INTERNET TECHNOLOGY: LIBERATING OR CONTROLLING?

Dr. Farid Farahmand

War & Peace Series

Updated: Fall 2016

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PART IV – ENABLING TECHNOLOGIES

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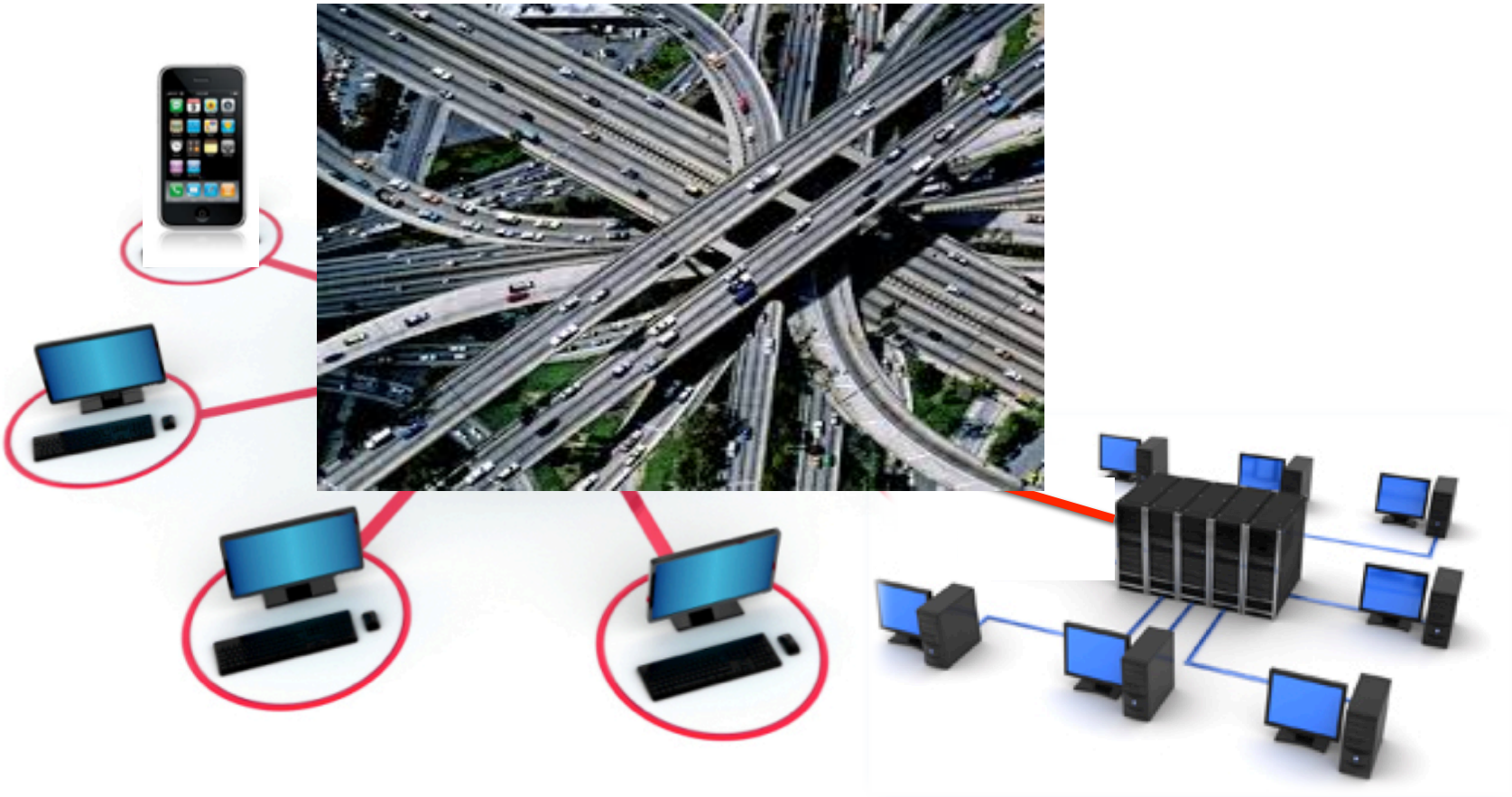
Is the Internet technology giving us more control OR taking us under control ?

What is the Internet?

- The The **Internet** is the **global system of interconnection** between devices – e.g., computers, cell phone, tablets, cars
- The Network of Networks!
- Connecting everyone together – road system!



Internet & WWW

- The **World Wide Web** is a technology that exploits the Internet to enhance delivering **many services**

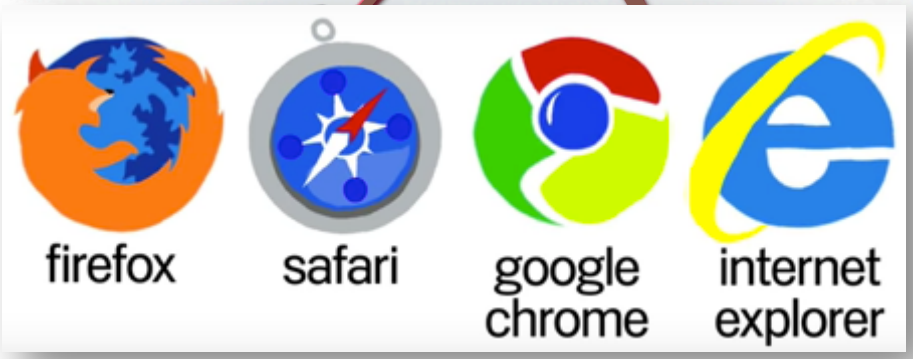
Examples of Such Services

- Finding Directions
- Shopping
- Chatting
- Music
- News
- File Sharing

Web Browsers

- The software connecting us to the Internet and allowing us to use available services
- Different in terms of
  - Speed,
  - Resource utilization,
  - Portability,
  - Etc.

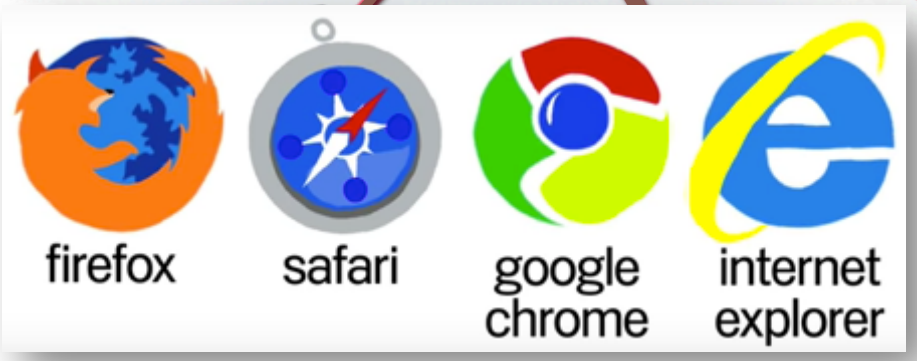
Common Browsers:



Web Browsers

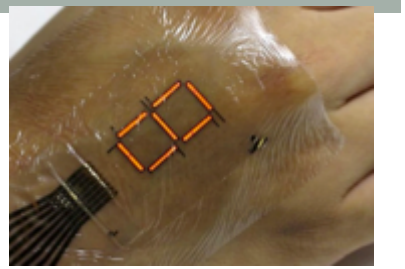
Less Common Browsers:

Common Browsers:



Access to the Internet Services

- Today about half of Internet users in the U.S. use their smartphones to get online!



Body-integrated electronic devices (Electronic Tattoo)

Watch-size Computers

Smart Phones:
Anytime, anywhere!
(smaller & more powerful)

Laptops:
Offering mobility

PCs:
Promising Individual Freedom

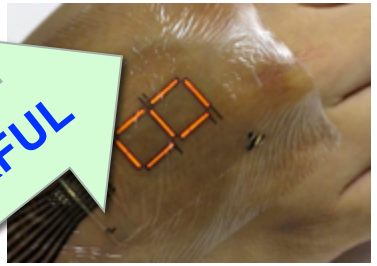
Mainframes:
Large machines,
Limited access

Access to the Internet Services

Smaller in Size

More …… POWERFUL

Electronic Tattoo



Watch-size Computer

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Offering mobi

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Anytime, anywhere!
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Promising
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Mainframes:
Large machines,
Limited access

Smartphones:

As they become smaller and more powerful
→ Integrated Part of Our Lives!

- Finding Directions
- Shopping
- Chatting
- Music
- News
- Contacts
- File Sharing
- email

1.75 Billion Cellphones in 2014
748 million Androids in 2013
125 million iPhones in 2012
53 million iPads in 2012

Smartphones:
Use Them Anywhere, Anytime!

63% keep their phone with them for ALL but an hour of a working day!

3.37 Billion worldwide email accounts

Teens send an average of **60 texts** a day,

40 percent of people with iPhones said they'd rather give up brushing their teeth for a week than go without their phone! (Chicago Tribune, 2011)

Percent who said they could only go a few hours without their mobile phone: 34%

When Was The Last Time Your Phone Was Not Within Ear Shot?

63% keep their phone with them for ALL but an hour of a working day!

79% keep their phone with them for ALL but **two hours** of a working day!

