ISPs





How Does Routing Work?

- That is, how do packets “know” which ISPs to go to?



How Does Routing Work?

- That is, how do packets “know” which ISPs to go to?
- I can't tell you...



How Does Routing Work?

- That is, how do packets “know” which ISPs to go to?
- I can't tell you...
- More precisely, Internet routing is *the* most complicated part of Internet technology, even at a high level



How Does Routing Work?

Roughly speaking:

- Each ISP tells its “neighbors” (the ISPs to which it is directly connected) everything it knows about the Internet topology
- Each ISP then does its own calculations about the “best” path to any destination
- They then try—but with only limited ability—to influence how their neighbors behave



Routing Criteria

Business

- Inter-ISP contracts may require payment for traffic volume
 - Minimize expenses; maximize revenue
- Balance inbound and outbound traffic to each neighbor
 - Contracts often specify the proper mix of eyeballs and content
- Minimize the cost of links

Technical

- Low latency; high bandwidth
- Load-balancing among multiple paths
- Reliability and fault recovery
- Implement business policies—but technically, that can be a difficult matter

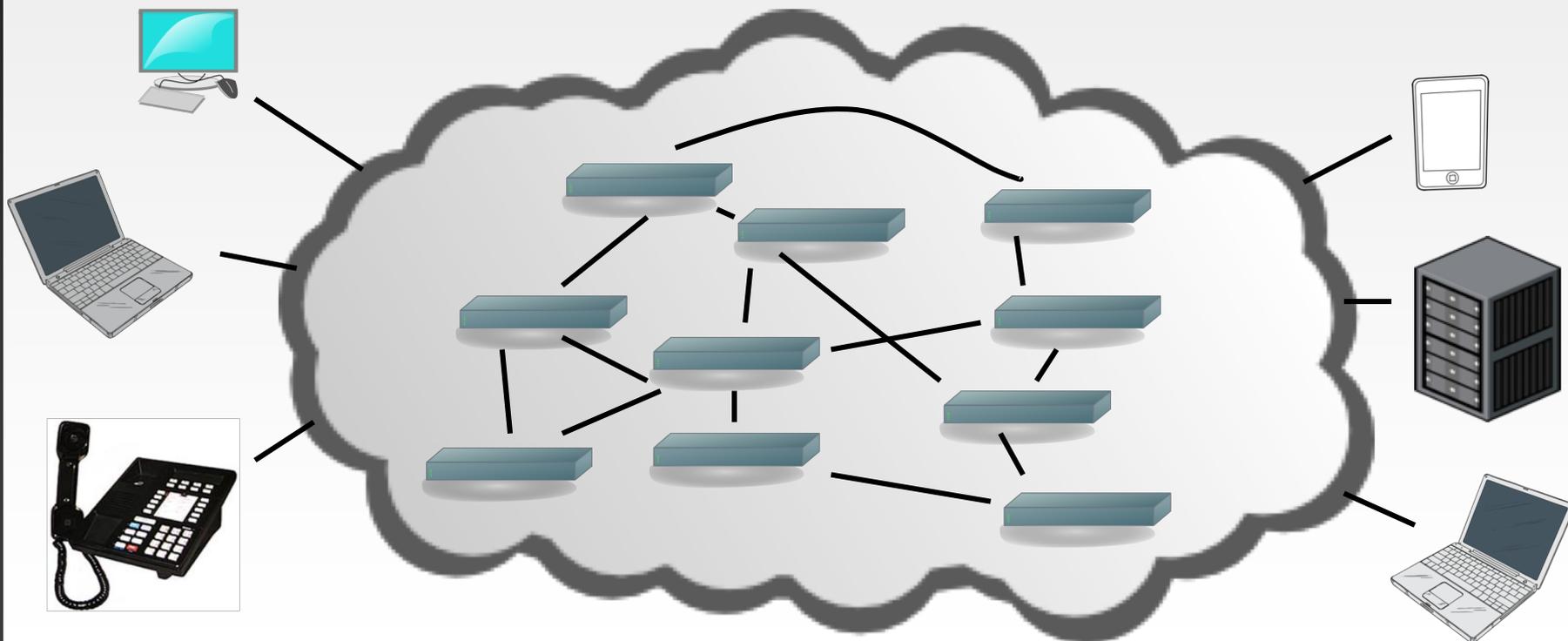


Some Regulatory Issues

- Contracts are generally bilateral and confidential
- It's hard to know a priori if there are antitrust issues
- Net neutrality was primarily about putting restrictions on these contracts



Each ISP Has Structure: Many Routers



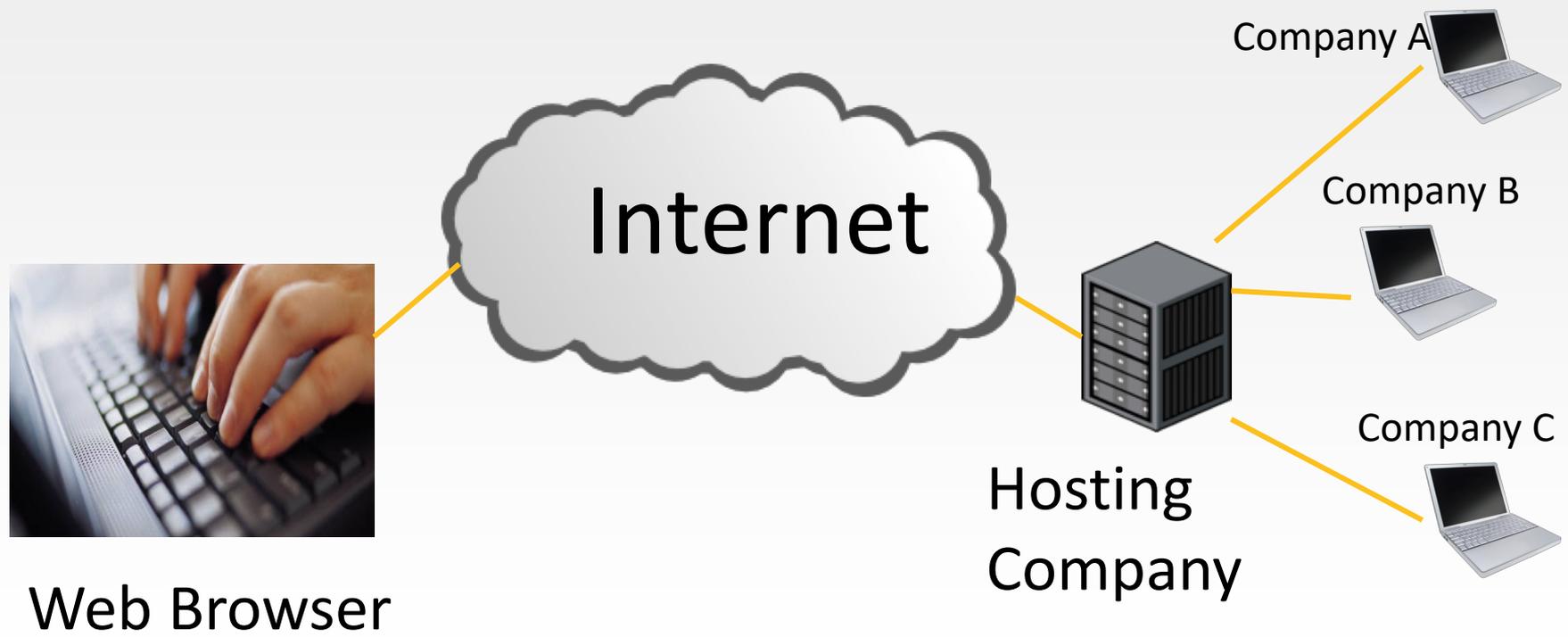


Intra-ISP routing

- Not as complex as inter-ISP, but still very complicated
- The same technical issues apply
- Must tune intra-ISP routing to properly handle the desired inter-ISP policies



