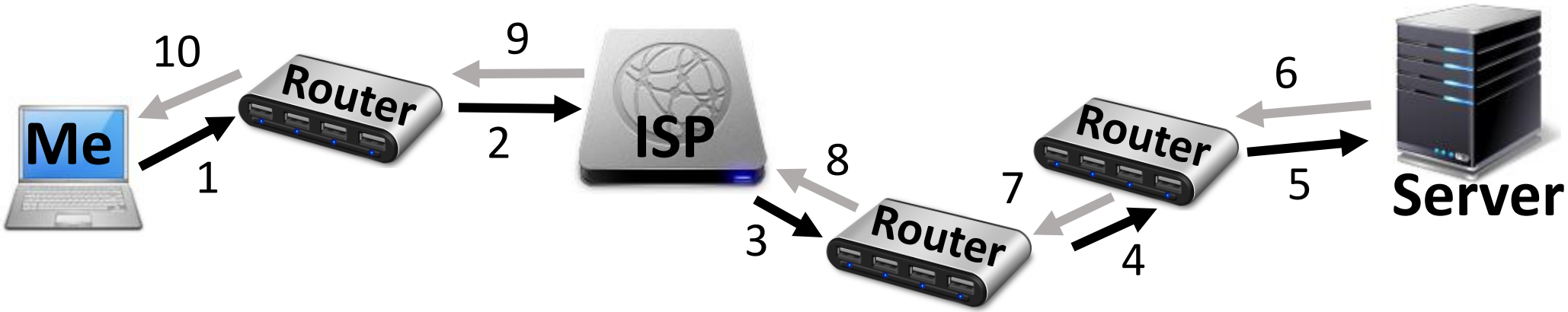
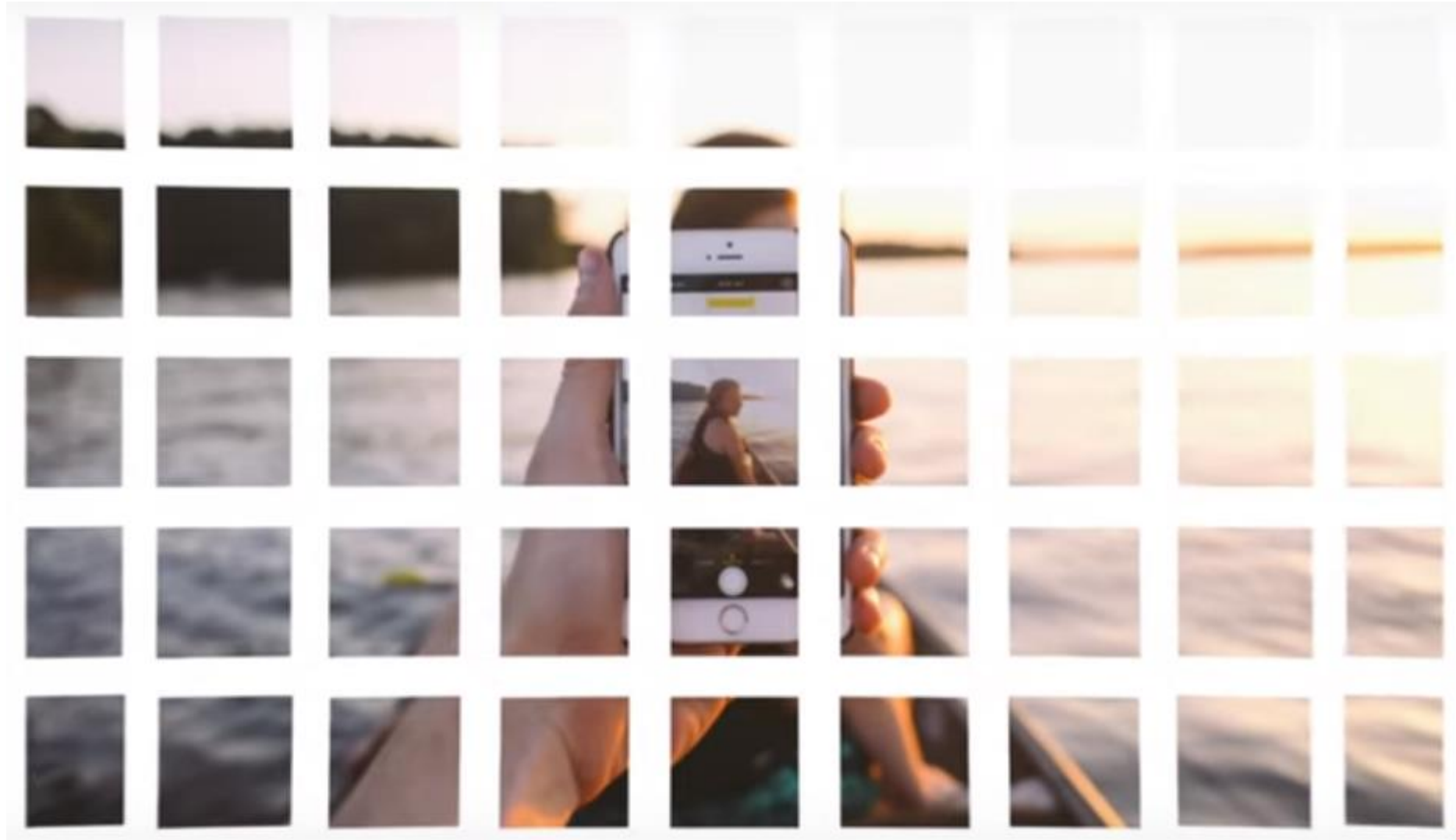
Network Basics