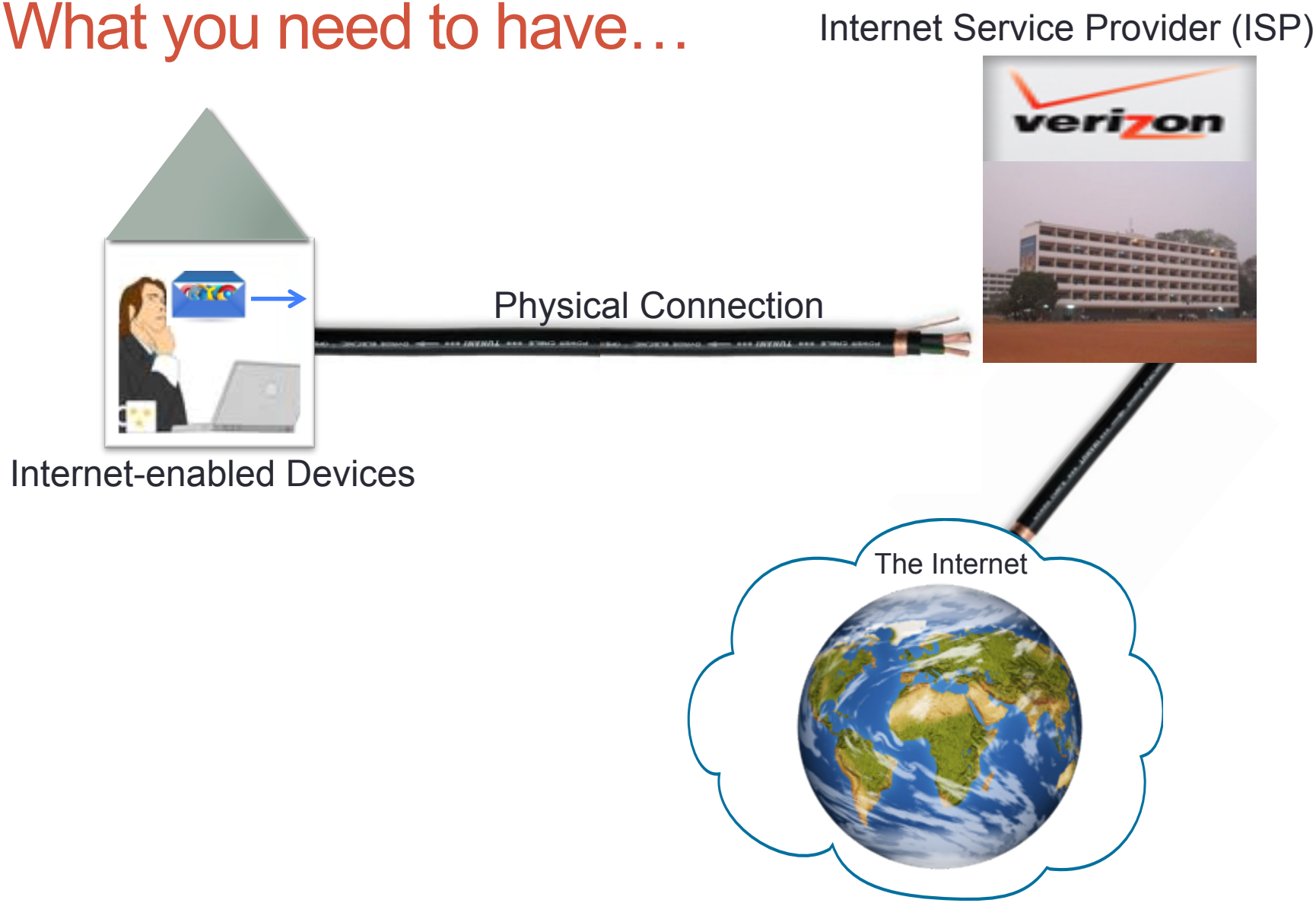
1 out of 4 does not recall the last time the phone was out of reach!

My cellphone's battery is dead!

How
THE INTERNET
Works
In Five Minutes

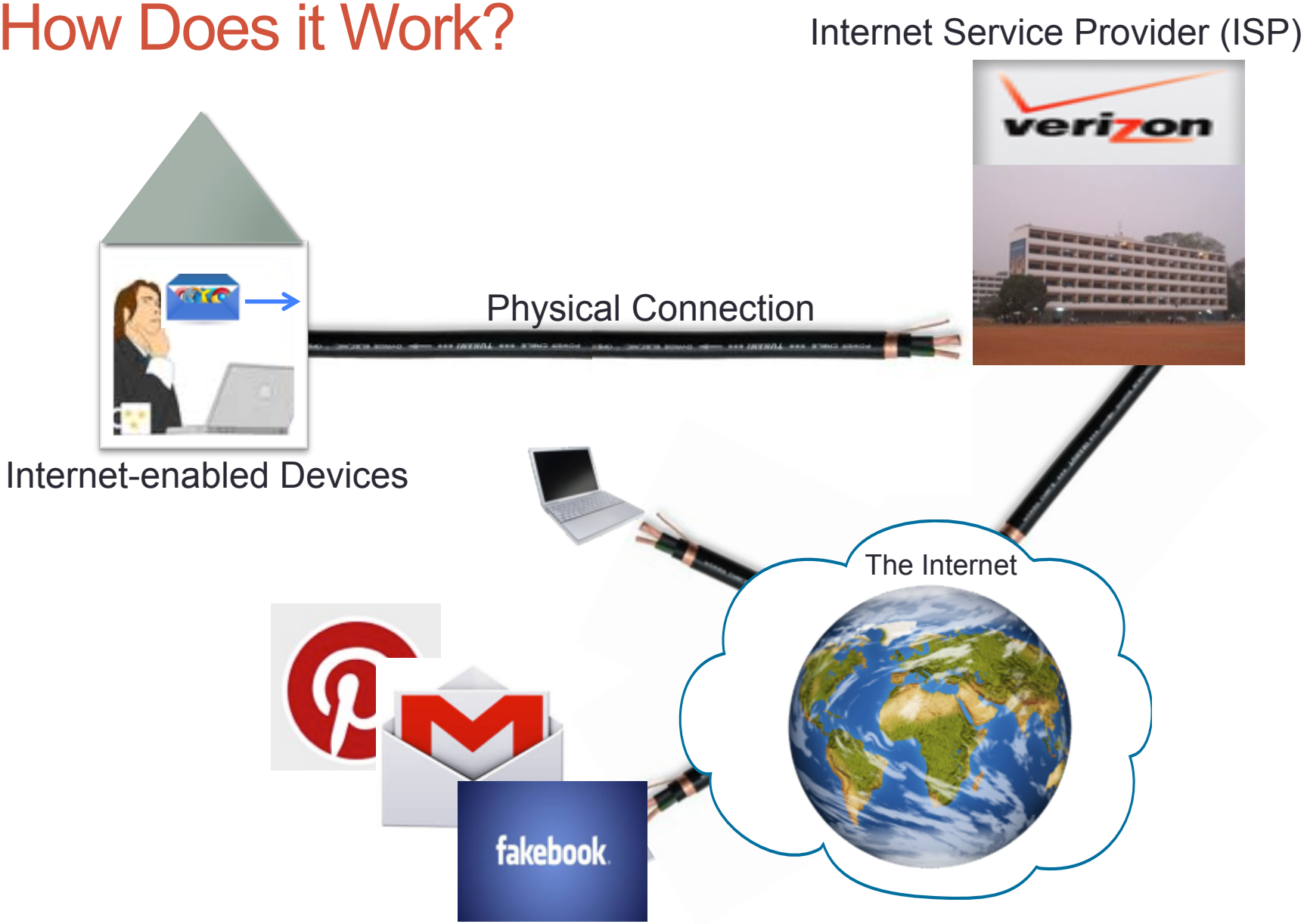
The Internet In Action

What you need to have…



The Internet In Action

How Does it Work?



The Internet In Action

Identifications….

Physical Connection

Internet Service Provider (ISP)

