HOW THE INTERNET WORKS: BROWSING

Anne's Computer

Anne visits news.com and logs in to her account. This diagram shows what can be collected along the way, depending on whether she connects to the website via http or https (shown as http:// or https:// in the browser bar).

HTTP
From: Anne's computer
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

HTTPS
From: Anne's computer
To: https://news.com
+ Time, date & other metadata

Anne's Router

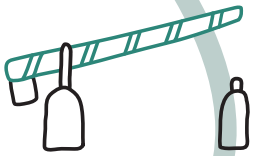
Anne's ISP

HTTP
From: Anne's router
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

HTTPS
From: Anne's router
To: https://news.com
+ Time, date & other metadata

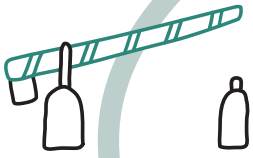
HTTP
From: Anne's ISP
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

HTTPS
From: Anne's ISP
To: https://news.com
+ Time, date & other metadata



National Gateway

Routing Server



National Gateway

HTTP
From: Anne's ISP
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

HTTPS
From: Anne's ISP
To: https://news.com
+ Time, date & other metadata

Website's ISP

Website Owner

HTTP & HTTPS
From: Anne's ISP
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

Parent Companies of Website Trackers

Notes

1. This is a simplified representation. Your traffic will pass through many more pieces of infrastructure.
2. Data travels in both directions. You send a request to the website server, and it sends a response back.
3. Every device in the diagram has a unique identifying MAC address. This includes your computer.

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HOW THE INTERNET WORKS: BROWSING VIA VPN

Anne visits news.com via a secure VPN. She logs in to her account. This diagram shows what can be collected along the way, depending on whether she connects via a secure HTTPS or insecure HTTP connection.

Anne's Computer

Anne's Router

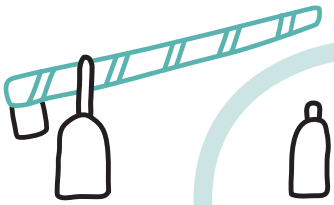
From: Anne's Computer
To: VPN Provider
+ Time, date & other metadata

Anne's ISP

From: Anne's Router
To: VPN Provider
+ Time, date & other metadata

From: Anne's ISP
To: https://news.com
+ Time, date & other metadata

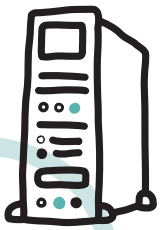
VPN Provider



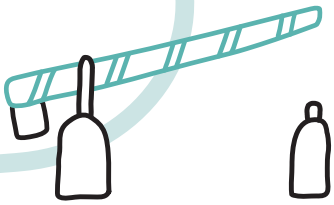
National Gateway

HTTP
From: VPN Provider
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

HTTPS
From: VPN Provider
To: https://news.com
+ Time, date & other metadata



Routing Server



National Gateway

Website's ISP

HTTP
From: VPN Provider
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

HTTPS
From: VPN Provider
To: https://news.com
+ Time, date & other metadata

Website's Owner

HTTP & HTTPS
From: VPN Provider
To: http://news.com
+ Time, date & other metadata
+ Pages visited
+ Login & password
+ Browser fingerprint

Notes

1. This is a simplified representation. Your traffic will pass through many more pieces of infrastructure.
2. Data travels in both directions. You send a request to the website server, and it sends a response back.
3. Every device in the diagram has a unique identifying MAC address. This includes your computer.

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HOW THE INTERNET WORKS: WEBMAIL

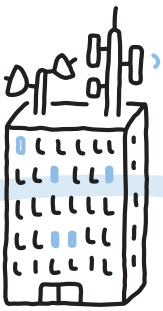
Through his browser, John logs in to his webmail account and sends an email to Anne. This diagram shows what can be collected along the way.

John's Computer

https://post.com
From: John@post.com
To: Anne@mail.com
Subject: Long time!