Hosting Services



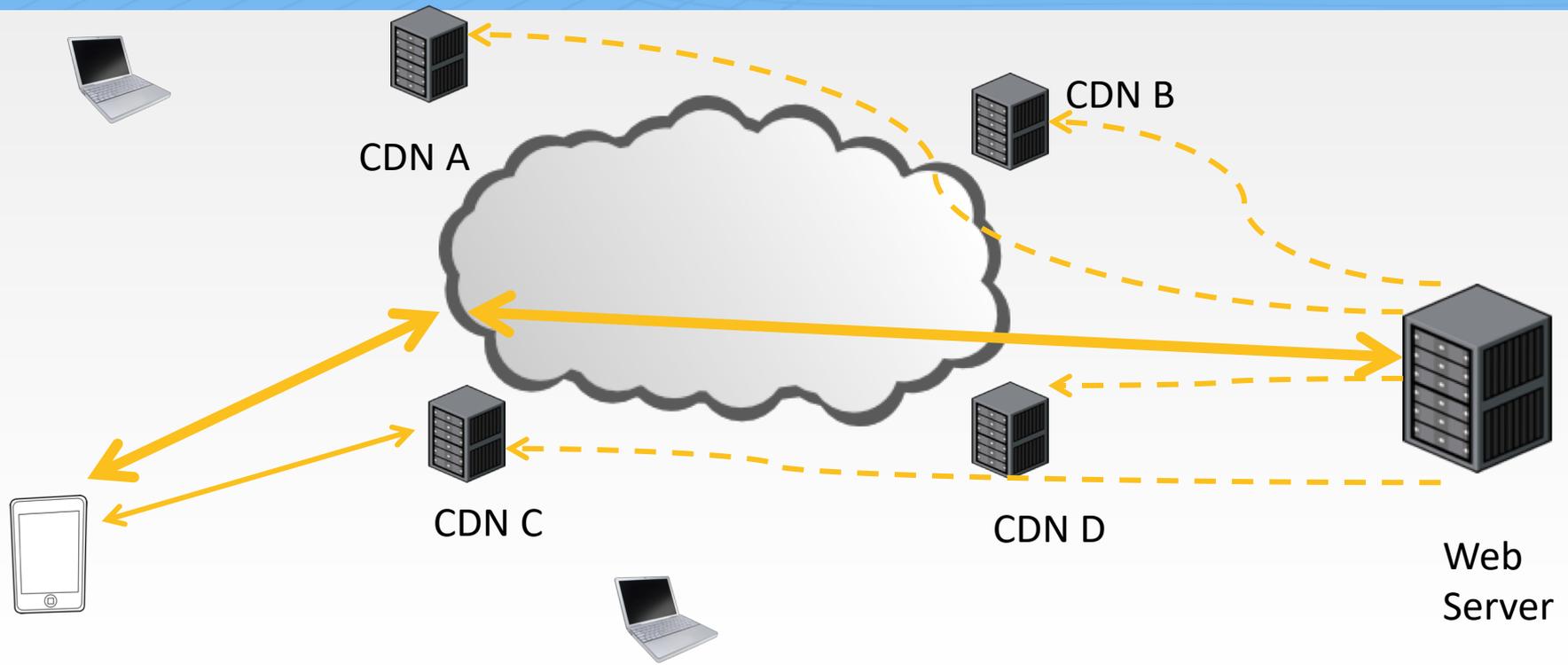
Web Browser

Hosting Company

Company A
Company B
Company C

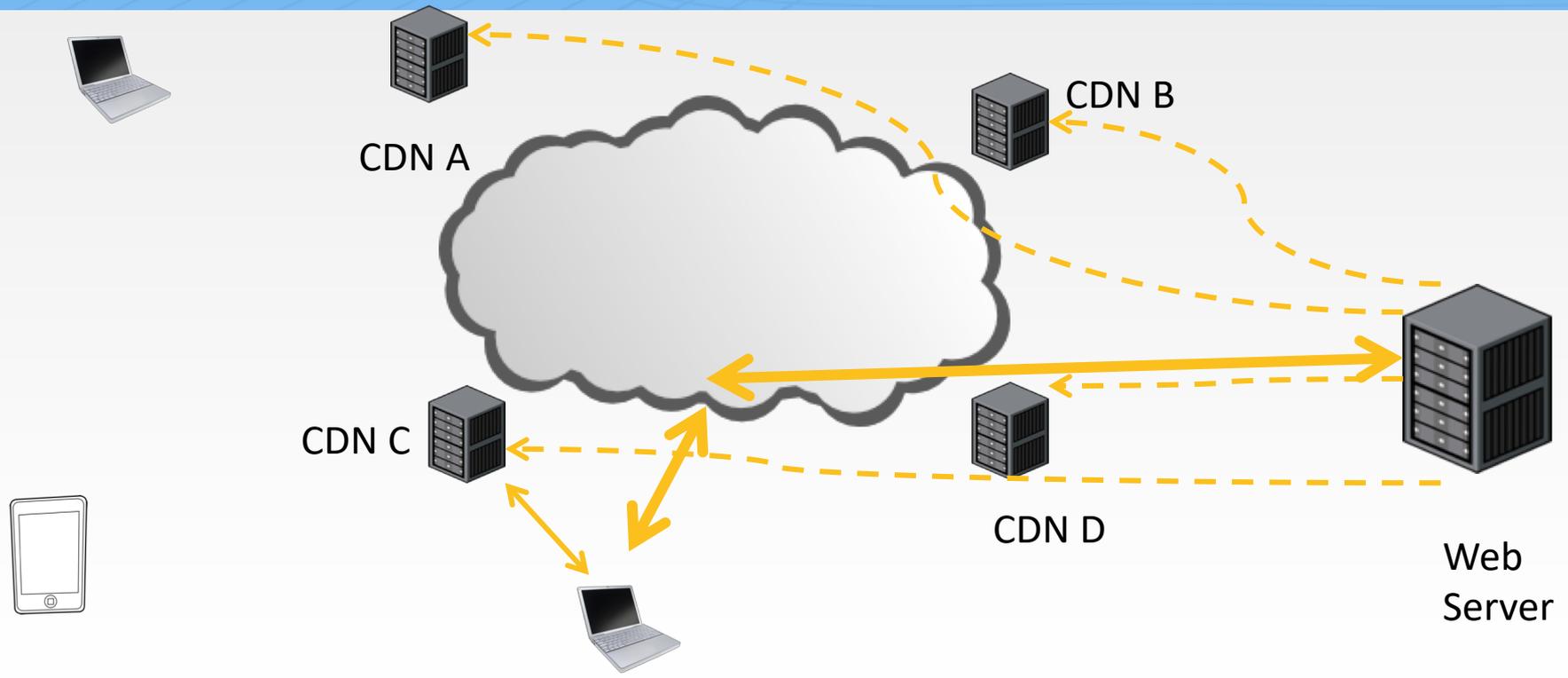


Content Distribution Network



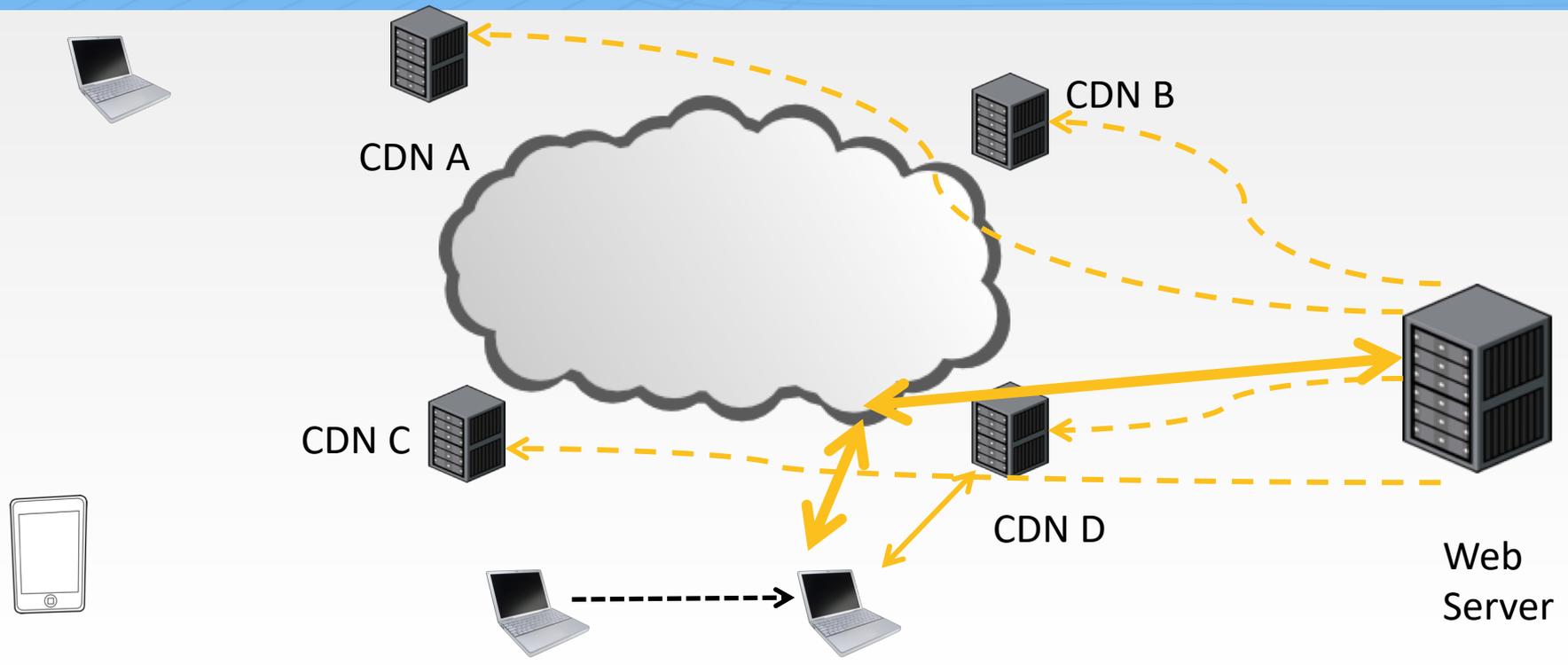


Content Distribution Network



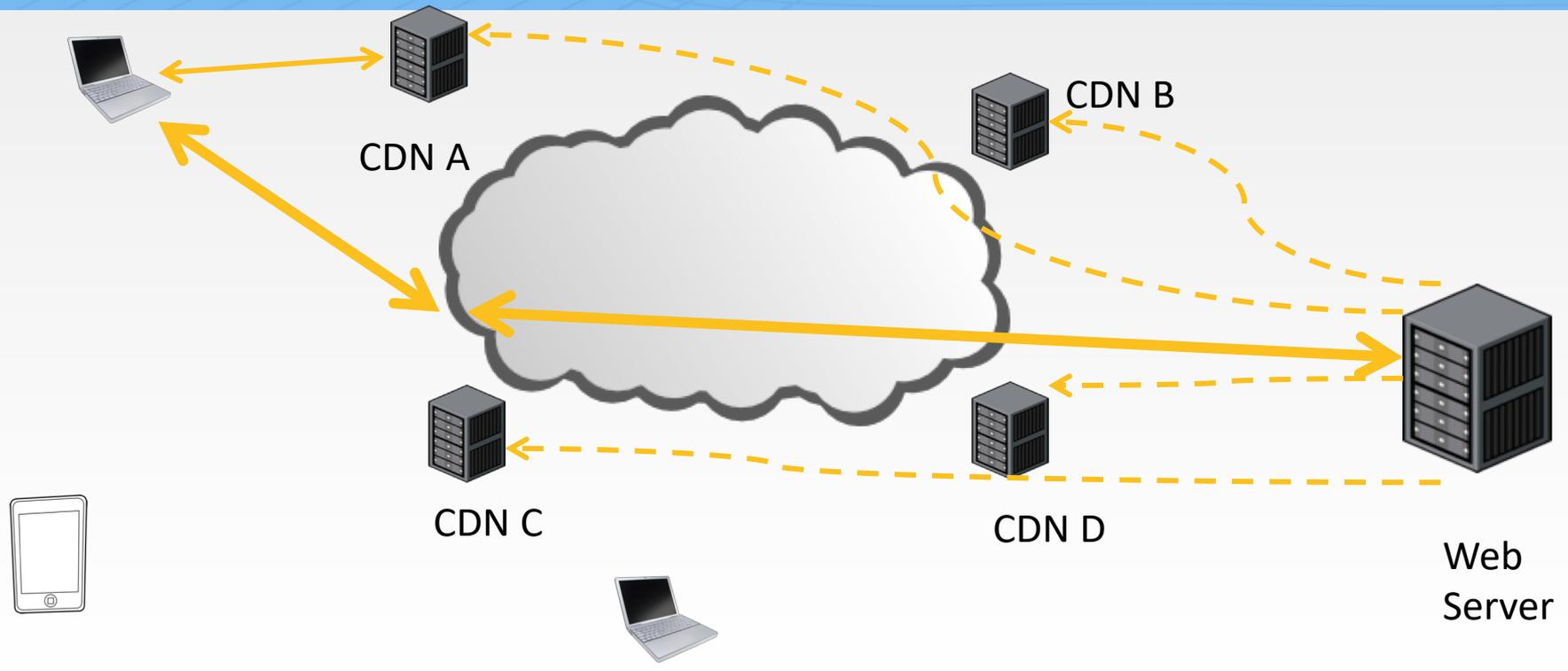


Content Distribution Network





Content Distribution Network





CDN Example: www.supremecourtus.gov

www.supremecourt.gov is an alias for a1042.b.akamai.net; Akamai is a prominent CDN operator

New York	24.143.200.48
Ashburn, Va	23.15.9.144
Atlanta	208.44.23.57
San Francisco	216.156.149.106
Boston	207.86.164.89



Fordham

- Fordham University's website uses a CDN
- Fordham Law's website is hosted at Fordham
- Fordham Lawnet uses a hosting service

but...

- Columbia University hosts its own website, while Columbia Law uses a CDN



Multiple Parties

- There are multiple parties involved in most web transactions
- Consequently, multiple parties know who is visiting what pages and hence when is retrieving what content
- However, determining who has the information for any given transaction is not always easy



Which is the Browser; Which is the Server?