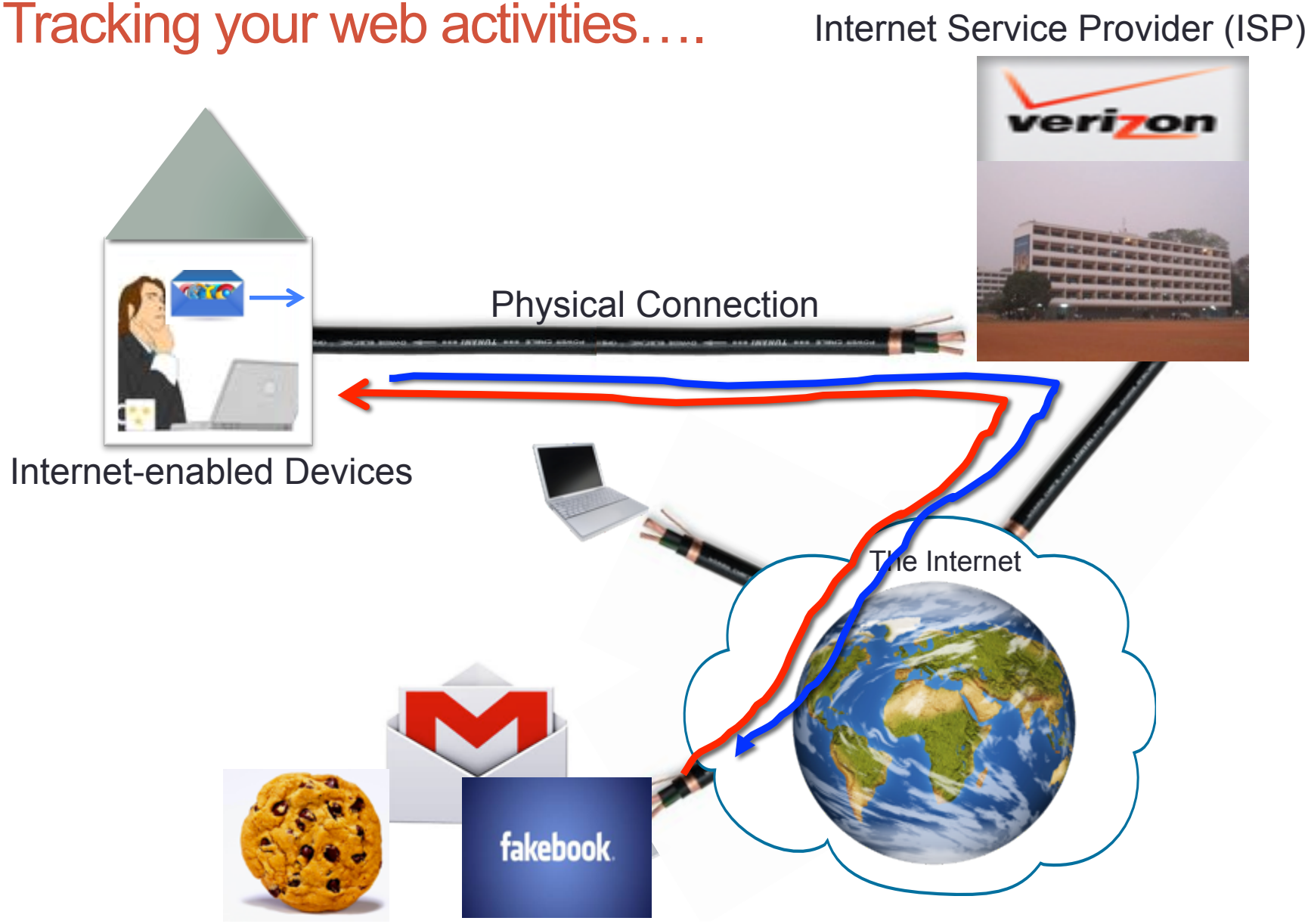
All your messages pass through the ISP

Internet-enabled Devices

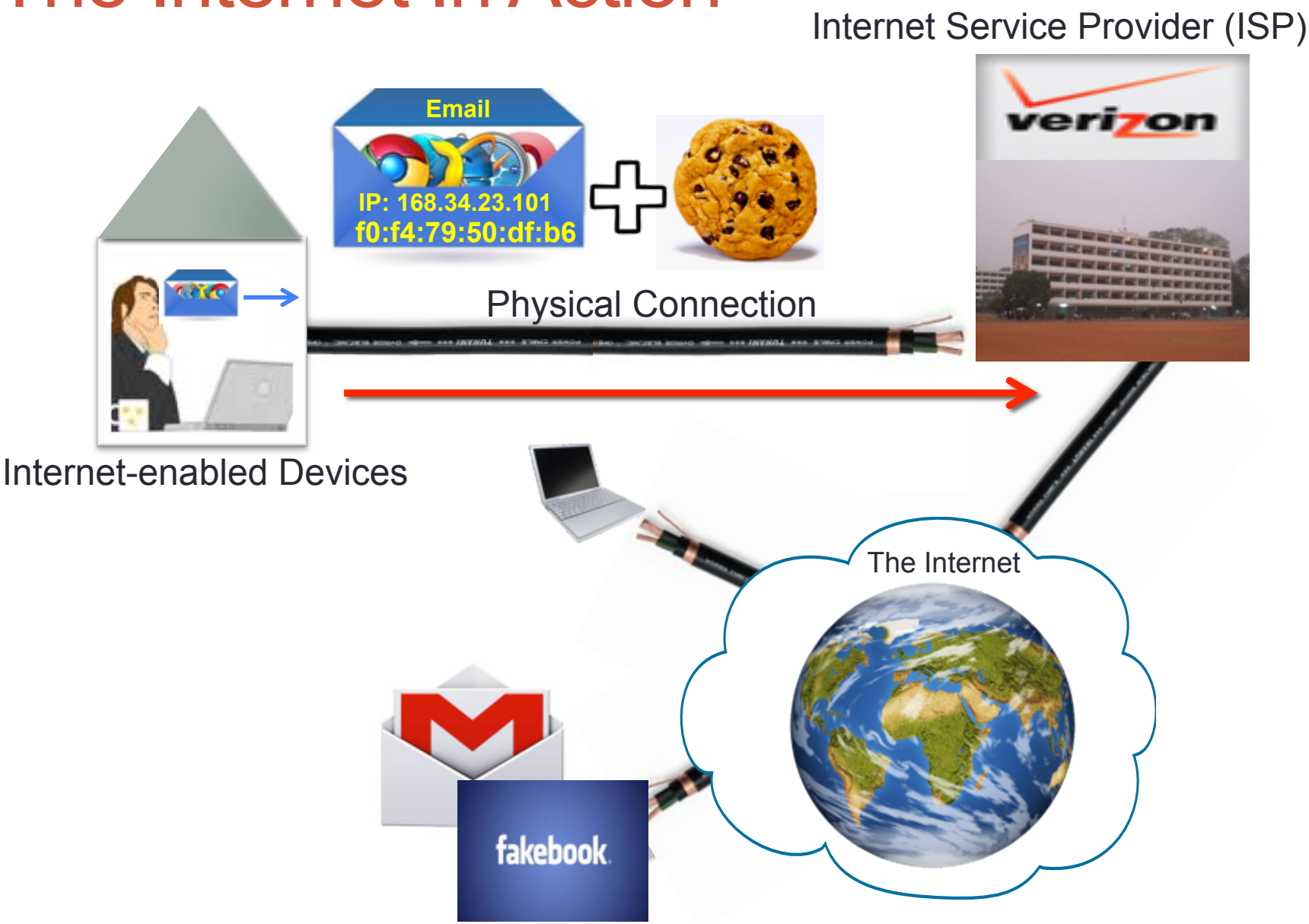
- Serial Number Identifies your machine
- The IP address identifies who you are!

The Internet In Action

Tracking your web activities….

