Who can know everything about me?

IS THE INTERNET EVERYWHERE?

The code can always be cracked

Who's the boss?

Every lock has a key

Internet knows best?

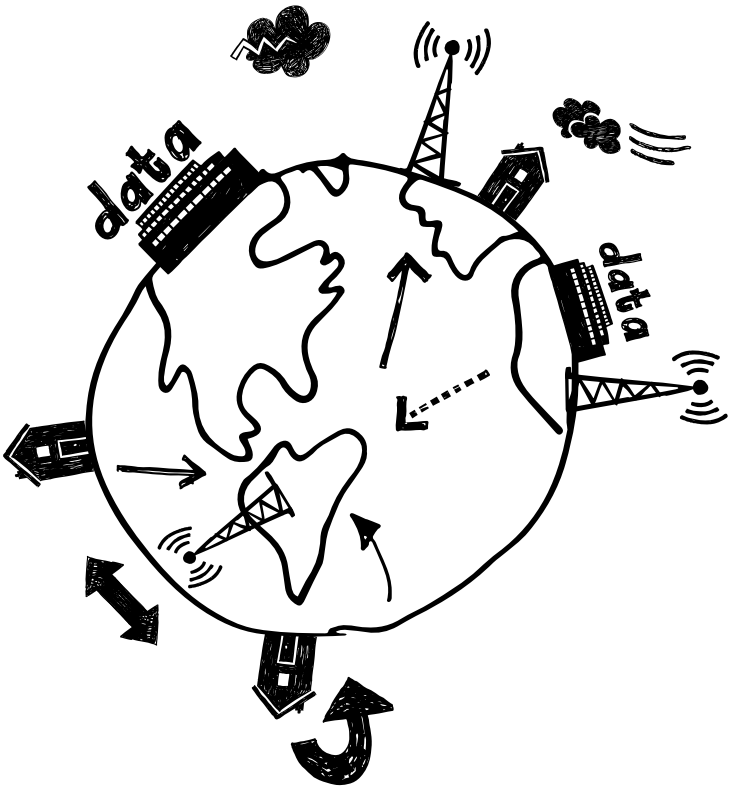
SIDNfonds FONDS21 BITS OF FREEDOM VERDEDIGT DIGITALE BURGERRECHTEN waag society NET WERK DEMO CRATIE

IS THE INTERNET EVERYWHERE?

WHO IS THE BOSS OF THE INTERNET?

SUMMARY OF THE CONTENTS

The Internet is pretty invisible. We are almost always connected to the Internet and don't even notice when we're online. But are we really always online? Where does the Internet begin? And where does it end?



The Internet is a web, it is a worldwide network that is used to share information. Everyone who uses the Internet becomes a part of this network.

A picture, email or Whatsapp message traveling from one Internet user to another, travels past transmission towers, data centres and very large Internet cables, spread out all over the world, before it meets its destination.

THIS IS HOW INTERNET WORKS:

When you want to send a message online, your computer or smartphone has to be connected to an Internet cable (that goes into the ground) or a wifi network or 4G network (that goes through the air).

HOW IS THIS MODULE SET UP?

Step 1 - How do you think the web works?

- We will map which elements are part of the Internet and how these elements collaborate to send a message.

Step 2 - Greg's Cable Map

- The website Greg's Cable Map (cablemap.info) shows us how many Internet cables there are in the world. These cables carry the information we send each other on the Internet. (We almost never use satellites for this!)

Step 3 - Build the Internet

- We will build different journeys of Internet messages. The challenges will get harder and harder, but once you get the hang of it you will be building the entire Internet in no time. Using only straws and sponges...

A **wifi network** runs through a **wifi-router**, where the information is sent into Internet cables.

A **4G network** runs through a **transmission tower**, where the information is sent into Internet cables.

Internet cables carry the information to data centres. **Data centres** are very large buildings that are full of servers. **Servers** store information and send it through to the right recipient(s).

After information passes through the **data centre**, the journey to the right recipient is about the same: information travels through an Internet cable in the direction of the recipient. It goes to a transmission tower (when the recipient is on a 4G network) or to a wifi-router (if the recipient is on a wifi network with its **laptop** or **smartphone**). When your phone doesn't have an Internet connection, you might not be close enough to a transmission tower to make a connection. But this rarely happens anymore.