Architecturally, They're the Same—What Matters is the Software They Run



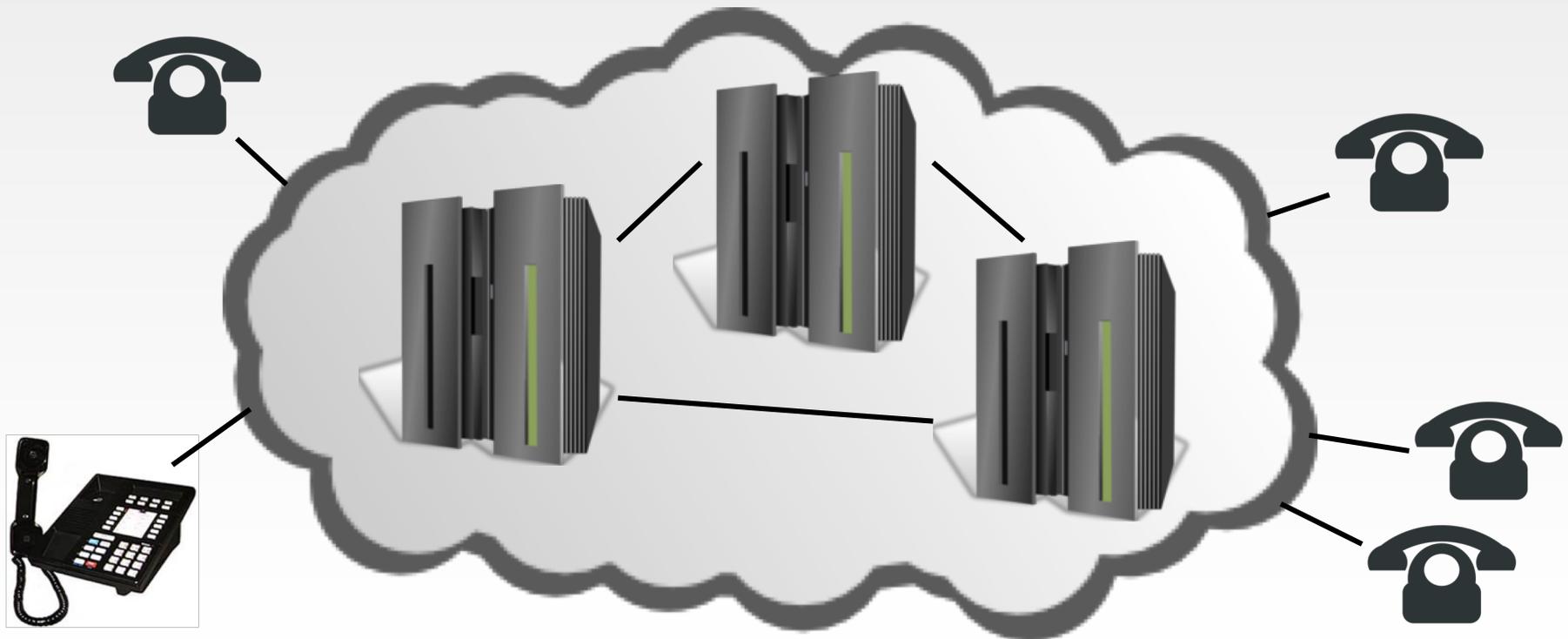


“Smart Hosts, Dumb Network”

- The phone network was built for dumb phones – nothing else was technically or economically feasible.
- All intelligence is in the network: conference calls, call forwarding, even many voice menus
- Internet routers are very dumb; all intelligence is in end systems
 - Consequence: *service* providers are not necessarily the same as *network* providers
 - Service provision is decoupled from physical location, and hence from jurisdiction
 - A person’s mail provider may be in another country

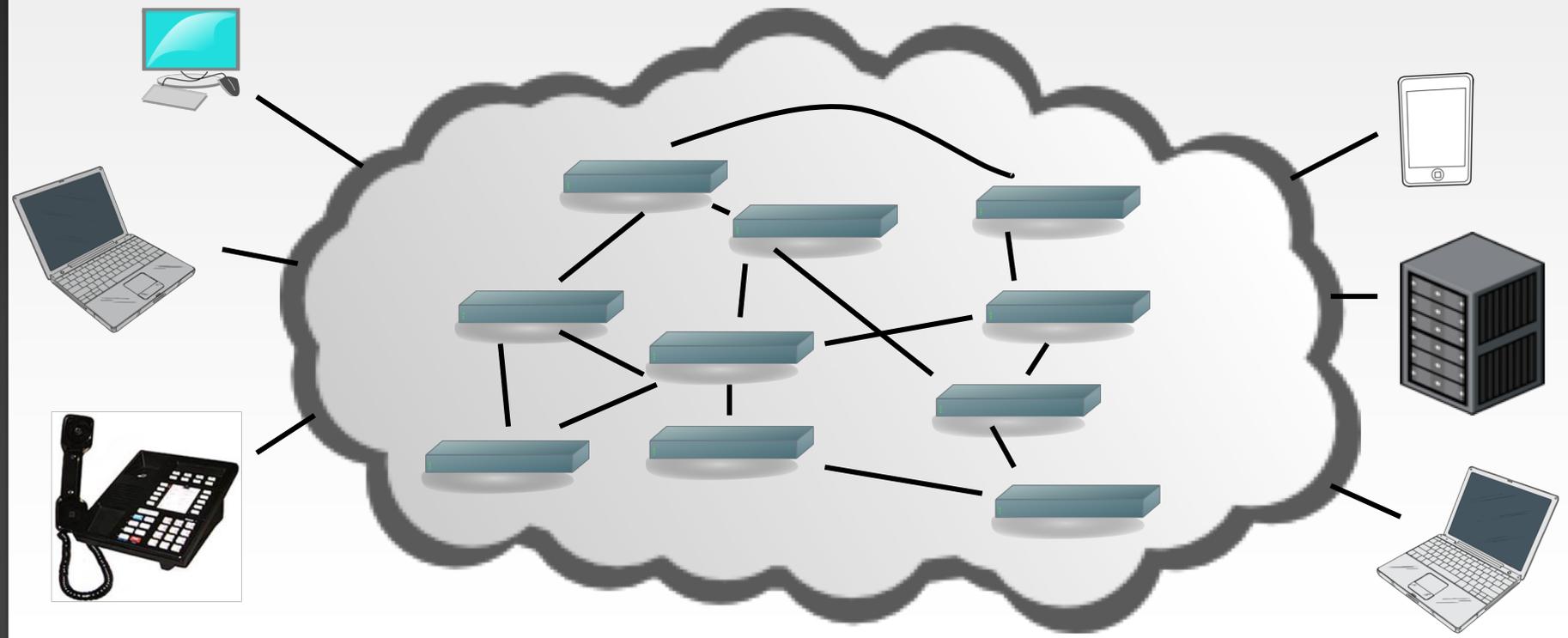


The Phone Network: A Few Large Switches, Serving Phones





The Internet: Many Routers, Very Many Types of Devices





Circuit Switching versus Packet Switching

- Circuits: traditional telephony model
- Path through the network selected at “call setup time”
 - Very small number of call setups; process can be heavyweight
- Each “phone switch” needs to know the *destination* of the call, not the source; return traffic takes the reverse path
- Packets: Internet model
- Every “packet” – a fragment of a message – is routed independently
 - No call setup
 - Routing must be very, very fast; it’s done for each packet
- Robustness: if a “router” fails, packets can take a different path
- Every packet must have a source and destination address, to enable replies
- Reply traffic may take a very different path



Many More Parties

- On the phone network, the central core knows everything
- On the Internet, the core knows little except for the endpoint addresses—and services can be provided anywhere
- Service providers can be and often are in different jurisdictions, where you may not have effective legal access (e.g., mail.ru)



IP Addresses

- A user types a name such as `www.dni.gov`.
- The *Domain Name System (DNS)* translates that to an *Internet Protocol (IP) Address* such as `23.213.38.42`
 - IP addresses are four bytes long; each of those numbers is in the range 0-255
 - `www.dni.gov` actually uses a CDN, so every querier gets a different answer
 - (DNS resolution is complicated and involves many parties_
- IP addresses are what appear in packets
- Routers talk to each other (via *Routing Protocols*) to learn where each IP address is



IP Addressing

- Roughly 4 billion possible IP addresses today—we’ve essentially run out
 - IPv6, a newer version of IP being deployed now, has many more addresses
- IP addresses are handed out in blocks to big ISPs. Big ISPs give pieces of their allocations to smaller ISPs or to end customers
- Unless you’re a very large enterprise, the only way to get IP addresses is from your ISP – and if you switch ISPs, you have to renumber your computers
- There is no analog to “local number portability” on the Internet – and can’t be; there’s no time to do that many lookups