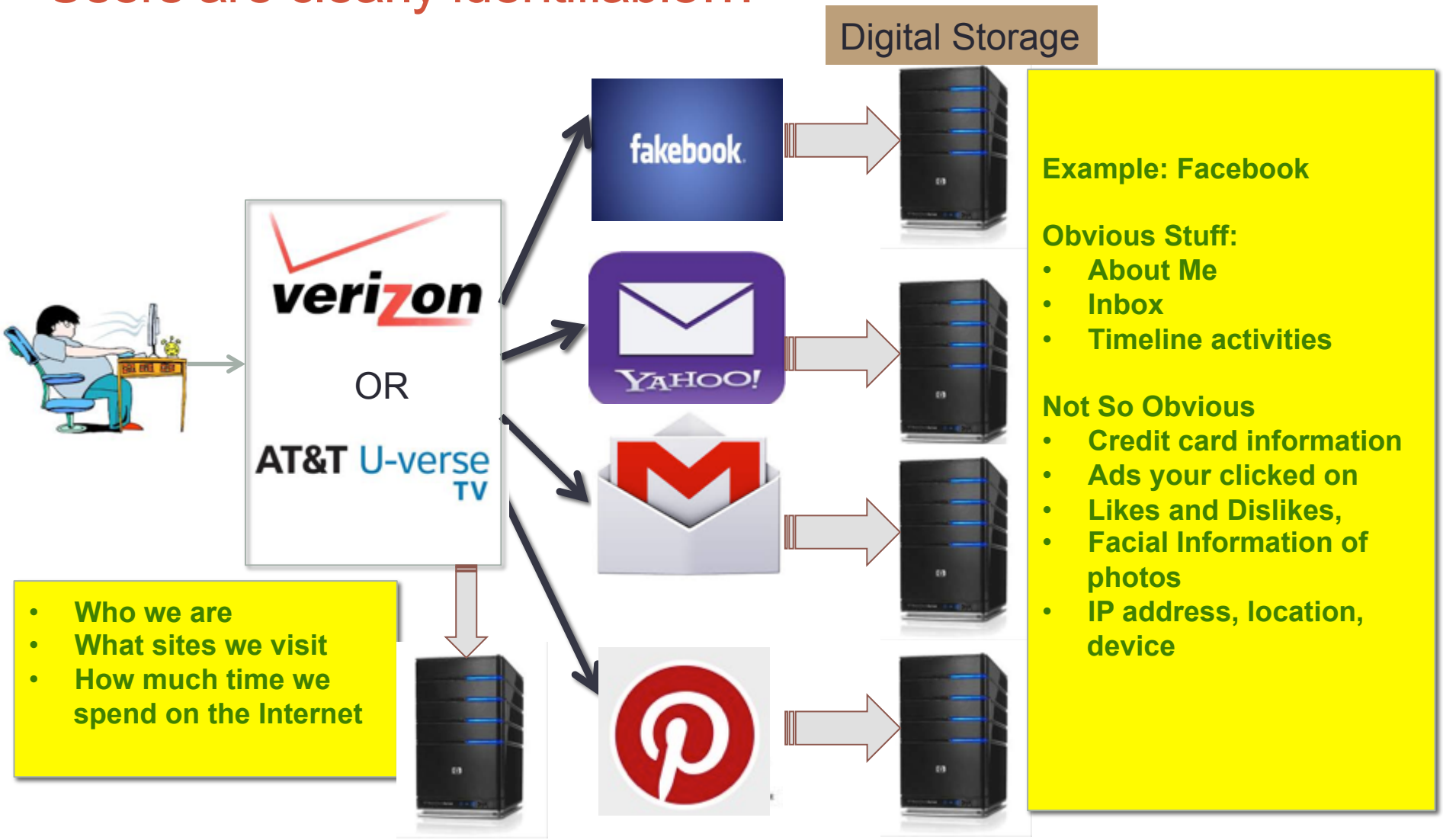


The Internet In Action



The Big Picture

Users are clearly identifiable…

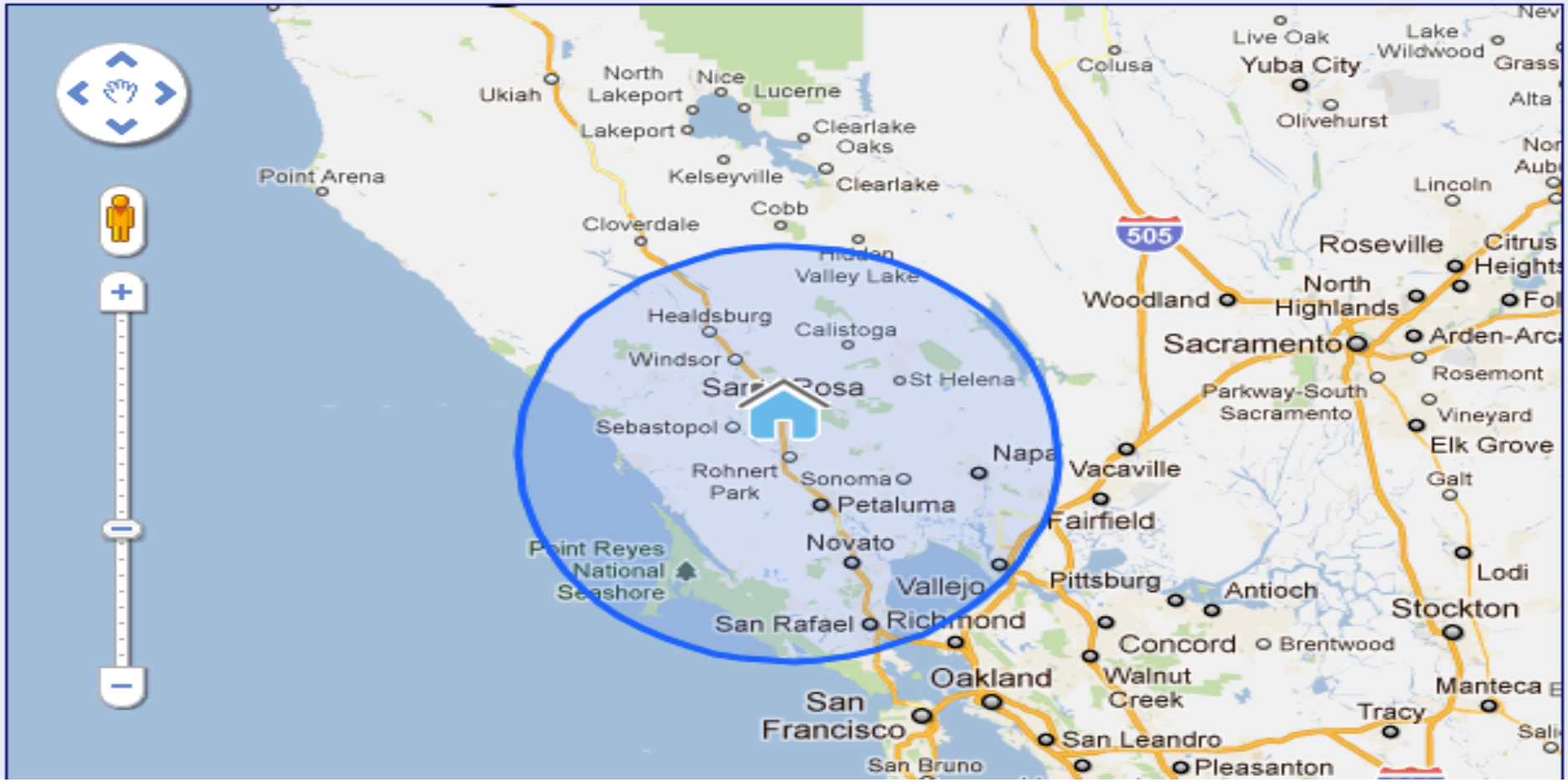


Email Header Analysis

IP Address: 130.157.158.211
Hostname: village-158-211.sonoma.edu
IP Address Country: United States
IP Continent: North America
IP Address City Location: Rohnert Park
IP Address Region: California
IP Address Latitude: 38.3433,
IP Address Longtitude: -122.7041
Organization: Sonoma State University
ISP: Sonoma State University

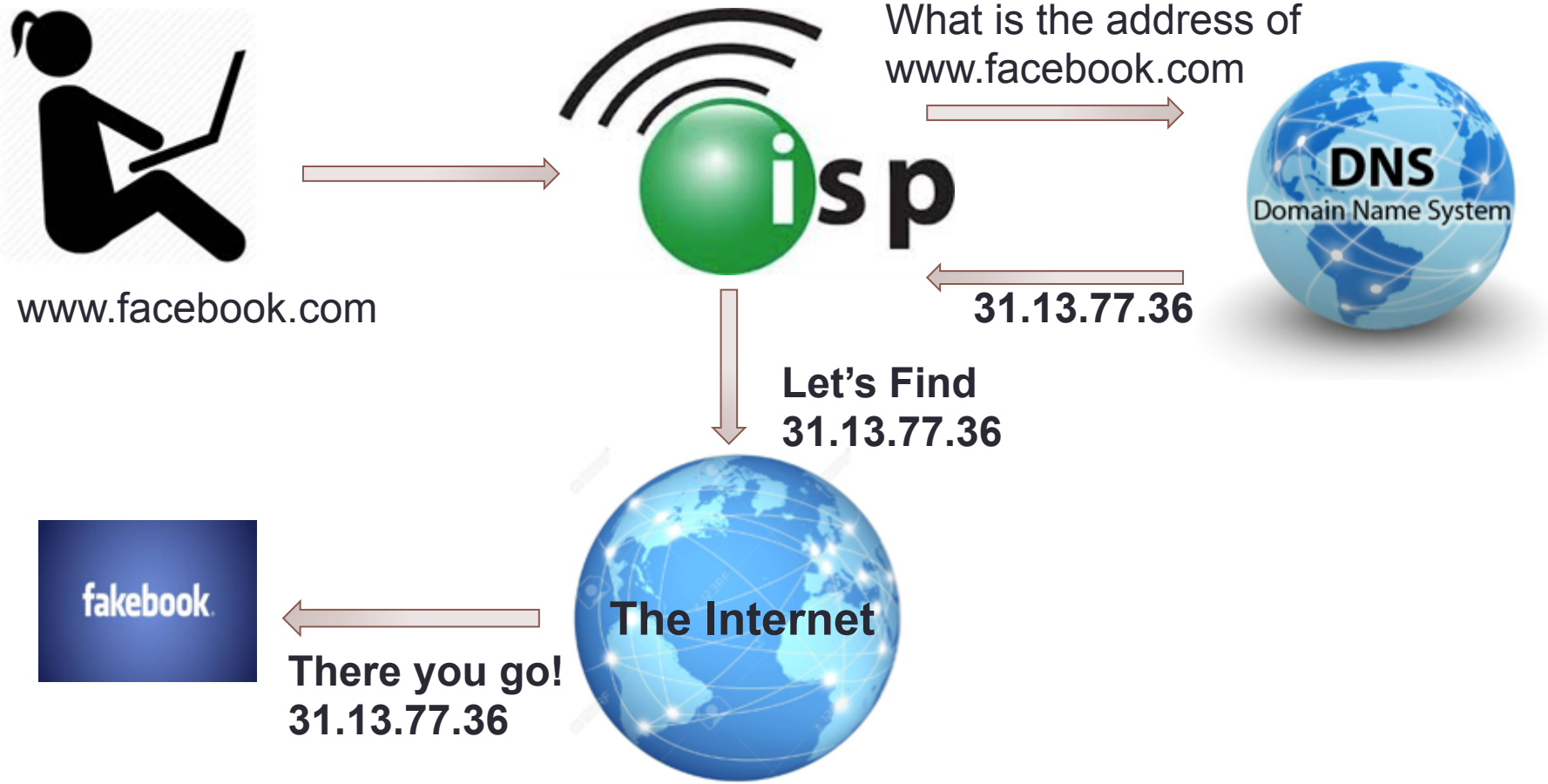
Tracking every email very simple

Email Lookup Map (show/hide)



The Internet In Action

Getting Connected to a Site Needs Name Resolution

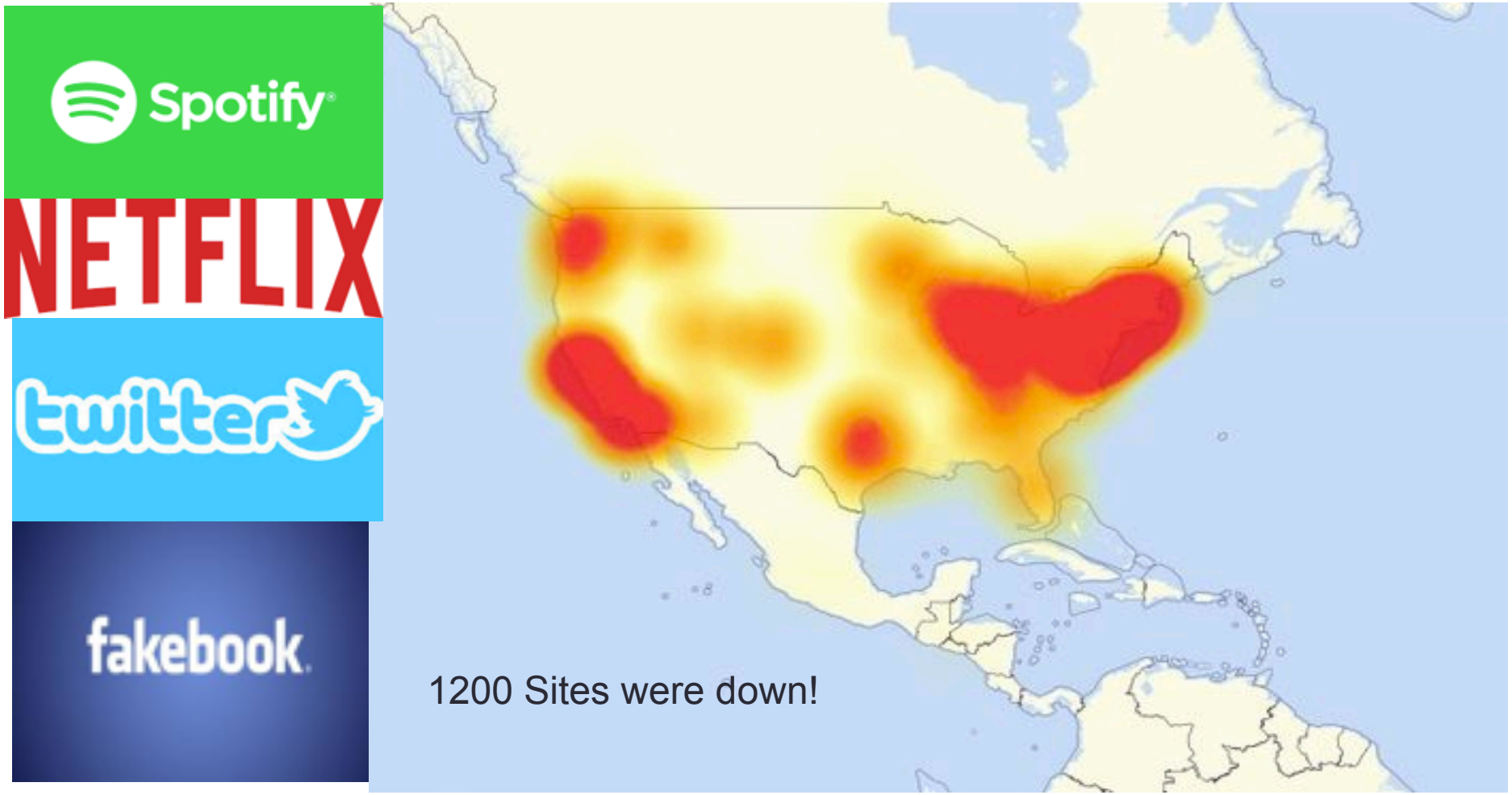


The Internet In Action

Recent Attack on DNS in East Cost!

The Internet In Action

DNS Hacked!



Getting Connected With Your Cell Phone

Internet Services

- Chatting
- Shopping
- Chatting
- Music
- News
- File Sharing

To get connected the phone uses
- Device name (MAC address)
- Device address (IP Address)

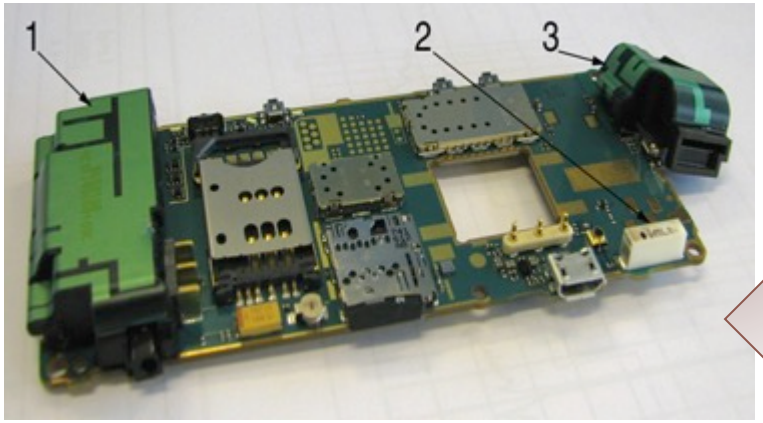
Inside Your Phone …..