John's Router

From: John's computer
To: John's webmail provider
+ Time, date & other metadata
+ Email contents (unless encrypted)

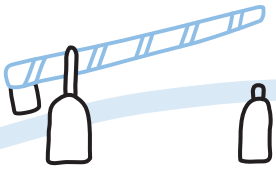


John's ISP

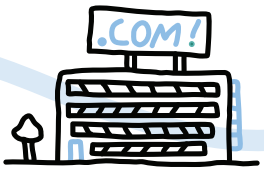
From: John's router
To: John's webmail provider
+ Time, date & other metadata
+ Email contents (unless encrypted)

John's Webmail Provider's ISP

From: John's ISP
To: John's webmail provider
+ Time, date & other metadata
+ Email contents (unless encrypted)

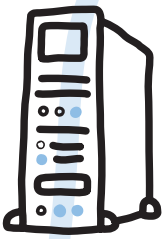


National Gateway



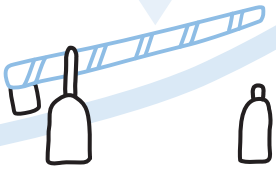
John's Webmail Provider (post.com)

From: John's ISP
To: Anne's webmail provider
+ Time, date & other metadata
+ Pages visited
+ Login & Password
+ Browser fingerprint
+ Email contents (unless encrypted)



Routing Server

From: John's webmail provider
To: Anne's webmail provider
+ Time, date & other metadata
+ Email contents (unless encrypted)

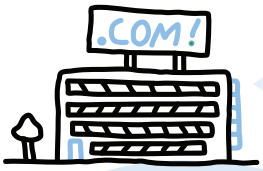


National Gateway

From: John's webmail provider
To: Anne's webmail provider
+ Time, date & other metadata
+ Email contents (unless encrypted)

Webmail Provider's ISP

to Anne's ISP and beyond



Anne's Webmail Provider (mail.com)

From: John's webmail provider
To: Anne's ISP
+ Time, date & other metadata
+ Pages visited
+ Login & Password
+ Browser fingerprint
+ Email contents (unless encrypted)

Notes

1. This is a simplified representation. Your traffic will pass through many more pieces of infrastructure.
2. The diagram assumes a secure HTTPS connection between John's computer and his webmail provider.
3. Data travels in both directions. You send a request to your email provider, and it sends a response back.
4. Every device in the diagram has a unique identifying MAC address. This includes your computer.
5. The only way to be 100% sure an email is encrypted is to do it yourself, using something like GPG.