How to organize this module:

TIME: PART:

10 min. **Introduction**

The Internet is pretty invisible. We are almost always connected to the Internet and don't even notice when we're online.

Ask the students questions to warm up:
- Are we really *always* online?
- Where does the Internet begin?
- And where does it end?

20 min. **Step 1 - How do you think the web works?**

In groups of 3 to 5 students.

You send a Snapchat message to your classmates. How does the message travel from your phone to theirs?

Draw out the journey of the message and include all the technologies that are used.
- Which places does the message go to?
- In which countries?
- Which technologies are used?

After 10 minutes each group presents their ideas. There are no wrong answers at this point. In step 2 and 3 everyone discovers how the Internet really works.

15 min. **Step 2 - Greg's Cable Map**

In duo's behind a laptop.
Each duo opens cablemap.info and zooms into their own country.

Demonstrate how to click on a cable and read the information that is displayed.

Students answer the questions on their worksheets independently.

(continue to next page for Step 3)

MATERIAL per group:

- Large sheets of paper
- Felt markers

- Computer / laptop

(continued) How to organize this module:

TIME: PART:

35 min. **Step 3 - Build the Internet**

In groups of 3 to 5 students.

We will build the web in order to understand how it works. The Internet is a big network that consists of different elements that are connected.

The elements we will be building with are: **Data centres, internet cables, wifi-routers, transmission towers, laptops and smartphones**.

> Explain the different elements on the cut sheet.

> Show an example of how elements can be connected (with a straw for an internet cable and a skewer for a wireless network – 4G or wifi).

> Hand out the materials.

> Ask students to start with challenge 1 and 2. When they get these right, they can move on to challenge 3 and 4.

10 min. **Reflection**

Reflect on the drawings that were made in step 1: What was right and what was wrong in those drawings?

Answer the central question of this module together:

IS THE INTERNET EVERYWHERE?

MATERIAL per group:

- Cut sheet: Build the web
- Scissors
- 6 sponges
- 4 skewers
- Tape
- 12 straws

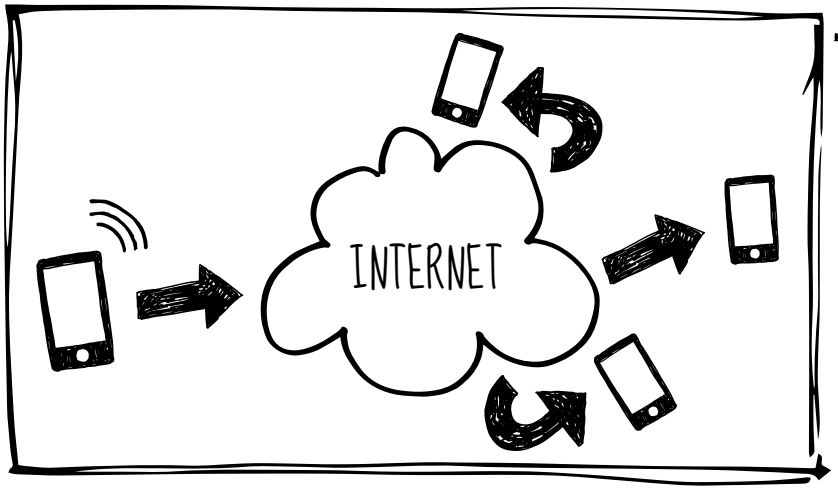
IS THE INTERNET EVERYWHERE?

The web is pretty invisible. We are almost always connected to the Internet and don't even notice when we're online. But are we really always online? Where does the Internet begin? And where does it end?

Make the Internet VISIBLE!*

* In 3 steps... Or more.

Step 1 - How do you think the web works?



You send a Snapchat message to some friends. How does the message go from your phone to theirs?

Draw the journey the message makes and all the parts of the Internet that are used in this journey. Use a big sheet of paper.

Which places does your message travel to? Through which countries? Which technologies are used?