1- GPS Antenna

2- GSM Antenna

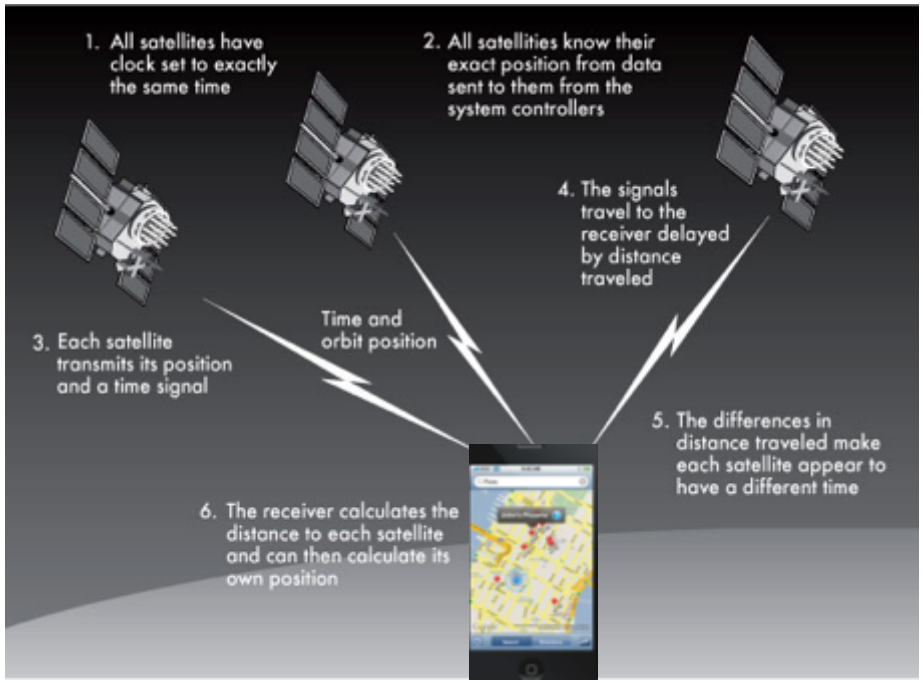
3- WiFi Antenna

4- Bluetooth Antenna



So, how can cell phones communicate?

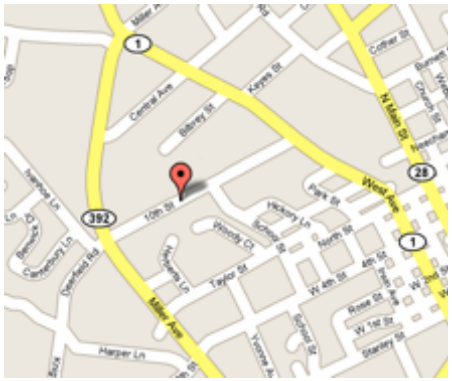
Cell Phone Tracking
Using GPS and Cell Towers



GPS Operation – providers can automatically turn it on!

Each System Has A Different Accuracy!
Does not work inside a Mall!

Closest Cell Tower



Cell tower triangulation

Intercepting Cell Phone Calls

- Magnet Corporation: their device allows users to intercept, block, follow, track, record and listen to communications using unique triangulation and other advanced technology
- Available to any government at a hefty cost …

Cell Phones Sending **Beacons**

Tracking Using Your Beacons

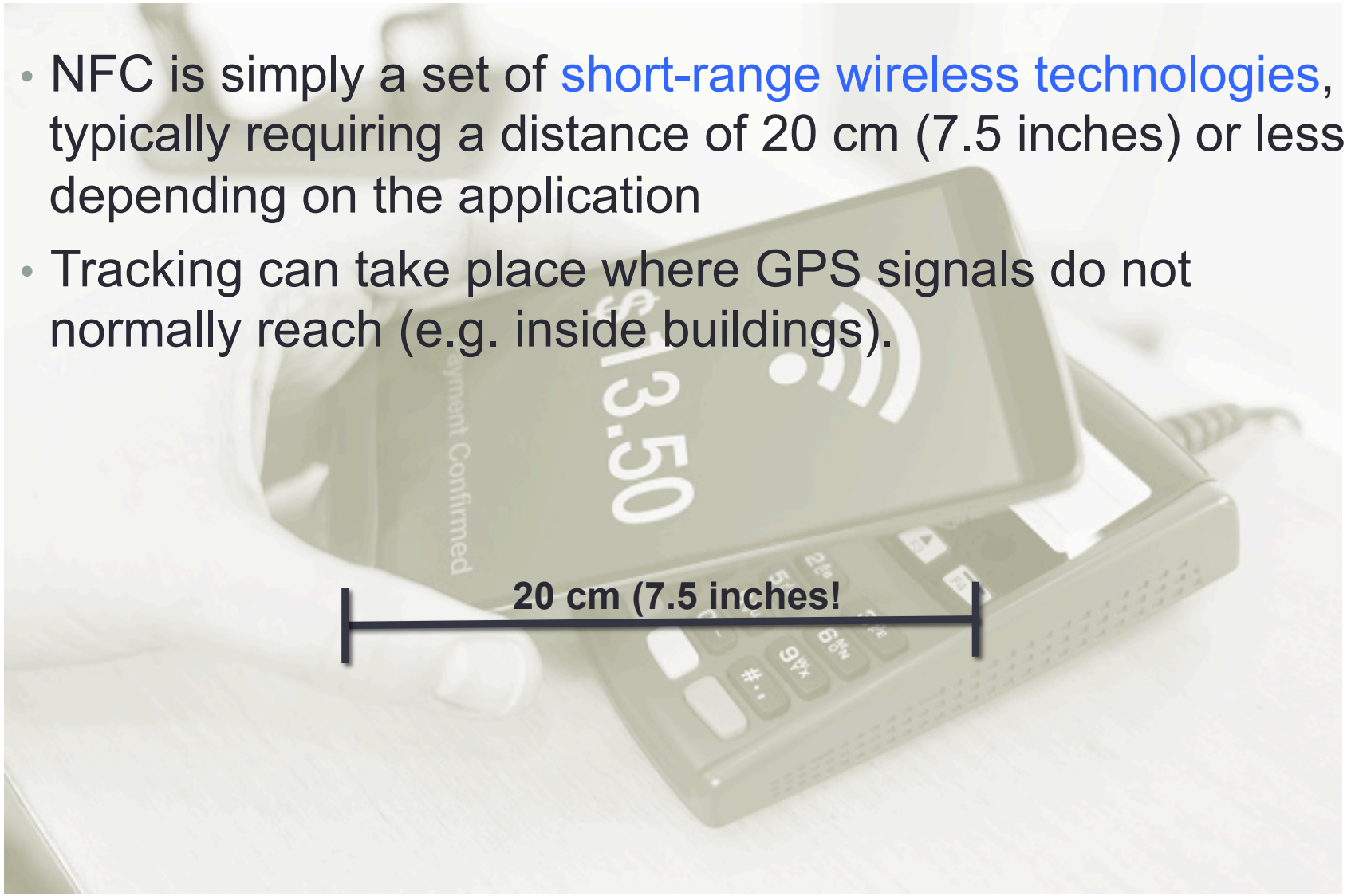
DB ID	Timestamp	MAC	AP	RSSI	Vendor
53483	2012-04-24 07:56:25	C4:2C:03:96:0E:4A		69	Apple
53482	2012-04-24 09:11:26	D8:2A:7E:10:1E:63	libelium_wsn1	60	Nokia Corporation

- How long you stood trying a merchandise
- How long you shopped
- Which stores you visited
- What are you looking for

Near Field Communication (NFC)

Near Field Communication (NFC)

- NFC is simply a set of short-range wireless technologies, typically requiring a distance of 20 cm (7.5 inches) or less depending on the application
- Tracking can take place where GPS signals do not normally reach (e.g. inside buildings).



Tracking Using Your Beacons

What is on sale!

Tracking Using Your Beacons: *Observing* Passengers at the Airport

- **Houston Airport** System has installed a Bluetooth-based, real-time queue measurement system at George Bush Intercontinental and William P. Hobby airports
- Individuals can be associated with their beacon signal (encrypted or not!)

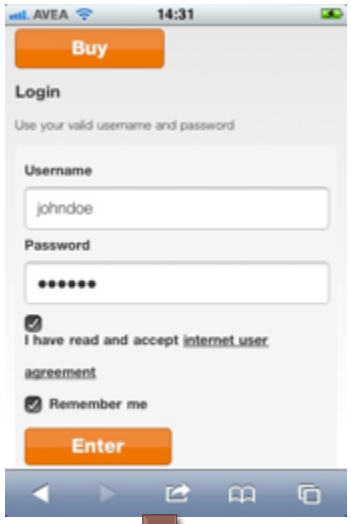
What Else Can Be Tracked?