Address Space Assignment

- IP addresses are handed out by *Regional Internet Registries (RIRs)*, such as ARIN
- They get their addresses from ICANN, an international non-profit which got its authority from the U.S. Department of Commerce – controversial abroad
 - ICANN is now independent of DoC—but it’s incorporated in California, which is again controversial
- Addresses are allocated based on demonstrated short-term need and evidence of efficient use of previously-allocated addresses
- Addresses may not be sold, even as part of a bankruptcy, merger, or acquisition, except with ARIN’s approval and in accordance with ARIN’s policies
 - This assertion of authority has never been contested in court—and some have been transferred by order of a bankruptcy court
 - Some ISPs have (very valuable) pre-ARIN addresses, called “legacy space”. Legacy address holders don’t have to renumber when switching ISPs (among other advantages)



The Need for Provider-Based Addressing

- Routing protocols—the way ISPs tell each other about the topology—can only handle a limited amount of data
- Analogy: it's easier to send all phone calls for area code 213 to Los Angeles, rather than every phone switch in the country needing to know about every single telephone in the city—instead, all that has to be known everywhere is “213”
- “Address aggregation”—the Internet analog to this—is the *only* way known to make the global Internet work



Implications of Address Space Allocation Policies

- That IP addresses are bound to providers *may* have antitrust implications—switching ISPs requires a lot of extra work to renumber computers
- Any party to the DNS name translation process—typically including the ISP, for most consumers—learns what sites are being contacted
 - Anyone who eavesdrops on the that traffic knows, too
- For a variety of reasons, including efficient use of IP addresses, ISPs always assign addresses hierarchically. This implies a tight, efficient relationship between IP addresses and location—important for online gambling, regional copyright licenses, jurisdiction

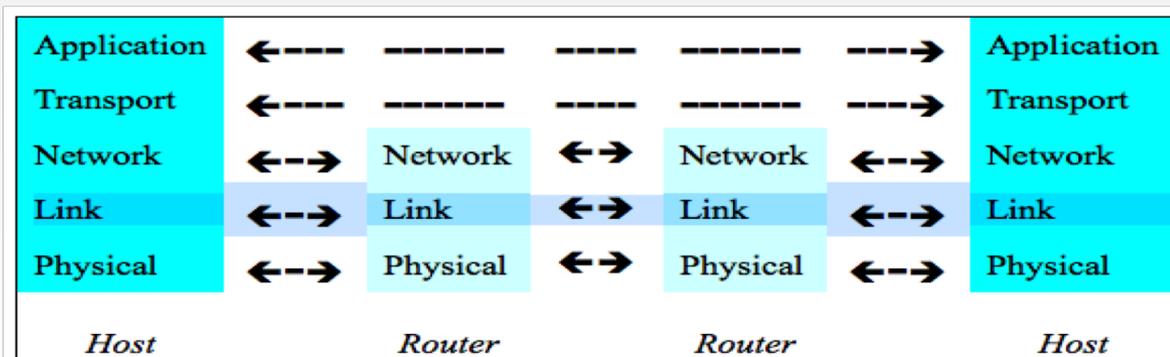


Port Numbers

- When one computer contacts another, is it trying to talk to a Web server or trying to send mail?
 - Remember that architecturally, all machines on the Internet are alike
 - It's perfectly legal to run a Web server *and* a mail server on a single computer
- Packets contain not just an IP address but a *port number*
 - Port 25 is the mail server, port 80 is the Web server, 443 is encrypted Web, etc.
- If an IP address is like a street address, a port number is the room number in the building
 - Room 25 is the mail room, room 80 is the library, etc.



The Network Stack



- The Internet uses a *layered* architecture
- Applications—email, web, etc.—are what we care about
- TCP (which has port numbers) *transports* the data; it is *end-to-end*
- IP (the *network layer*) is processed by every router along the path
- The *link layer* is things like WiFi, Ethernet, etc.



Are Port Numbers Third-Party Data?

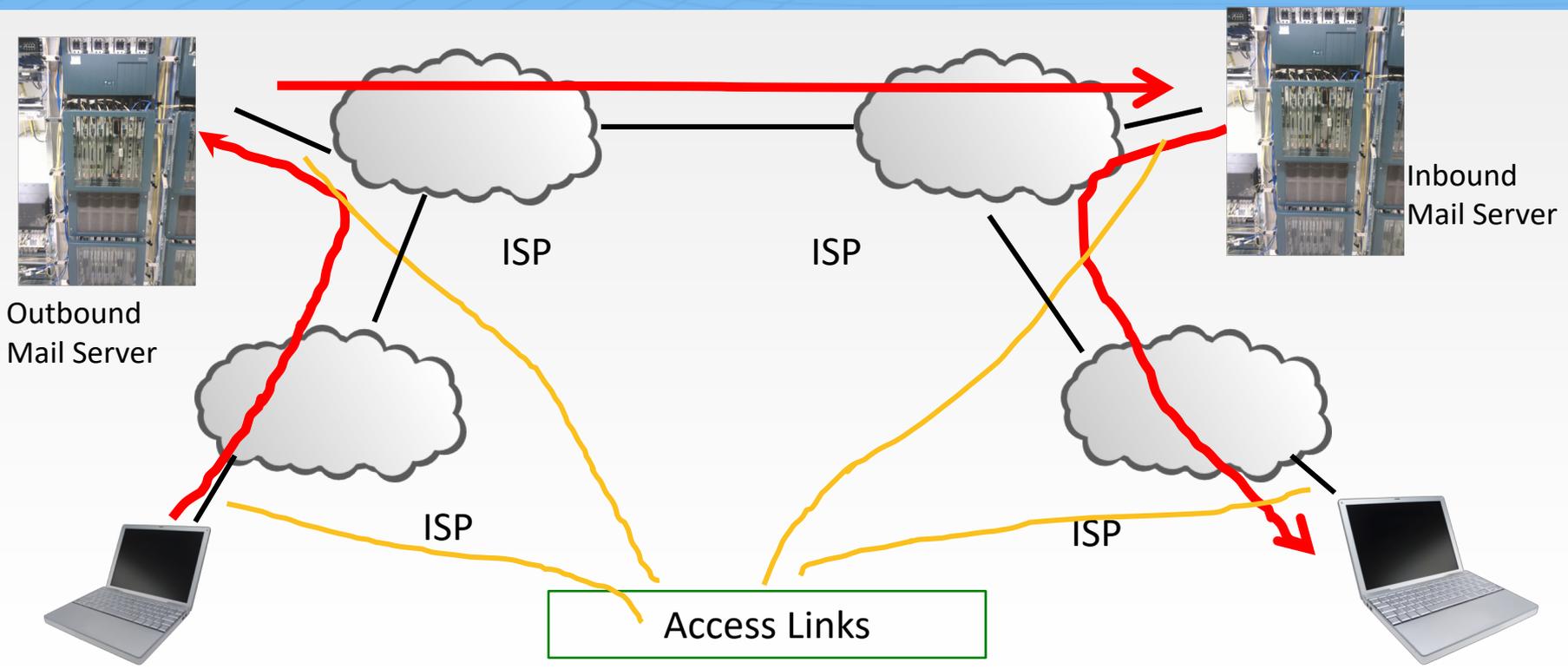
- They're not given to ISPs or other third parties (but IP addresses are very clearly accessible via the Pen/Trap statute)
- Well, under complicated circumstances they might be—but people very rarely know this
- ISPs sometimes examine them anyway, sometimes for consumers' benefit and sometimes for their own reasons
- DOJ asserts that they are third-party data
- There's no case law yet, nor any relevant cases that I know of