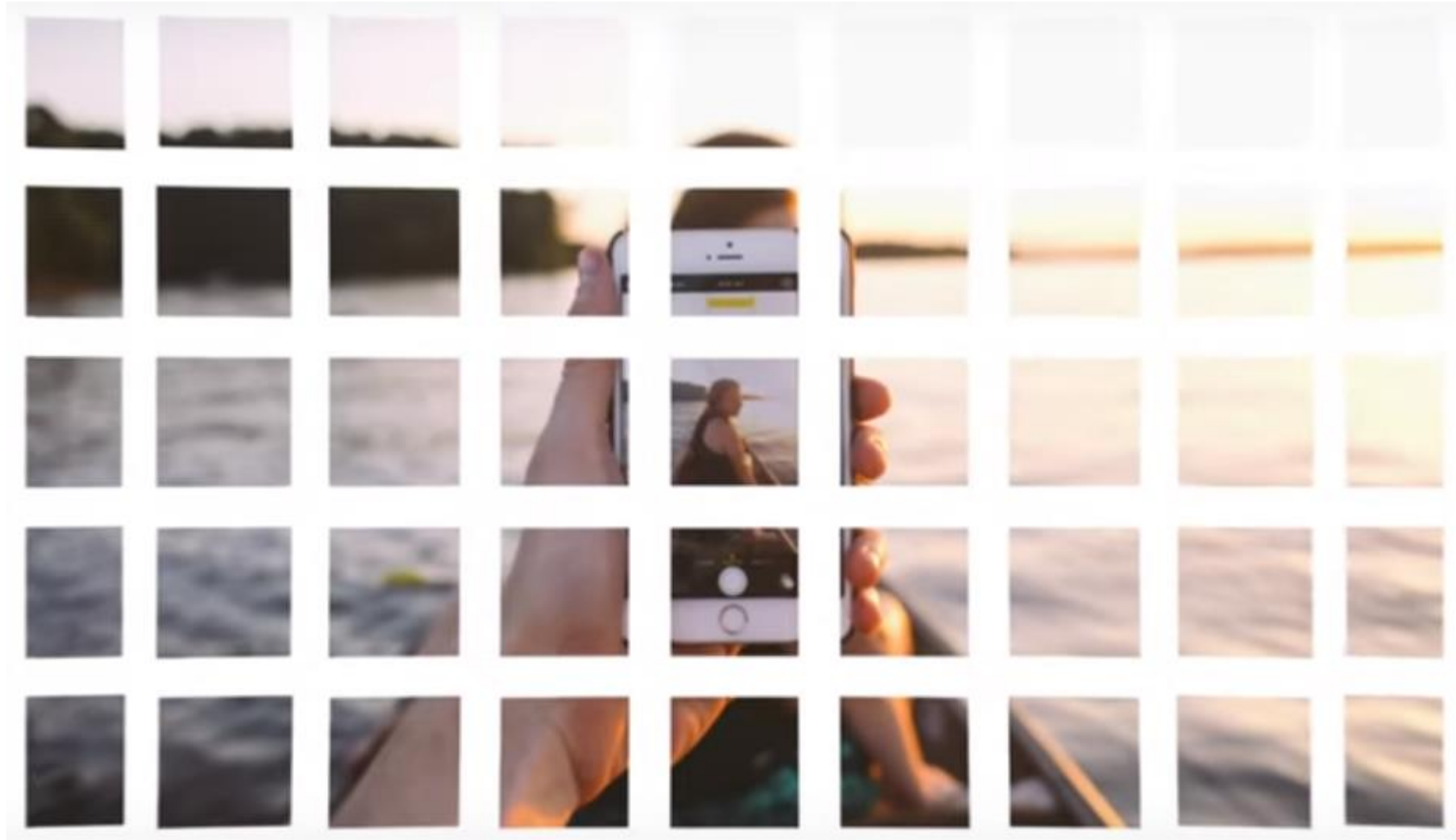
Pieces of a Network

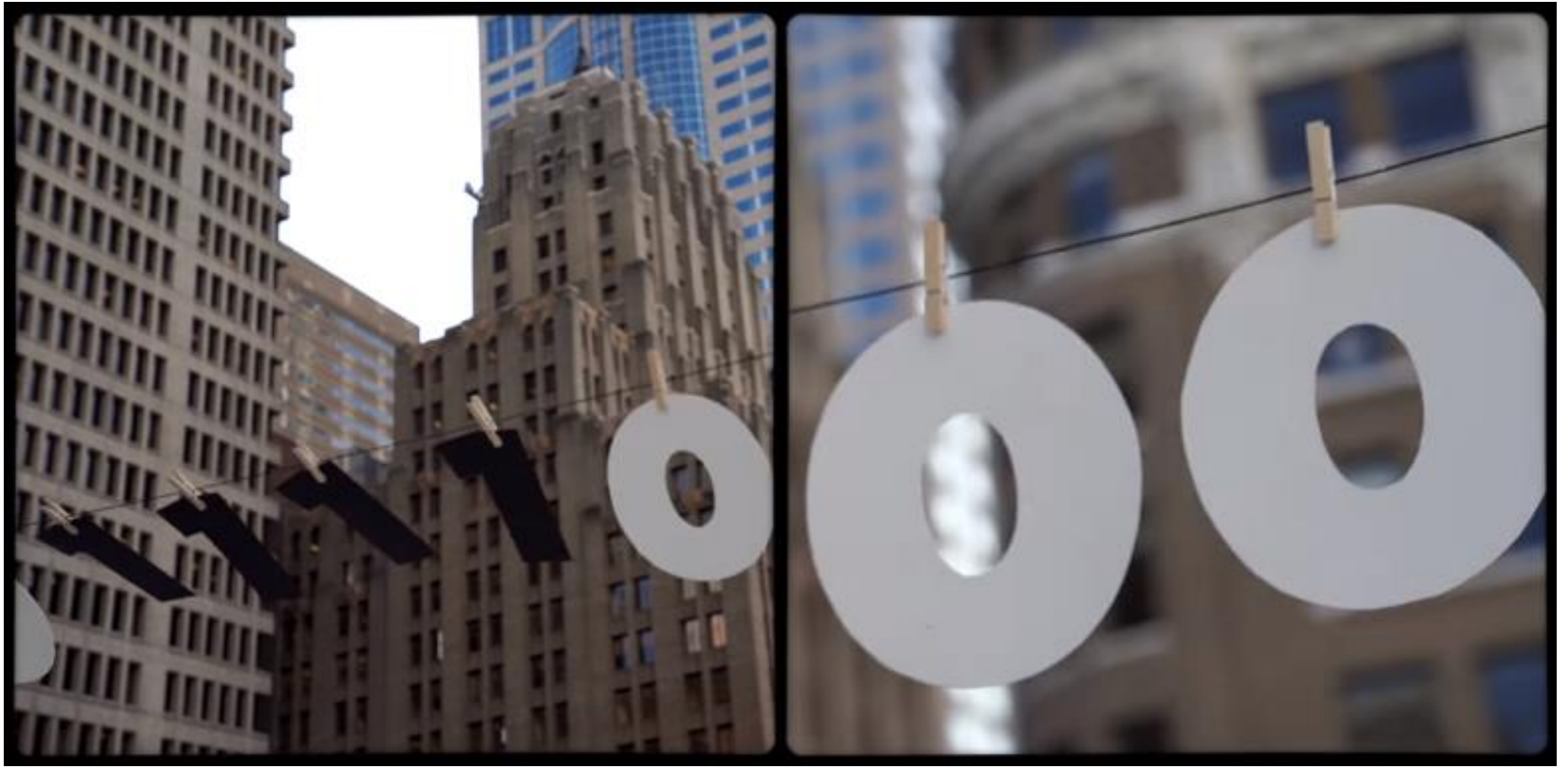

Me
Router
ISP
Router
Router
Server
1
2
3
4
5
6
7
8
9
10



Cupcake