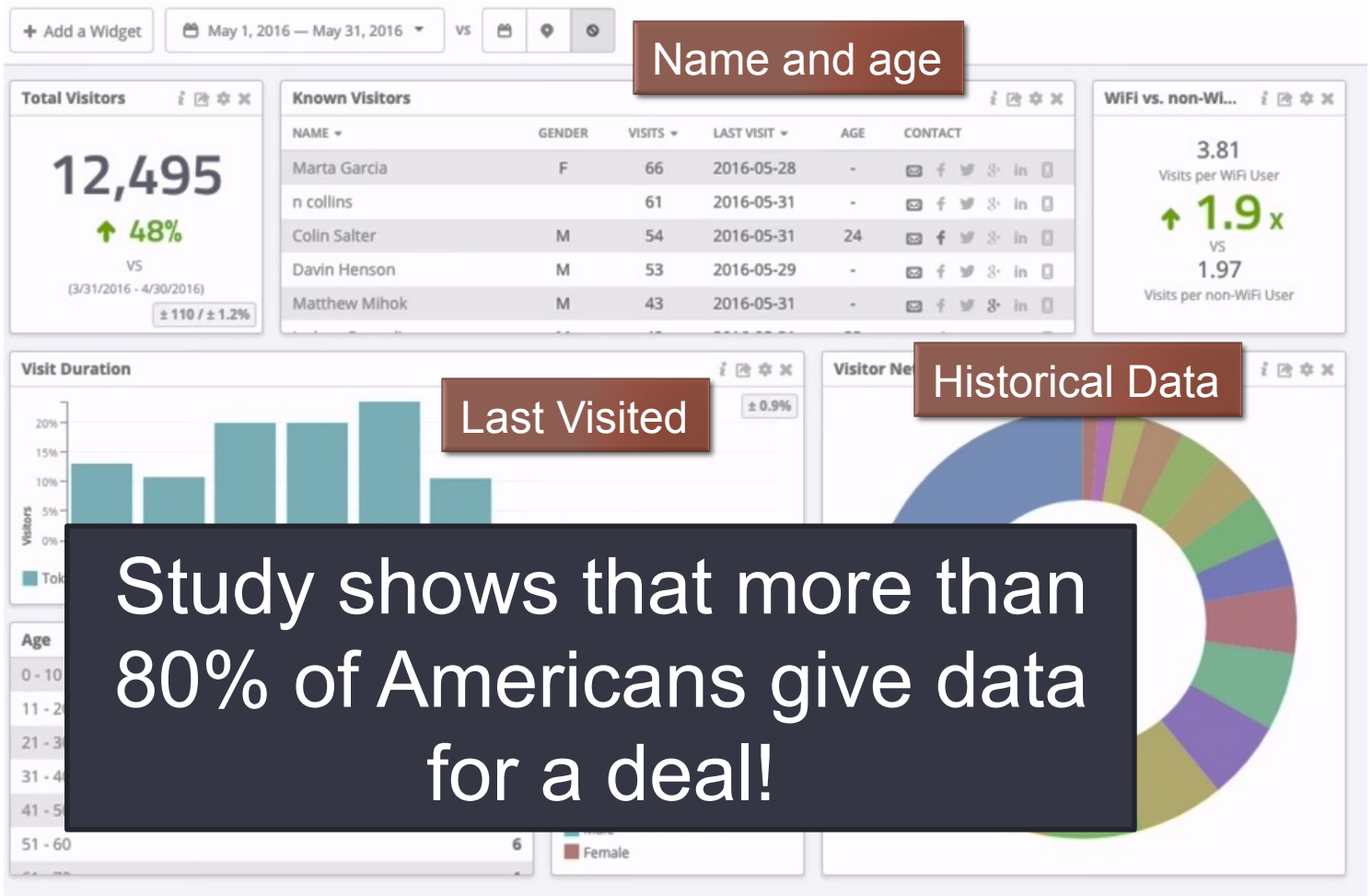
Turnstyle.com: Location Tracking & Analytics

- Find Location Habits
  - Places You Visit
  - What Time Do You Arrive
  - What Time You Leave Work
  - Your Daily Routine …..

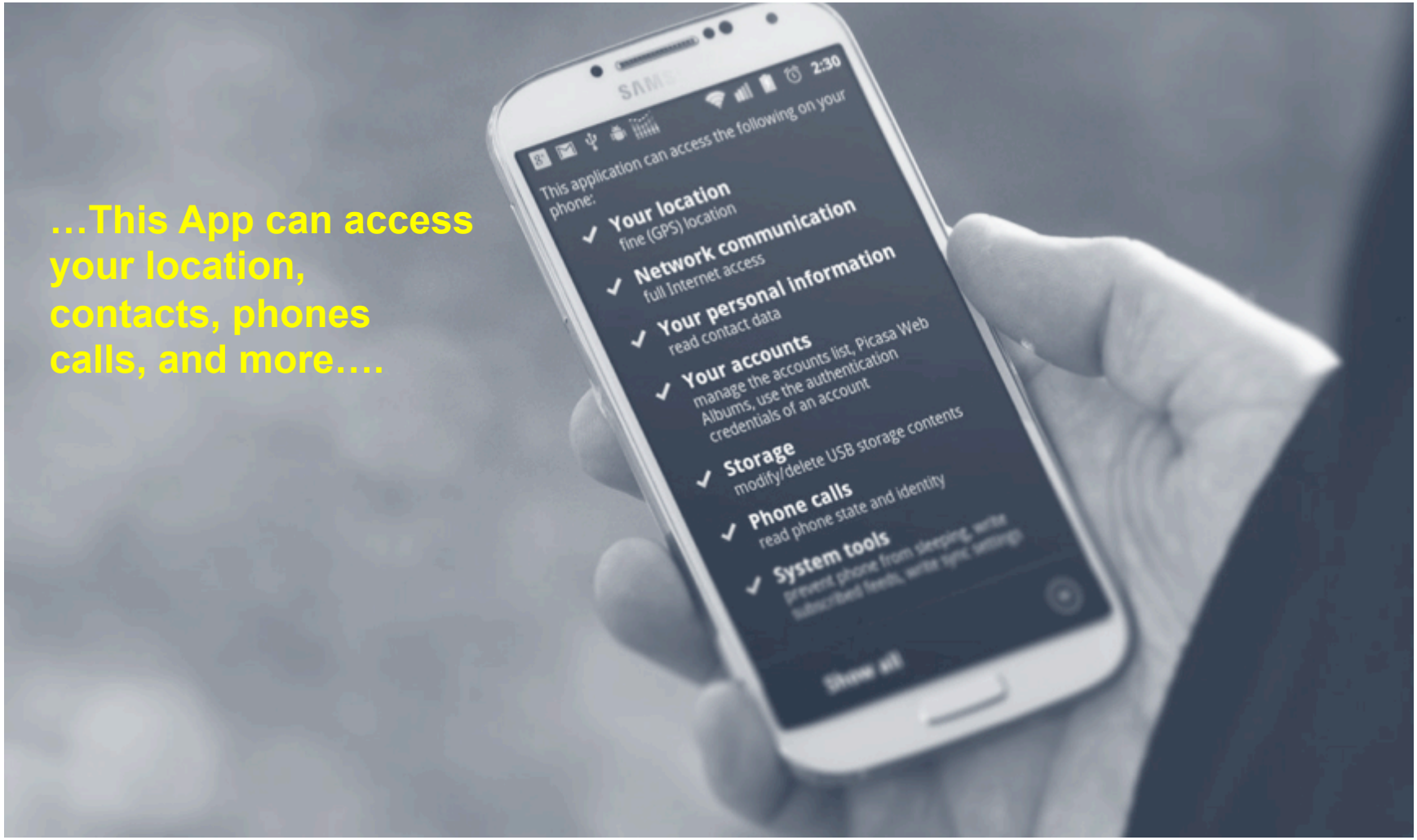
Remember:
If we are attached to our phone it is not hard to be tracked!

Tracking (or Observing) Customers….



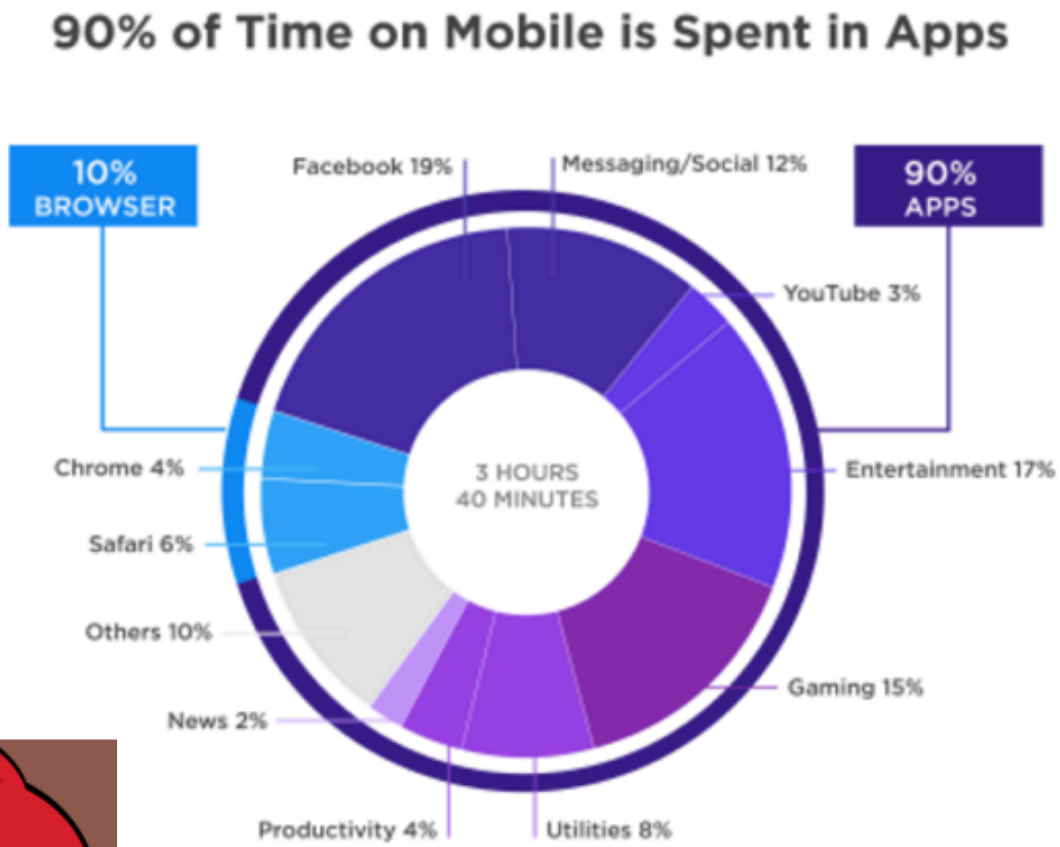


How Do APPS Track us?