Email



Sending Email





Sending Myself Email—An SMTP Transcript

```
220 machshav.com ESMTP Exim 4.82 Tue, 11 Mar 2014 19:43:03 +0000
HELO eloi.cs.columbia.edu
250 machshav.com Hello eloi.cs.columbia.edu [2001:18d8:ffff:16:12dd:b1ff:feef:8868]
MAIL FROM:<smb@eloi.cs.columbia.edu>
250 OK
RCPT TO:<smb@machshav.com>
250 Accepted
DATA
354 Enter message, ending with "." on a line by itself
From: Barack Obama <president@whitehouse.gov>
To: <smb2132@columbia.edu>
Subject: Test

This is a test
.
250 OK id=1WNSaS-0001z5-1d
QUIT
221 machshav.com closing connection
```



Message



Conversation With A Third Party

```
220 machshav.com ESMTP Exim 4.82 Tue, 11 Mar 2014 19:43:03 +0000
HELO eloi.cs.columbia.edu
250 machshav.com Hello eloi.cs.columbia.edu [2001:18d8:ffff:16:12dd:b1ff:feef:8868]
MAIL FROM:<smb@eloi.cs.columbia.edu>
250 OK
RCPT TO:<smb@machshav.com>
250 Accepted
DATA
354 Enter message, ending with "." on a line by itself
[REDACTED MESSAGE]
.
250 OK id=1WNSaS-0001z5-1d
QUIT
221 machshav.com closing connection
```

Message

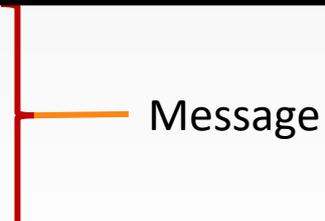
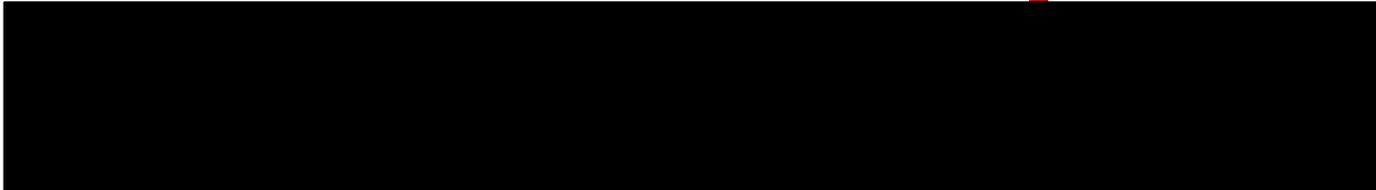


What the Recipient Sees



From: Barack Obama <president@whitehouse.gov>
To: <smb2132@columbia.edu>
Subject: Test

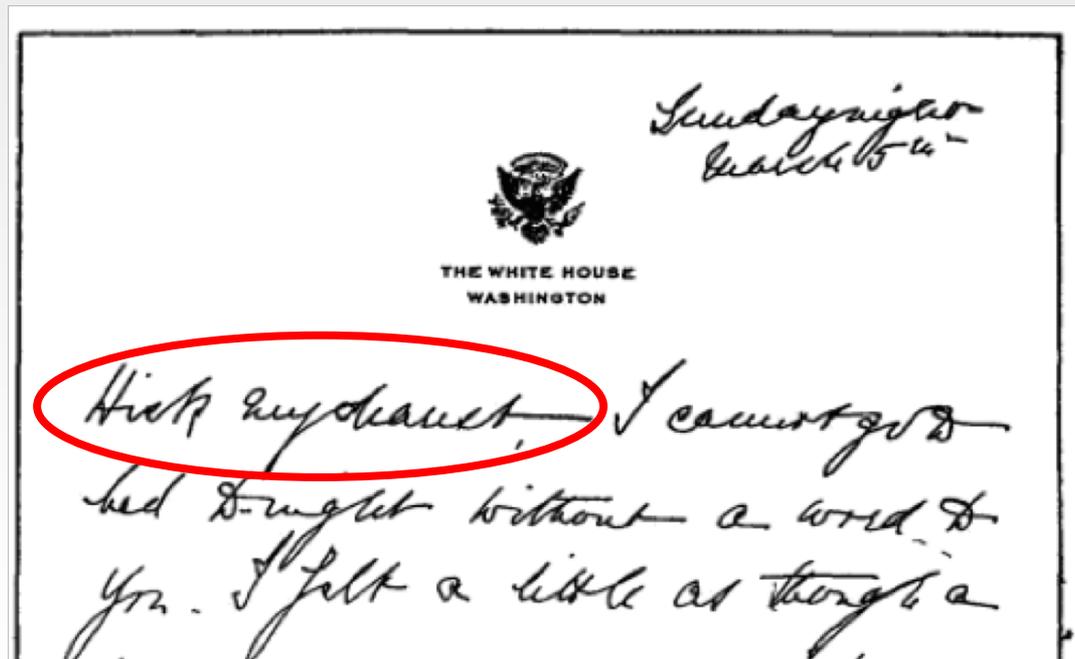
This is a test



Message



A Letter from Eleanor Roosevelt to Lorena Hickock (March 1933)



It begins "Hick my dearest".

(excerpt from
Amazon.com)



Things to Note re the Third Party Doctrine

- The SMTP *envelope*—that’s the technical term!—can have different information than the message headers
- Unlike the phone network, anyone can run their own mail servers
 - I personally run two, one personal and one professional
 - This complicates third party doctrine analysis
- The reality of email is far more complex than I’ve outlined here
 - Example: many people read their email via a Web browser—and the NSA has stated that even for them, picking out just the From/To information from a Webmail session is very difficult
- I haven’t even begun to address server-resident email, virus scanning, spam filtering, and the like, let alone all of the other metadata that’s present



Encryption on the Internet



Anything Can be Encrypted

- Links—though mostly encrypted on WiFi
- Virtual Private Networks (VPNs)
- Simple connections (Web, email, etc.), generally via Transport Layer Security (TLS)
- Data, especially the body of email messages



VPNs

- Used by corporate employees for telecommuting or while traveling
 - Also used to connect multiple corporate locations
- Sometimes used to spoof location
 - Cover tracks
 - Fool geographic restrictions on content, e.g., streaming movies and music
- A recently published academic paper concluded that the NSA could cryptanalyze a lot of VPN sessions



TLS

- Used for all secure Web traffic
- Widely (and increasingly) used when sending and retrieving email
 - But—TLS does not protect email “at rest”, i.e., while on disk on the various servers
- Used for many other point-to-point connections, e.g., Dropbox
- Older versions of TLS have cryptographic weaknesses; these are (believed to be) fixed in the newest versions
- The most common implementations of TLS have a long history of serious security flaws



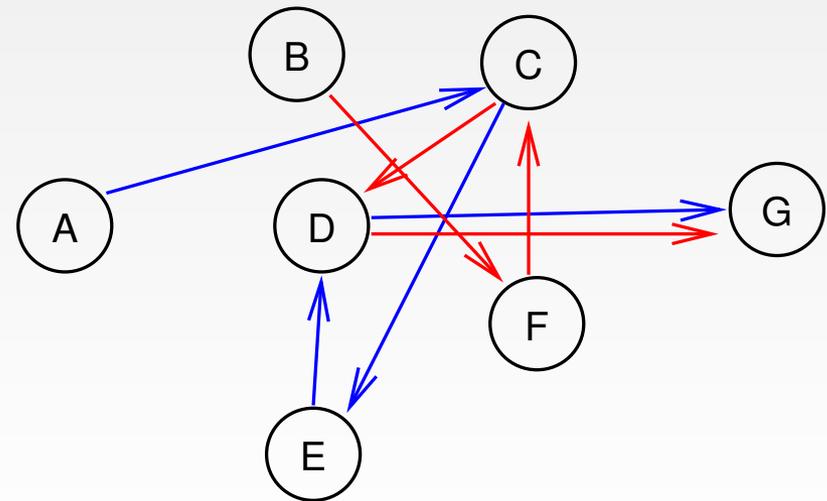
Email Encryption

- Two different standards, S/MIME and PGP
 - S/MIME is widely supported—but rarely used
 - PGP requires less infrastructure support, and hence is used by enthusiasts (though not that many of them)
- Protects email at rest—but hinders searching
- Does not protect email headers or other metadata
- Both are extremely hard to use correctly
 - In fact, virtually no one uses them