Step 2 - Greg's Cable Map

Go to cablemap.info

Zoom in on Denmark.

Which Internet cable runs through the capital?

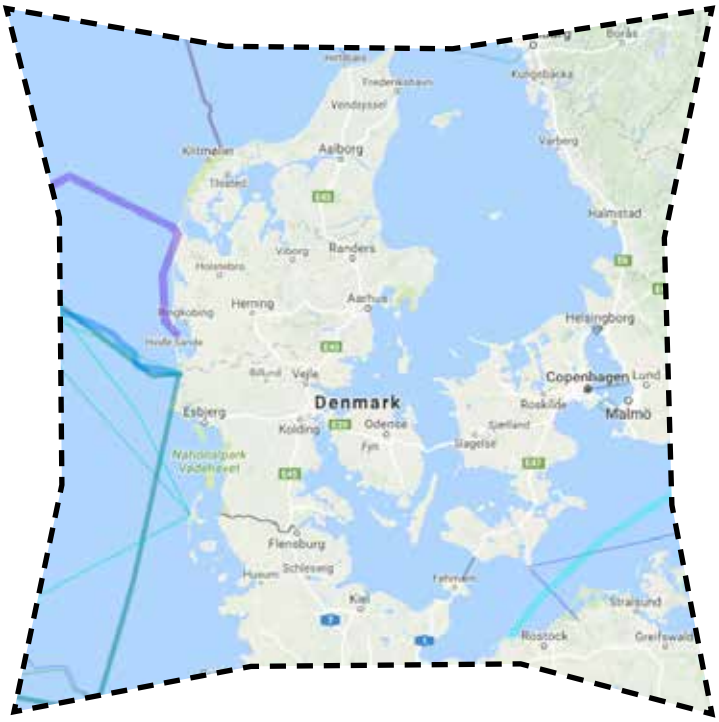
Which Internet cable also visits The Netherlands?

Which Internet cable goes the Farao Islands?

Which Internet cable crosses the Atlantic Ocean?

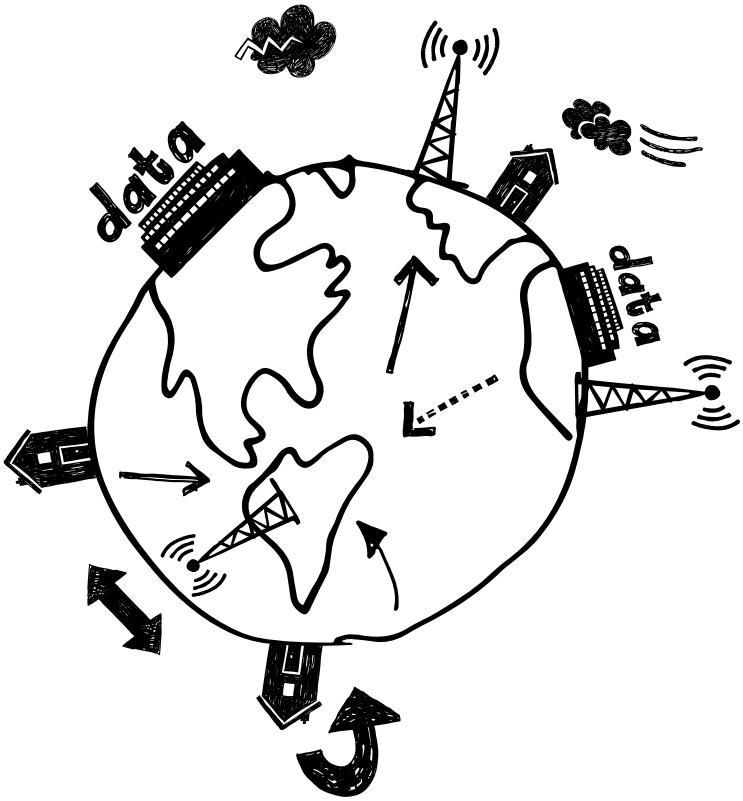
Which Internet cable is the oldest in Denmark?

Which Internet cable is the fastest?