Cell Phones and Apps

- Data is perhaps the most valuable currency for retailers today
- Your location is one of the most valuable things on your phone



Ever wondered why….
Angry Birds **needs to have access to your contacts!**

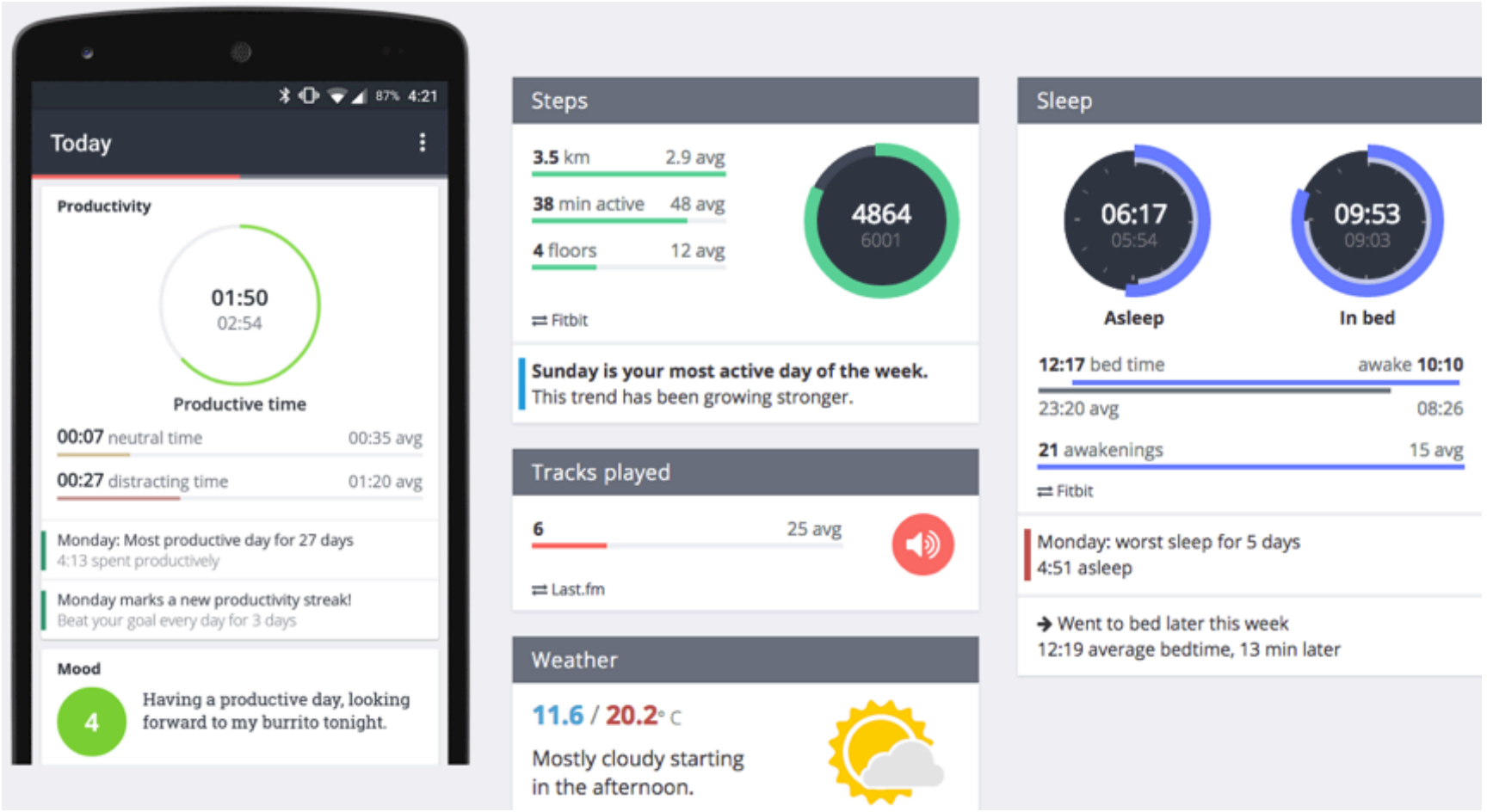
APPS Can Put Us At Risk!

- In the **HP study,** 97 percent of the apps contained some sort of privacy issue ….
- Many Apps **Access** your name, email address, phone number, home address, credit card info, and just leave it **unencrypted**, *wide open* for anyone to see

EXMAPLES

- **Starbucks** app for iOS that many use to track their coffee purchases did not use encryption when storing your login information – making them easily accessible

Track everything in one place: Understand **your life**….



Track everything in one place.
Understand **your life**….

- How much time I slept
- When did I go to bed
- What day was my active day
- How many hours I exercised
- How much German I practiced
- How much I biked

- My Daily Productivity!
- My Weekly Productivity
- Average Bed Time
- Average Active Time

Can the employer ask for similar information or your social media accounts?

Who Cares About Any of These?

Employers Asking for Passwords to Social Media Accounts

- Maryland: In 2011, state **Department of Corrections** employee Robert Collins went to his recertification interview, where he was asked to provide his **Facebook password!**
- More than a dozen states (including California, Virginia, and Illinois) now protect applicants and employees from having to provide social media passwords to employers or otherwise give employers **access to their accounts**

Custom Boarder & Protection Asking for Passwords to Social Media Accounts

- Last week, a proposal was submitted by **Customs and Border Protection** to have travelers submit their social media profile details along with their visa waiver applications if they' re-entering the United States
- The new field in which persons entering the country can declare their various social media accounts and screen names
- The information wouldn't be mandatory, but the proposed field would still provide customs officials with an unprecedented window into the online life of travelers

Your Twitter handle may soon be part of the US visa process!

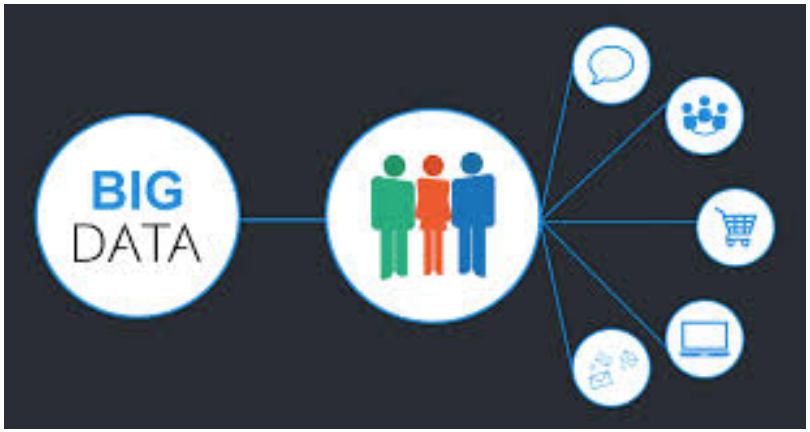
Internet has changed our lives!

Yet,
It is increasingly
becoming a tool to monitor & control!

So What Can We Do?

PERSONAL DATA BELONGS TO THE INDIVIDUAL!

- Giving data **voluntarily** is not an issue
- **Our personal data** is saved and analyzed to learn even more about us!
- There must be transparency
  - Consumers have to be **clear** about the services and what kind of data they are giving away
- Customers must have alternative choices
- The user must be allowed to remove the data



Who Is Protecting Our Personal Data?

- Keeping hackers away
- Assuring consumers their privacy

Who Is Protecting Our Personal Data?

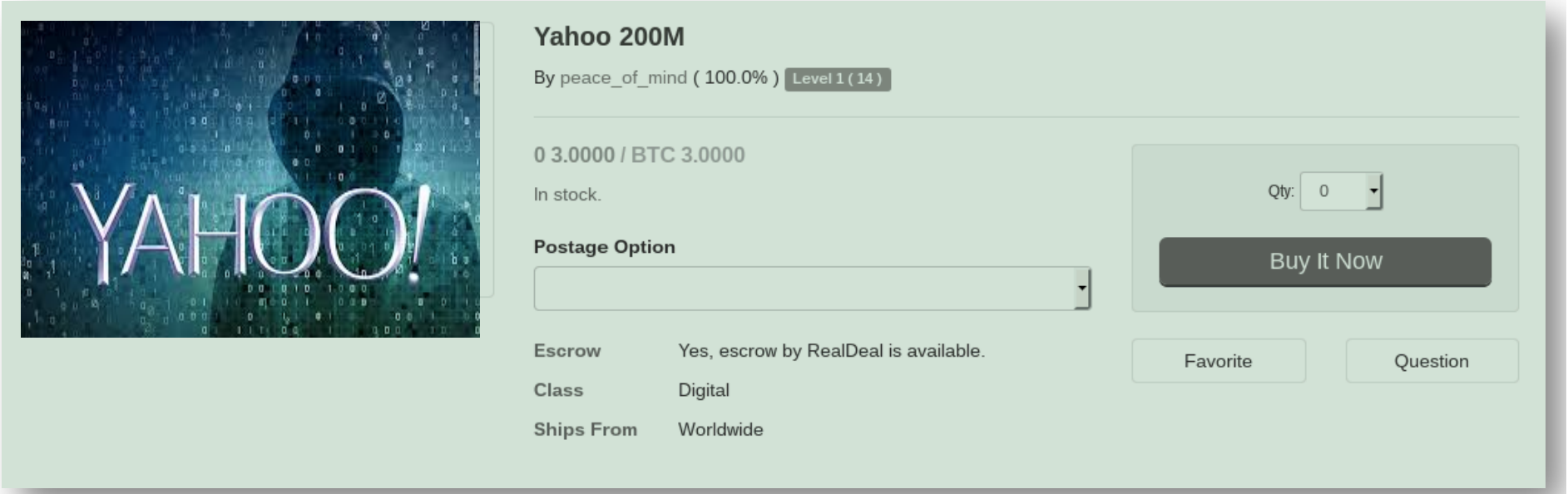
Consider recent hacks and security breaches:

- Up to 70 million customers of **Target stores** had their personal information and credit and debit card numbers compromised late last year
- **Neiman Marcus** was the victim of a similar breach in December & more than 1.1 million customers were affected
- **Yahoo** announced hackers swiped personal information associated with at least a 200 million accounts

Who Is Protecting Our Personal Data?

Consider recent hacks and security breaches:

- The Yahoo hack became known in August when an infamous cybercriminal named “**Peace**” said on a website that he was selling credentials of 200 million Yahoo users from 2012 on the **dark web** for just over $1,800



Final Remarks…..

- Technology certainly facilitates our lives but we should not be blind to it and just accept it!
  - Don’t take it as granted!
  - We should educate ourselves
- The tracking technologies are part of our communication systems; advertisers and governments exploit these technologies
  - Be aware
  - Understand the risks
- Learn about technology
  - Be a part of the discussion
  - We need to have multidisciplinary groups designing our tools…

Final Remarks…..

Remember…..

References

- References are available here: https://www.diigo.com/user/faridfarahmand/war_and_peace

Any Questions?