50c
To: IP Address – 23.45.34.53
From: IP Address – 45.23.65.123
Packet number 2 of 345

Data
Error Check
Packet Header
Sequence No.
Return Address
Destination Address





Network Basics

Hardware on the Internet

Router

Router

Switch

Hub

Copper Wire Cable

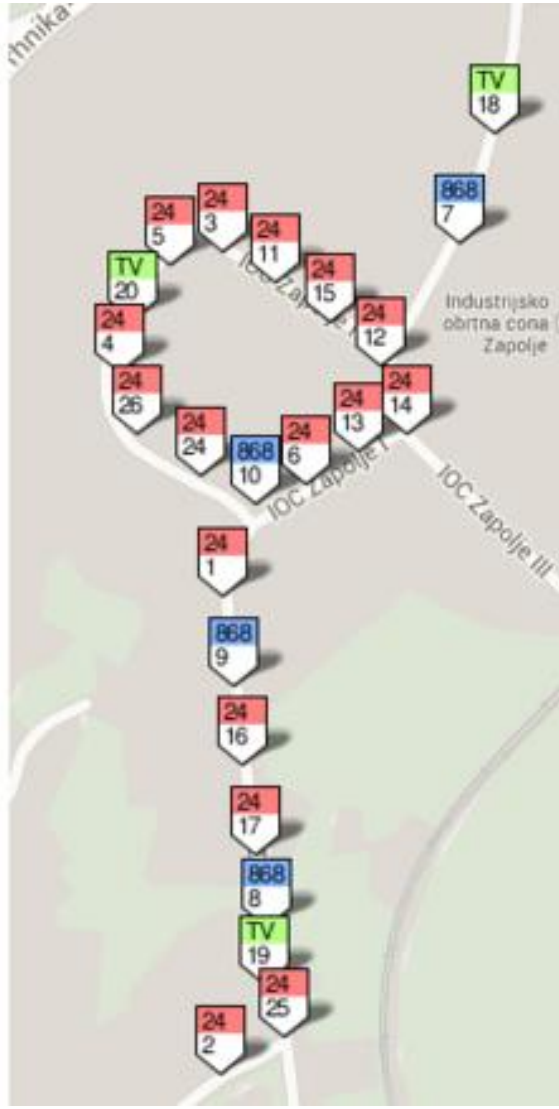
Fibre-optic Cable

DSL Line (Rogers)