By zooming in on the map you can view the Internet cables in Denmark. By clicking on a cable you can find out more about a particular cable. For example: how long it is, how old it is, which countries it visits and how much information can pass through it.

The speed of a cable is defined by how much information can travel through it per second. The more wires are packed in one cable, the more information it can carry back and forth. Internet speed is measured in Mbps / Gbps / Tbps (Megabyte / Gigabyte / Terrabyte per second).



Step 3 - Build the Internet

We are going to recreate the web to better understand how it works. In four different challenges you recreate the journey that a message makes.

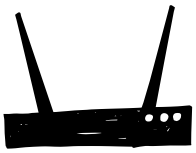
The challenges become more and more difficult, but once you get the hang of it you will build the web in no time. And only with some sponges and straws!

The Internet is a large network (a web) that consists of different parts that are connected to each other.

We will work with: Data centres, cables, wifi-routers, transmission towers, laptops and smartphones.

DATA CENTRE

Stores large bulks of information (data) on servers. Sends data through Internet cables to the right receivers.



WIFI-ROUTER

Manages a wifi network. Connects devices on a wifi network (in the air) with cables (in the ground).

TRANSMISSION TOWER

Manages a 4G network. Connects devices on the 4G network (in the air) with cables (in the ground).

LAPTOP

Can be connected to the Internet through a wifi network (in the air) or an ethernet cable.

SMARTPHONE

Can be connected to the Internet through a wifi network or a 4G network.

INTERNET CABLE

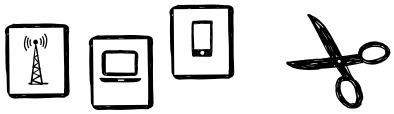
Passes on digital information (data) and connects data centres, transmission towers, routers and laptops to each other.

IS THE INTERNET EVERYWHERE?

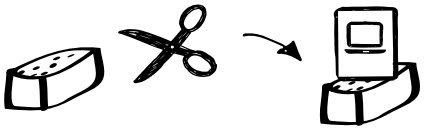
WHO IS THE BOSS OF THE INTERNET?

Recreate the web for the challenges below.

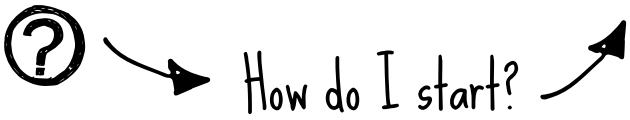
1. Cut out the carts from the cut sheet.



2. Cut across a sponge and place a card in the slid.



3. Build the challenge.



Use an Internet cable (a straw) to connect two sponges to each other.

Make a hole on the side of a sponge and stick the straw there.

A wifi or 4G network goes through the air.
When you want to connect a wireless network (4G/wifi) to a laptop, smartphone, router, or transmission tower, you place a skewer upright in the sponge. Create a circle with a straw at the top of the skewer, this is how far your network reaches.

Challenge 1.

You're on your laptop with wifi and surf to Google.com.

Challenge 2.

You are on your smartphone on a 4G network and send a Snapchat message to your friends, who are also on a 4G network.

Challenge 3.

You're at home on your laptop and you Skype call your grandparents who are on holiday in Spain. Your grandparents use the wifi network of the hotel on their phone to use Skype.

Challenge 4.

You are cycling in a meadow where your phone doesn't have a working 4G network connection. After fifteen minutes of cycling you are within reach of a network again. Immediately a few Whatsapp messages from your parents come in, asking you if everything is okay. You quickly reply to them.

Cutsheet: Build the Internet

WHO IS THE BOSS OF THE INTERNET?

DATA CENTRE

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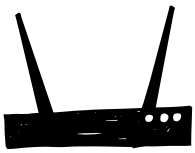
SMARTPHONE

Can be connected to the Internet through a wifi network or a 4G network.



WIFI-ROUTER

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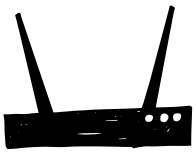

WIFI-ROUTER

Manages a wifi network. Connects devices on a wifi network (in the air) with cables (in the ground).

LAPTOP

Can be connected to the Internet through a wifi network (in the air) or an ethernet cable.