For more information contact:
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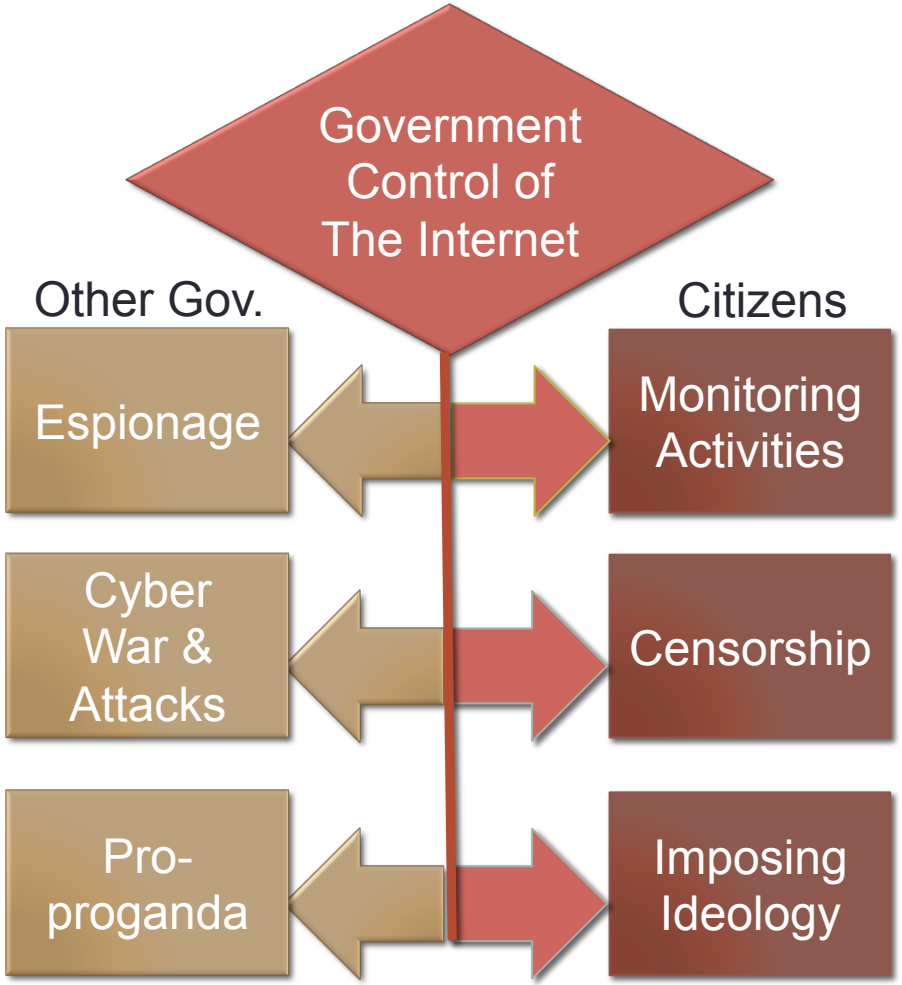
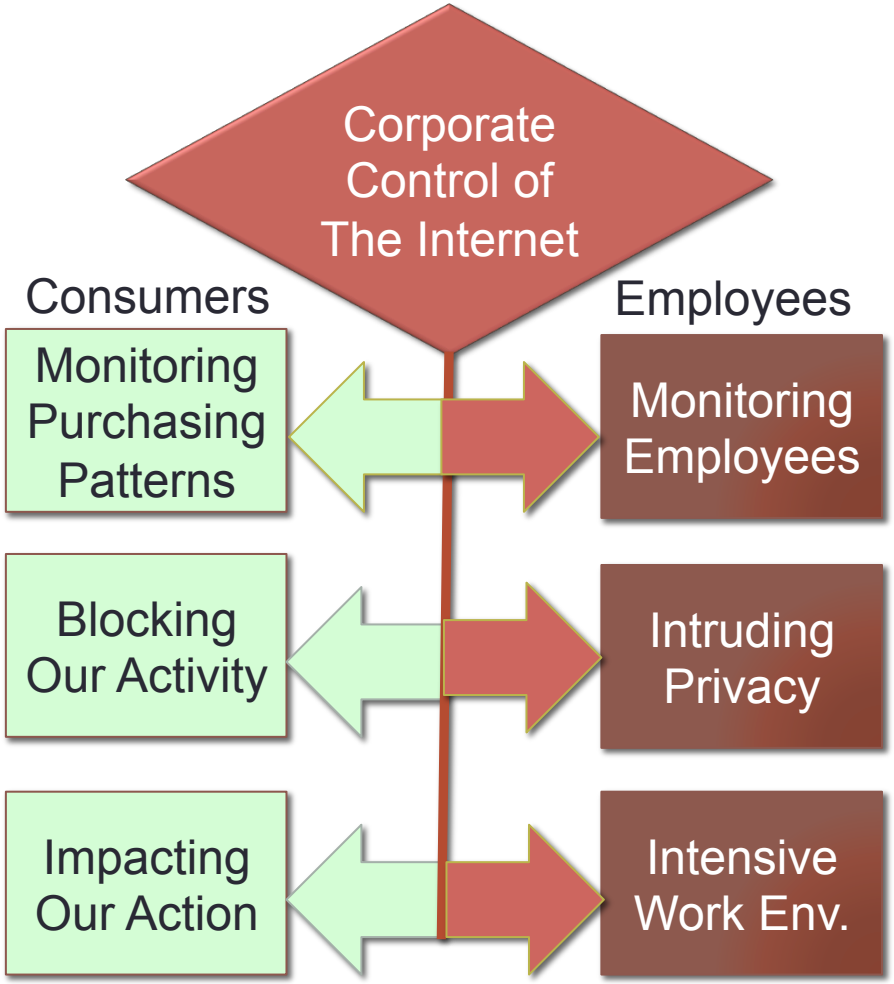
farid.farahmand@sonoma.edu

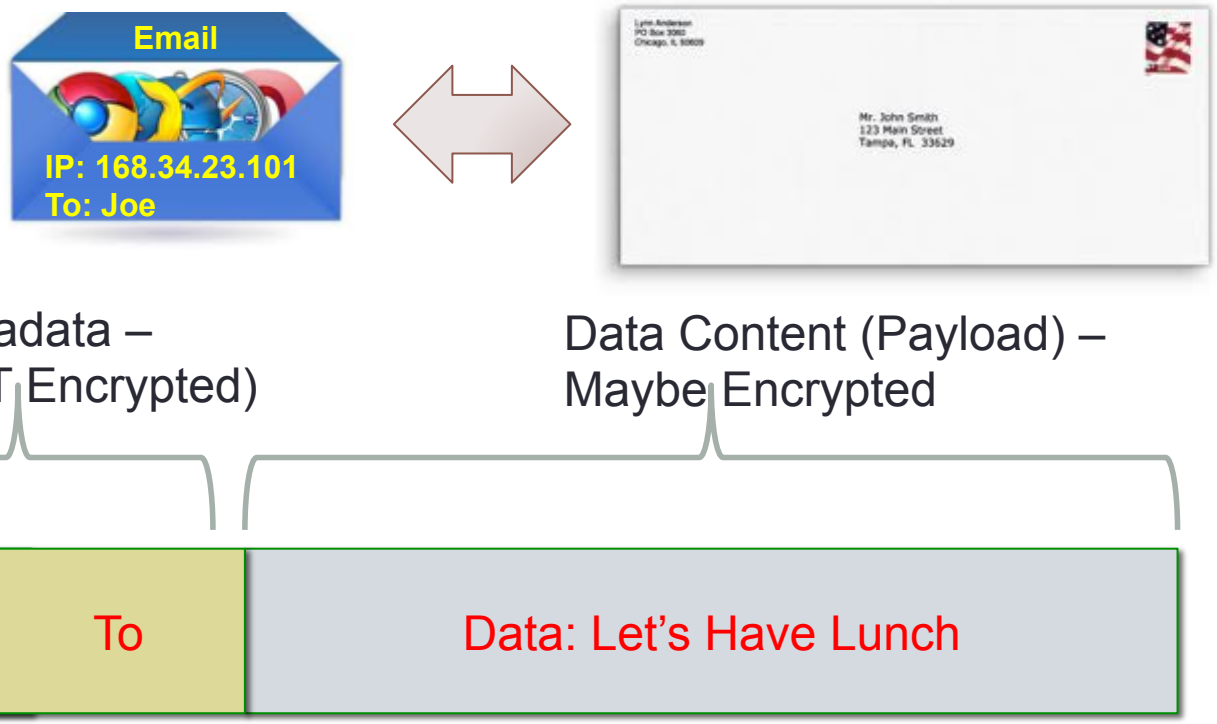
Internet: Enabling Technology of Control - Government Control



Internet: Enabling Technology of Control

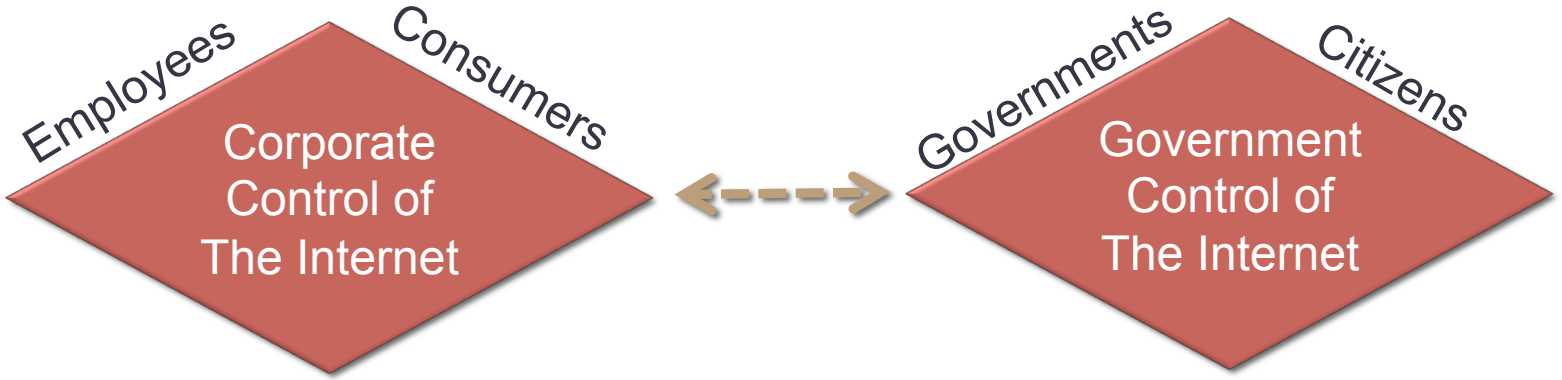


The Internet In Action –
Metadata Monitoring



Internet: Enabling Technology of Control

…for justifiable reasons!



1-National Security
- Terrorism
- Preserve sovereignty

2-National Laws
- cyber crime
- child porn.,
- Gambling,
- Intel. property rights,
- etc.)