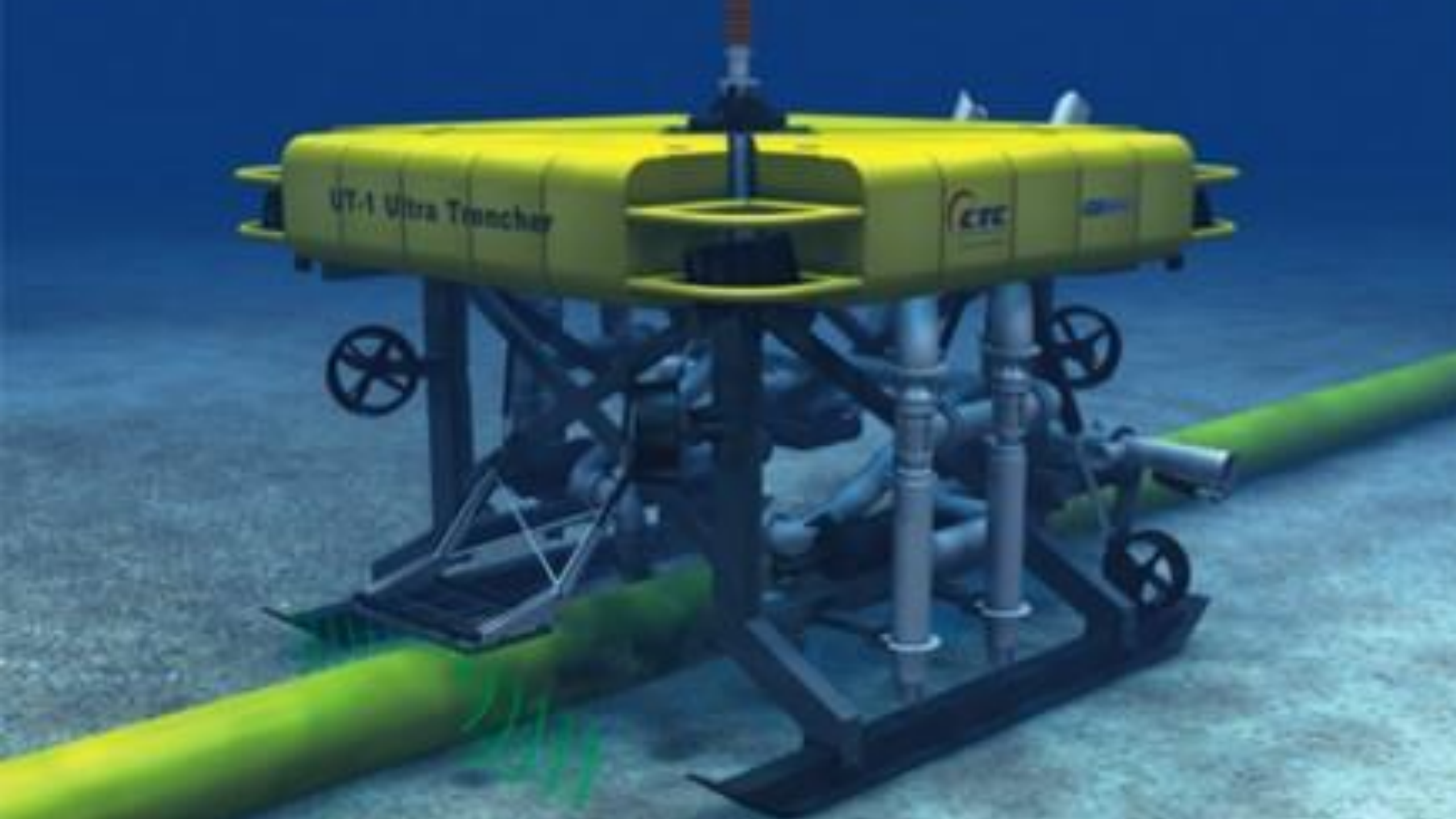
Cable (Bell)