TRANSMISSION TOWER

Manages a 4G network. Connects devices on the 4G network (in the air) with cables (in the ground).

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Manages a 4G network. Connects devices on the 4G network (in the air) with cables (in the ground).

SMARTPHONE

Can be connected to the Internet through a wifi network or a 4G network.

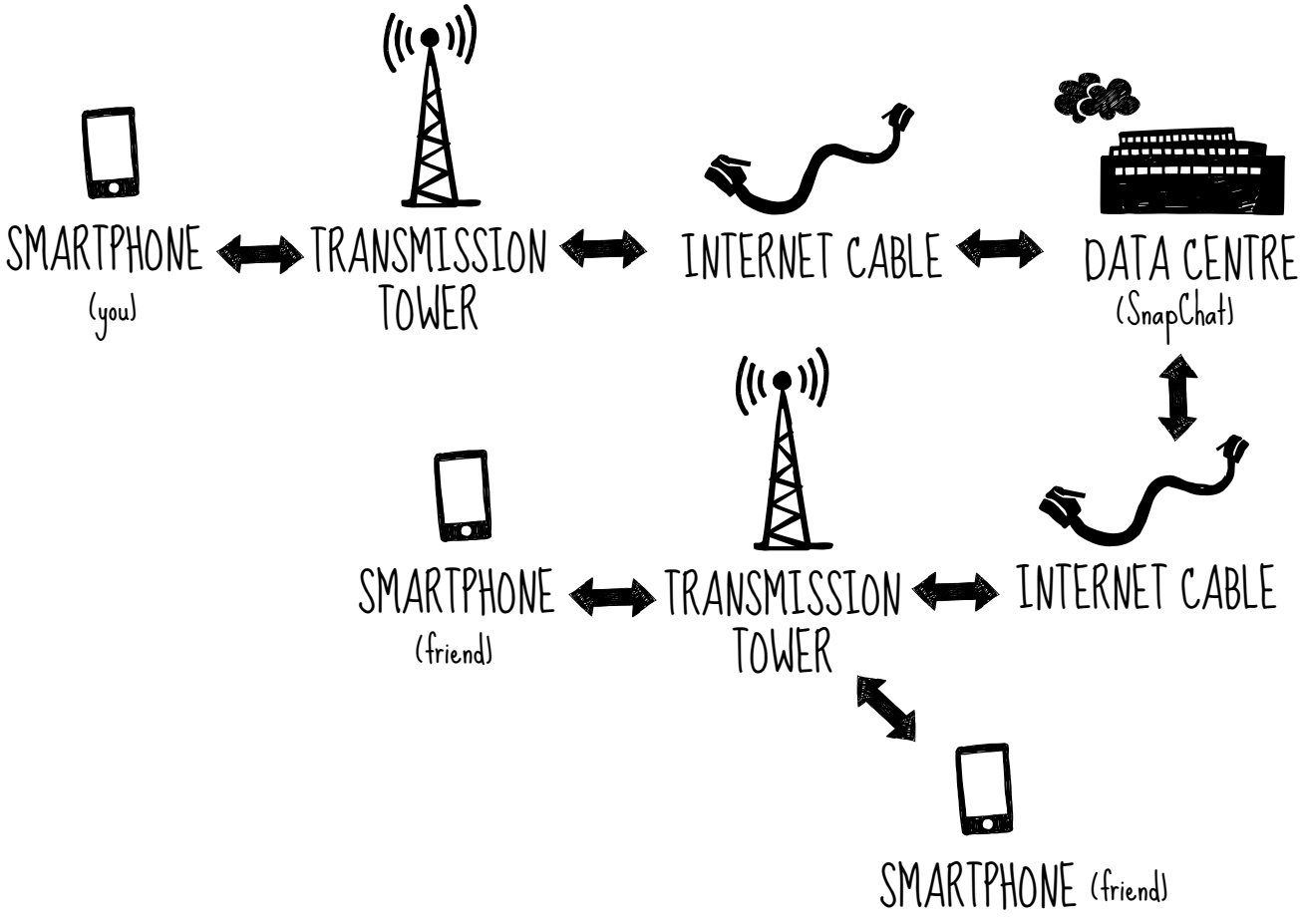
ANSWERS: Step 3 - Build the Internet

Challenge 1.