Tor: The Onion Router

- Computer A picks a sequence of Tor relays (C→E→D)
 - D is the exit node, and passes the traffic to destination host G
 - All of these hops are encrypted
- B picks relays F→C→D
 - G can't tell which is from A and which from B
- Neither can anyone else monitoring G's traffic
- Many use Tor for anonymity: police, human rights workers, spies—and criminals (e.g., Ross Ulbricht of Silk Road fame)
- Mental model: nested, sealed envelopes





Encryption

- Modern encryption algorithms, if used correctly, are *extremely* hard to break
- As a consequence, it is extremely hard to trace Tor connections or figure out the real origin of VPNed traffic
- The FBI and other law enforcement agencies have complained that they are “going dark” and want a legislative solution to provide for “exceptional access”
 - Most cryptographers think this is a bad idea

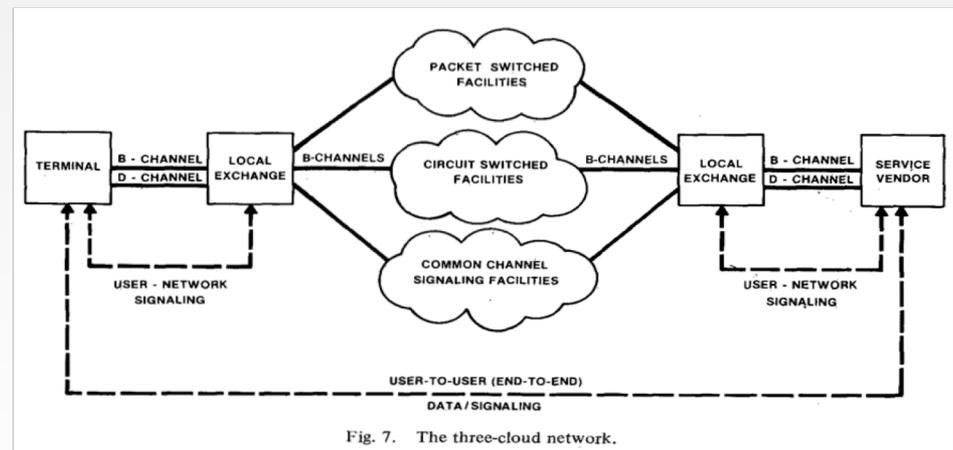


Cloud Computing



What's a Cloud?

- A cloud is a traditional way to represent a network
- This “three-cloud network” picture is from 1982
- But—today “cloud” refers to **computing services** provided via the **Internet** by an **outside party**.
- (The modern usage seems to date to 1996:
<http://www.technologyreview.com/news/425970/who-coined-cloud-computing/>)





“Via the Internet”

- The service is not provided on-premises
- An Internet link is necessary
- This link provides an opportunity for interception, lawful or otherwise



“Outside Party”

- By definition, cloud services are provided by an outside party
 - Similar in spirit to the computing and time-sharing service bureaus, which date back to the 1960s
- *Not* the same as a company’s own remote computing facility
 - Organizations can have a “private cloud”, but the legal issues may be very different



Computing Services

- Many different types of services
 - Storage
 - Computing
 - Applications
 - Virtual machines
 - More



Storage

- Disk space in a remote location
- Easily shared (and outside the corporate firewall)
- Often replicated for reliability
 - Replicas can be on different power grids, earthquake zones, countries, continents, etc.
 - Data can be moved—or move “by itself”—to be closer to its users
- Expandable
- Someone else can worry about disk space, backups, security, and more
- Examples: Dropbox, Google Drive, Carbonite (for backups), Amazon S3
- Mental model: secure, self-storage warehouse



Computing

- Rent computing cycles as you need them
- Pay only for what you use
- Often used in conjunction with the provider's cloud storage service
- Examples: Amazon EC2, Microsoft Azure, Google Cloud
 - Dropbox is a cloud service that uses a different provider's cloud storage
- Mental model: calling up a temp agency for seasonal employees



Applications

- Provider runs particular applications for clients
- Common types: web sites, email services
- Less common types: shared word processing, payrolls
- Well-known providers: Google's Gmail and Docs, Microsoft's Outlook and Office 365, Dreamhost (web hosting)
- Mental model: engaging a contractor for specific tasks



Playing an Active Part: Google Docs

- Someone, using a Web browser, creates a document
 - Standard formatting buttons: font, italics or bold, copy and paste, etc.
- Others who have the proper authorization (sometimes just a special URL) can edit the document via their own Web browsers
- The changes made by one user show up *in real time* in all other users' browser windows
- In other words, Google is not just a passive repository; it is noticing changes and sending them out immediately



Virtual Machines

- Normal desktops: an *operating system* (e.g., Microsoft Windows) runs the computer; applications run on top of the operating system
- Virtual machines: a *hypervisor* running on a single computer emulates multiple real computers. A different operating system can run on each of these emulated computers—and each one is independent of the others and is protected from it
- Net effect: many computers that consume the space and power requirements of a single computer
- Mental model: rented office space



Location of Cloud Servers

- Responsiveness of and effective bandwidth to a server is limited by how far away it is
 - The problem is the speed of light—and not even Silicon Valley can overcome that limit!
 - It takes a *minimum* of a quarter-second to set up a secure connection from Washington to Paris, and twice that to New Delhi
- For performance reasons—and independent of political and legal considerations—large cloud providers therefore place server complexes in many places around the world
 - Also: take advantage of cheap power and cooling



Where is Data Stored?

- Modern email: on the server *and* on one or more devices
 - Users can't easily tell what's on their device (e.g., phone or laptop) versus what is retrieved from the server on demand
 - It differs for different devices at different times, and may depend on the user's recent activity
 - What if the device and server are in different jurisdictions?
- (A bad fit for the assumed behavior model of Stored Communications Act)



Security and Privacy Issues

- Gmail: Google applications scan email and serve up appropriate ads
- Dropbox: uses Amazon S3 for actual storage; encrypts data so that Amazon can't read it—but Dropbox can
- Spider Oak: data is encrypted with the user's password; Spider Oak can't read it
- Outlook.com: blocks file attachments that frequently contain viruses
- Many: check pictures for known child pornography
- Many: spam filtering



Compulsory Access to Email

- The Stored Communications Act requires search warrants for access to email less than 180 days old
- Older email is presumed to be abandoned and is accessible via a subpoena-like process
 - Once, perhaps that presumption was correct
 - Widespread agreement that that provision violates the Fourth Amendment
 - But the government has argued that email is often voluntarily given to third party providers, so no search warrant is needed
 - In *United States v. Warshak*, the 6th Circuit strongly disagreed

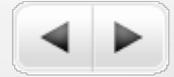


Web Sites and Ads



Web Pages

- Web pages are composed of many separate elements
- Images *always* are loaded from a separate URL
- There are also “frames”—web pages embedded in other web pages, again from separate URLs
- Many pages download JavaScript (small programs embedded in web pages) libraries from yet other URLs
- Web requests (HTTP—hypertext transfer protocol) generally contain the URL of the referring page
- In other words, for a typical web page *many* sites may know of the request



Cookies

- Web sites will tell you that cookies are small, harmless text files. That's true, but...
- When you visit a site, it can set a cookie; your browser stores it on disk
- When you return to this site, your browser sends back that cookie
- Cookies are used for logins, site preferences, shopping carts, etc.
- They're also used to track people around the web
- When you visit a page that includes other URLs, *each* site can set and receive cookies