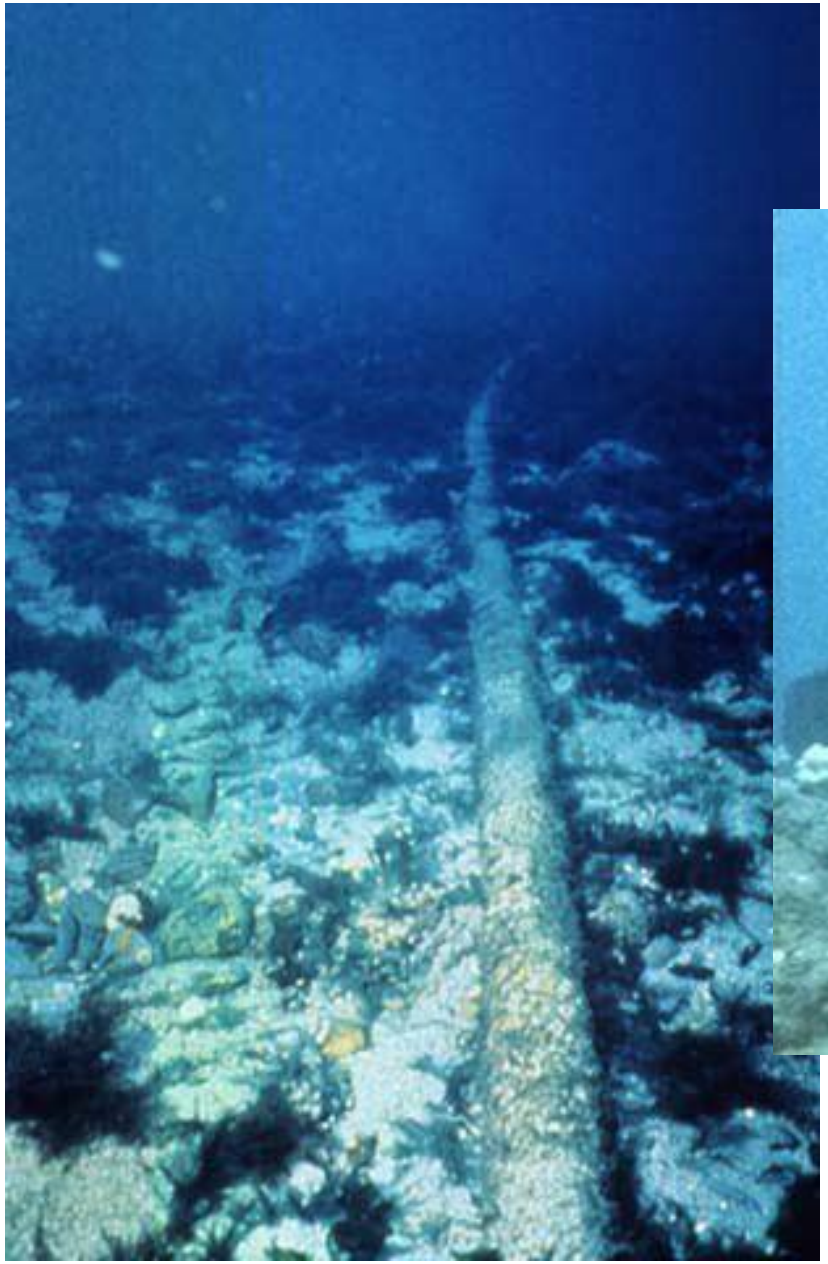
Pavšičeva ulica
Kraigherjeva ulica
Kidričeva ulica
Partizanska ulica
Tržaška cesta
Logatec
Republika Slovenija upravna enota Logatec
Poštna poslovalnica
Knjižnica Logatec
INOVATIVA MMR
Šušteršič krovstvo, kleparstvo, gradnje, trgovina, doo
Brod
Potoška cesta
Prešernova ulica
Poštni Vrt
Gregorčičeva ulica
Cevica
409
BS

Tovarniška cesta
Cankarjeva cesta
Guesthouse Jersin
Šolska pot
Cerkev
OŠ


Industrijsko obrtna cona Zapolje
IOC Zapolje I
IOC Zapolje III

HYUNDAI


UT-1 Ultra Trencher



The internet's undersea world

The vast majority of the world's communications are not carried by satellites but an altogether older technology: cables under the earth's oceans. As a ship accidentally wipes out Asia's net access, this map shows how we rely on collections of wires of less than 10cm diameter to link us all together