You're on your laptop with wifi and surf to Google.com.

Challenge 2.

You are on your smartphone on a 4G network and send a Snapchat message to your friends, who are also on a 4G network.



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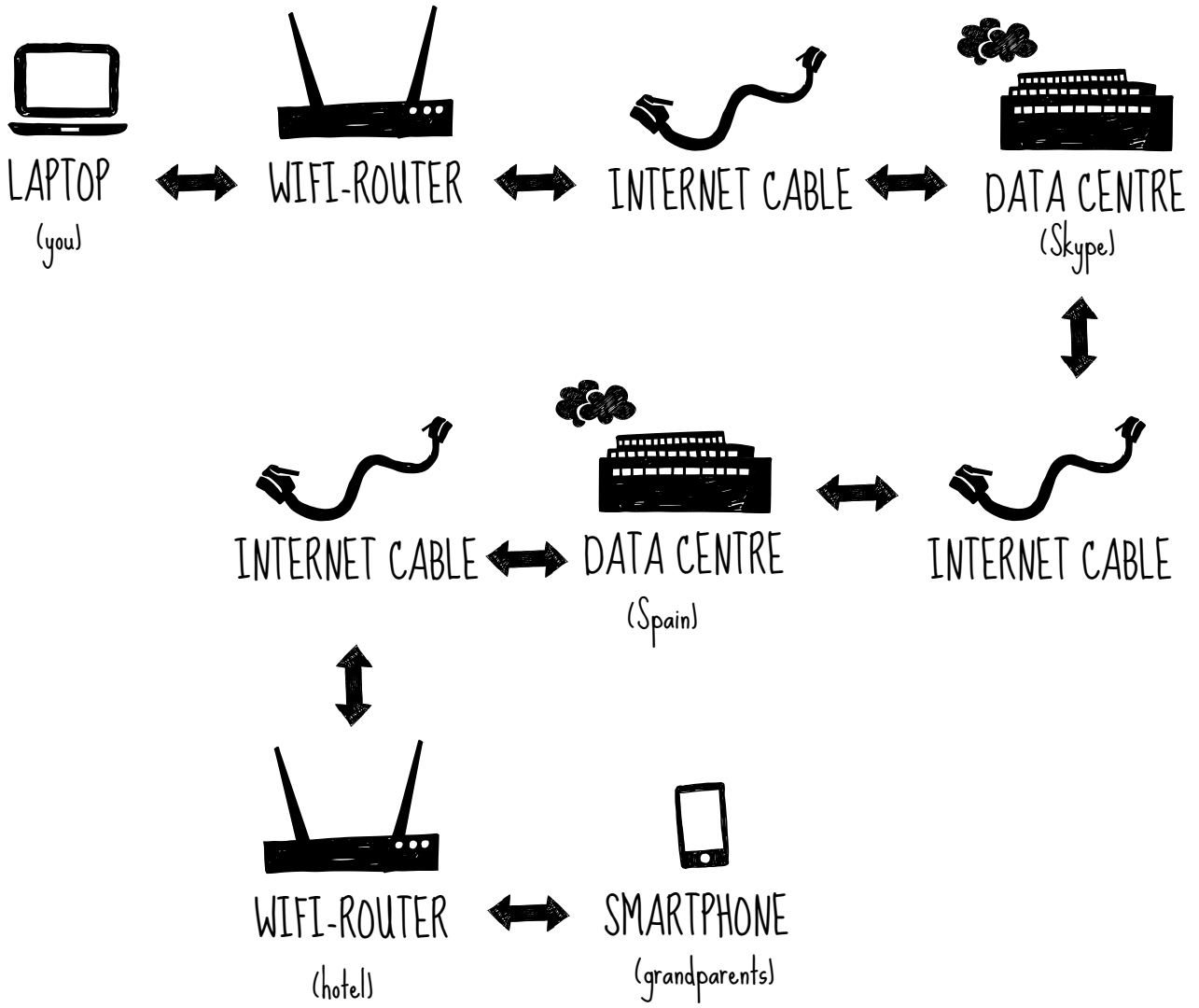