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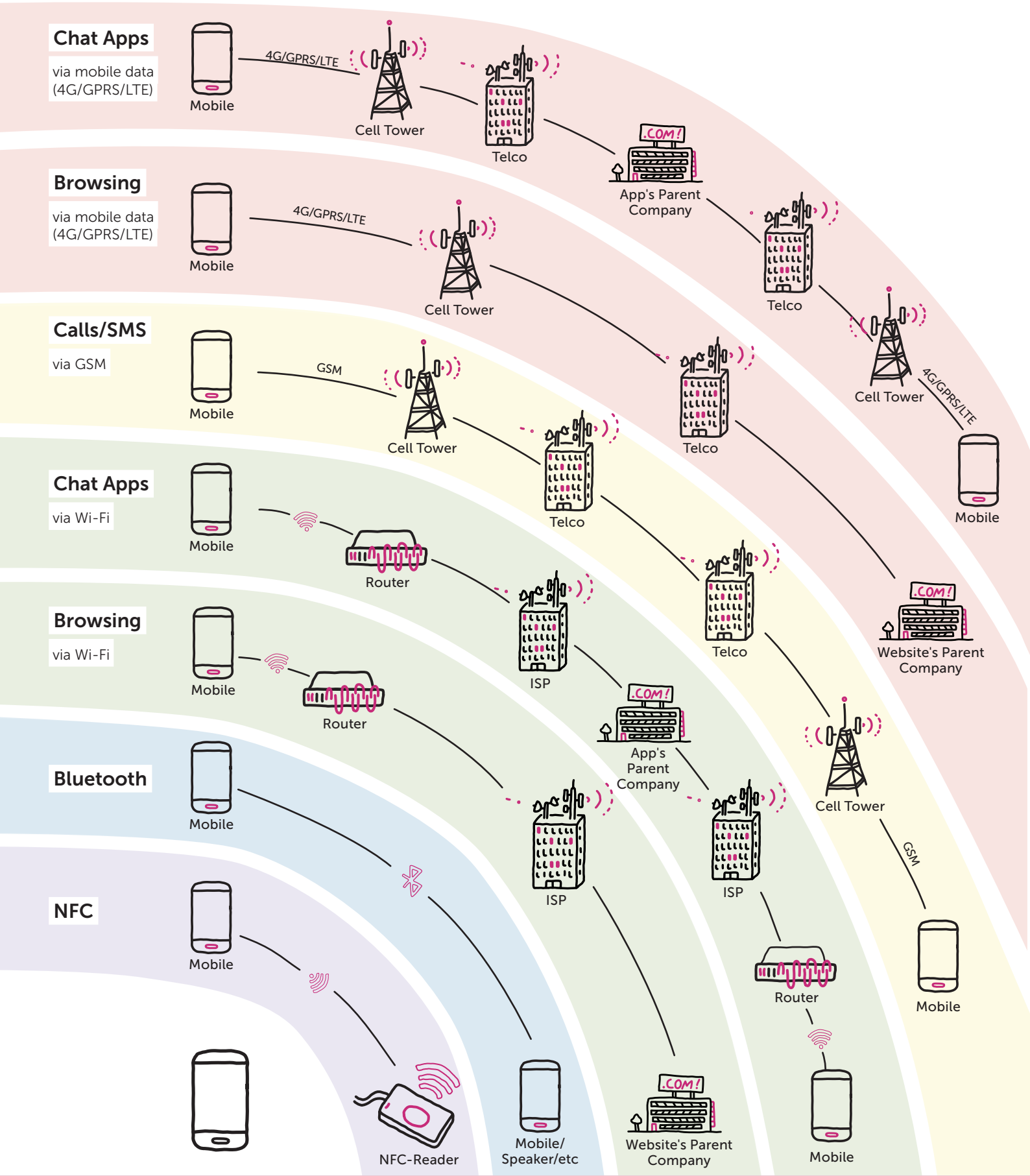
HOW MOBILE COMMUNICATION WORKS



Notes

1. Each colour in the diagram represents a specific frequency band of the radio spectrum.
2. This is a simplified representation of mobile communication.
3. Your communication passes through many more pieces of infrastructure, including servers and national gateways. Each parent company also has its own ISP.

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GLOSSARY

Me and My Shadow is a project by
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GPRS/3G/4G/LTE
Wireless mobile telecommunications technologies.

Bluetooth
Wireless technology that allows devices to connect and exchange data over short distances

Browser fingerprint
Unique identification pattern created by the specific configuration and use of your device (language settings, browser version and type, display resolution, etc). Shared by your browser.

Browser history
List of web pages you've visited, usually recorded by default by your browser.

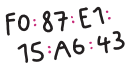
Cell Tower
Elevated structure that houses antennas and equipment that support cellular commnunications.

GSM (Global System for Mobile Communication
Standard mobile telecommunications protocol that provides wireless transmission of voice calls and SMS.

HTTPS
Protocol that creates an encrypted connection between your device and a website. Shown as **https://** or a small lock symbol in the browser bar, instead of the default **http://**.

IP (Internet Protocol) address
Unique number assigned to each device connected to a computer network or the internet, enabling it to exchange data with other devices on the network. Your IP also shows ***where*** you are connecting from

ISP (Internet Service Provider)
Company or organisation that provides your internet connection.



MAC (Media Access Control) address
Unique number assigned to each device, enabling it to connect to, and be identified on, the network.

National Internet Gateway
Physical infrastructure through which internet traffic travels across national boundaries.

NFC (Near-Field Communication)
Protocol that enables communication between two devices over a very short distance: e.g. smartphones, or a smartphone and an NFC Reader.

Router
Device that connects and directs internet traffic (e.g. connects 'home' devices to the internet).

Server
Combination of computer program and device that provides specific services for other computers to access (for example hosting a website or routing traffic from one point to another).

Telco (Telecommunications Company)
Provides your connection to a telecommunications network.

Wi-Fi
Technology that enables network connectivity via radio waves (wireless), enabling devices to connect to computer networks.