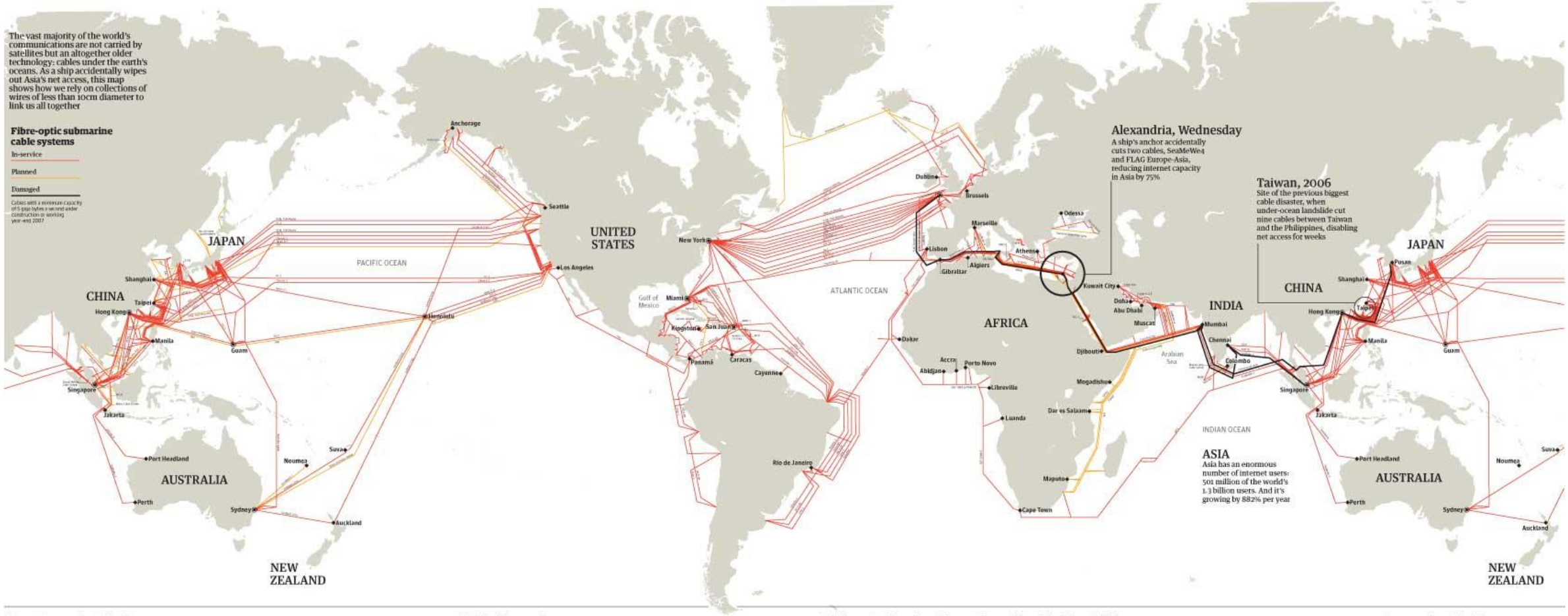
Fibre-optic submarine cable systems

In-service

Planned

Damaged

Cables with a minimum capacity of 5 giga bytes a second under construction or working year-end 2007



Alexandria, Wednesday

A ship's anchor accidentally cuts two cables, SeaMeWe4 and FLAG Europe-Asia, reducing internet capacity in Asia by 75%

Taiwan, 2006

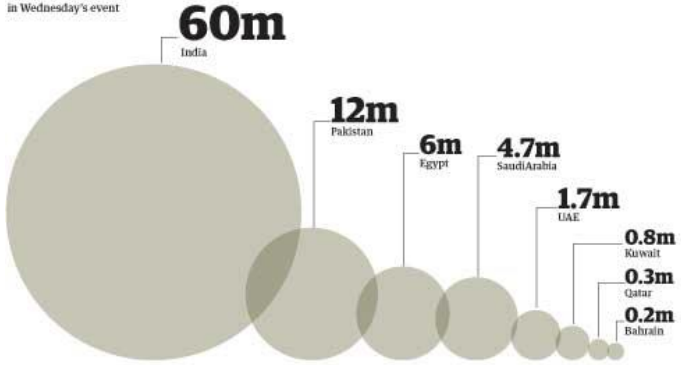
Site of the previous biggest cable disaster, when under-ocean landslide cut nine cables between Taiwan and the Philippines, disabling net access for weeks