ANSWERS: Step 3 - Build the Internet

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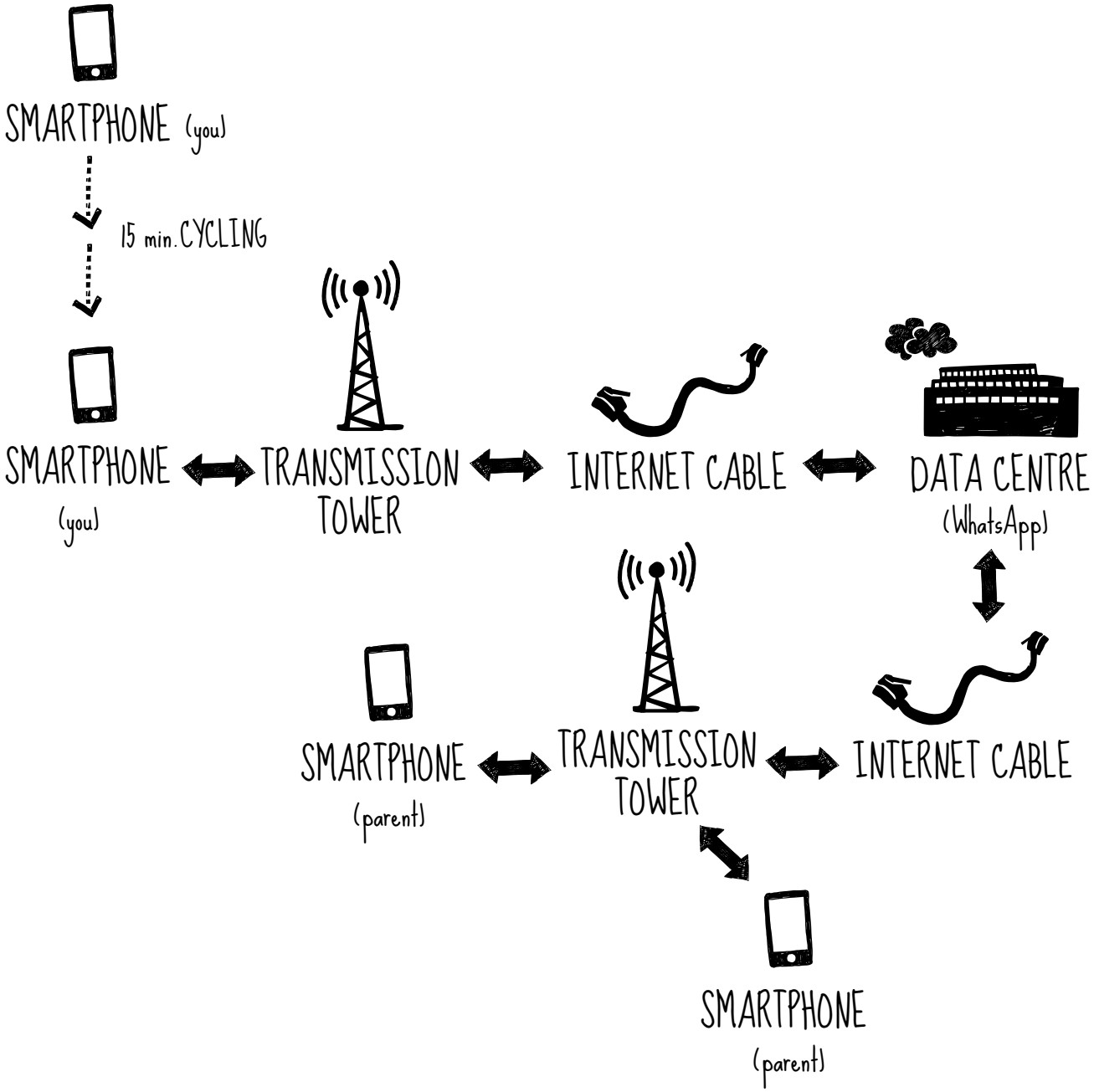

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