The Initial Request

I heard you say

```
GET / HTTP/1.1
Host: greylock.cs.columbia.edu
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.13; rv:59.0) Gecko/20100101 Firefox/59.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
DNT: 1
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

from 128.59.107.140:61588

I just sent you, #1804289383, a cookie; reload this page to see it coming back to me.



The Return Visit

I heard you say

```
GET / HTTP/1.1
Host: greylock.cs.columbia.edu
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.13; rv:59.0) Gecko/20100101 Firefox/59.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://greylock.cs.columbia.edu/
Cookie: Size="Large"; WhoYouAre=1804289383; ID-Age=1524108611; Last-Seen=1524108611
DNT: 1
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

from 128.59.107.140:61600

I just sent you, #1804289383, a cookie; reload this page to see it coming back to me.
ID Age: Wed Apr 18 23:30:11 2018
Last visit: Wed Apr 18 23:30:11 2018



Ad Networks

- Most ads are not served from the web sites you visit
- Instead, sites deal with ad brokers
- When you download a page, advertising image and frame requests point to ad brokers
 - The ad brokers get and set cookies
- They then send “redirect” commands, giving the URL of the actual ads for your browser to fetch and display
 - Again, the ad sites can get and set cookies



Privacy Implications

- You're tracked around the web
- If you visit a site and click on an ad for, say, shoes, a cookie will be set by the ad network saying "this user is interested in shoes"
- When you visit a site that uses the same ad network, it will see that cookie—and show you more ads for shoes



Tracking

- Many web sites are involved in almost every visit to a web page
- Their log files are probably available as business records via the third-party doctrine
- Cookies are only accessible via a search warrant—but they (plus browser history) paint a very full picture of online activity
 - Note that they can disclose site logins, leading to more evidence
- Much of this tracking is dubious under the GDPR—but we'll have to see how web sites react
- These tracking-based ads provide the money that keeps the web operating
 - But whether or not tracking works is not that clear—the data is proprietary



Google, Facebook, et al.



Websites?

- Google and Facebook are web sites
- They're also ad networks
- They collect massive amounts of information
- Their mobile apps let them collect even more, including your contacts and location
- And Facebook at least will merge information about online behavior with data about offline behavior

They know a tremendous amount about people, and their machine learning algorithms let them intuit even more



Ad Networks

- Together, Facebook and Google reap most of the profits (at least 65%) from online advertising
- Virtually all of the revenue growth has gone to these two companies
- Why? Because they use their detailed knowledge about people for very precise targeting

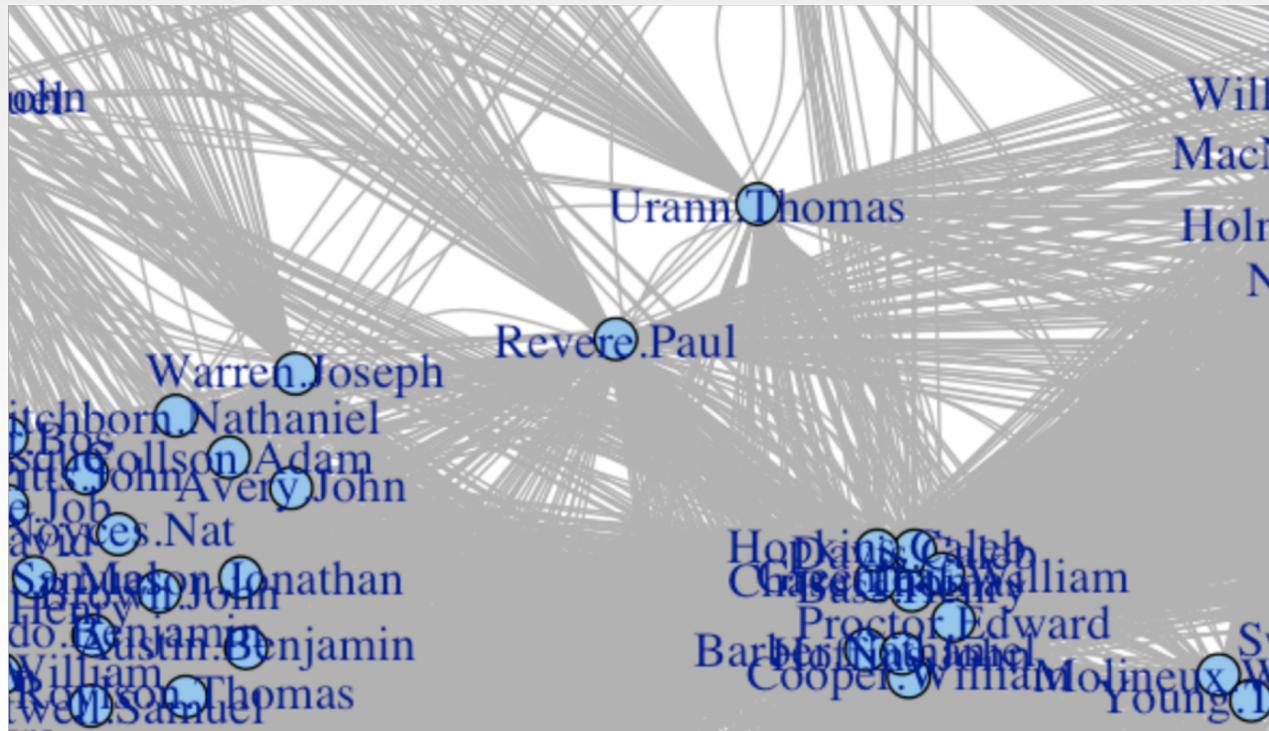


Birds of a Feather

- Facebook, Twitter, and other social networks learn the *social graph*: who interacts with whom
- “Birds of a feather flock together” can be very true—and very revelatory
- Example: Some MIT undergraduates found that it was possible to predict people’s sexual orientation from whom their Facebook friends were



And Right in the Middle...





Evidence

- In many cases, it has become routine to seize (often via subpoena) parties' Google and Facebook records
 - Divorce, disability, crimes, and more
 - Google records include search history, as well as email (via the Stored Communications Act)
- Don't forget the metadata
 - Communications patterns
 - Location
 - Timing of messages



Jurisdiction



Where Did Something Happen?

- The server is a multinational with many data centers
 - Users have no control over or even knowledge of which holds their data
- There may or may not be a content distribution network involved
- Users don't know what countries their requests or the responses pass through
 - (Twice, I've been in one country near the border but my phone was talking to a telco in another)
 - The physical routing of the fibers may be different than the apparent path given the routers' locations



Jurisdiction

- Which countries have jurisdiction over incidents?
 - What if the problem is content that is illegal in some countries but not others?
- Which companies have to respond to subpoenas from which countries?
- What if laws conflict?
- The US has the Cloud Act—but it's unilateral and unpopular abroad

'Cloud Act' Creates Threat of U.S. Espionage, Say EU Lawmakers

by [Lucian Armasu](#) February 25, 2019 at 9:30 AM -
Source: [Bloomberg](#)



According to a [Bloomberg report](#), multiple members of the European Union (EU) are worried that the United States will start to abuse the recently passed "Cloud Act" to spy on EU citizens. The U.S. law is also said to be clashing with EU's [General Data Protection Regulation \(GDPR\)](#), which is supposed to protect EU citizens' data against illegal data mining by foreigners.

<https://www.tomshardware.com/news/cloud-act-us-espionage-threat,38688.html>



Summary



It's Complicated

- The Internet has lots of moving parts
- They're constantly evolving
- Many pose legal issues
 - Even if the law doesn't change, the answers might, because the technology has changed without legislators noticing



Questions?



Photo by Steven M. Bellovin