ASIA

Asia has an enormous number of internet users: 501 million of the world's 1.3 billion users. And it's growing by 882% per year

Internet users affected by the Alexandria accident

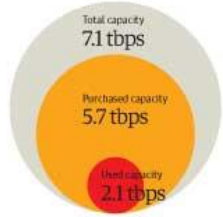
The main countries affected in Wednesday's event



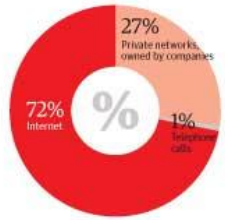
World cable capacity

Submarine cable operators light (turn on) capacity on their systems to sell bandwidth to other carriers. Carriers buy extra capacity, mainly to hold in reserve. On the trans-Atlantic route 80% of the bandwidth is purchased, but only 29% is used

Capacity in terabytes a second



What makes up "used capacity"?



The longest submarine cables

The SeaMeWe-3 system from Norden in Germany to Keoje, South Korea connects 32 different countries with 39 landing points

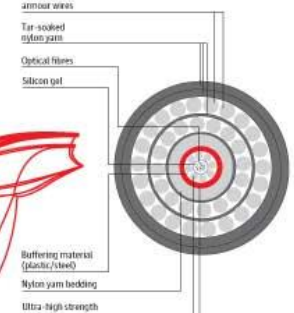
SeaMeWe-3	39,000 km
Southern Cross	30,500 km
China-US	30,476 km
FLAG Europe-Asia	28,000 km
South America-1	25,000 km

The world's cables in bandwidth

The first intercontinental telephony submarine cable system, TAT-1, connected North America to Europe in 1958 and had an initial capacity of 640,000 bytes per second. Since then, total trans-Atlantic cable capacity has soared to over 7 trillion bps

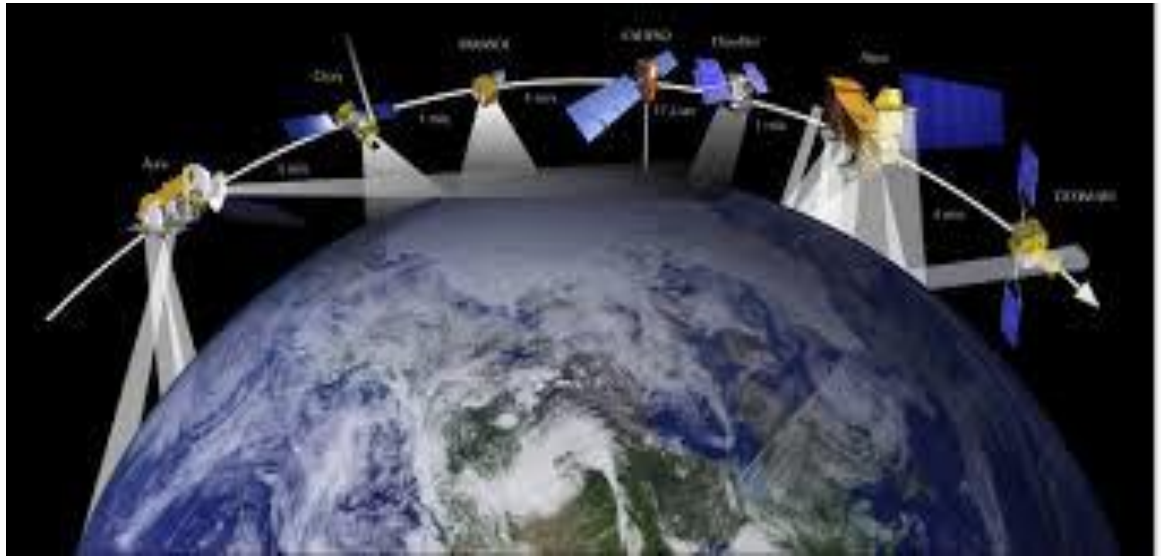
Cross-section of a cable

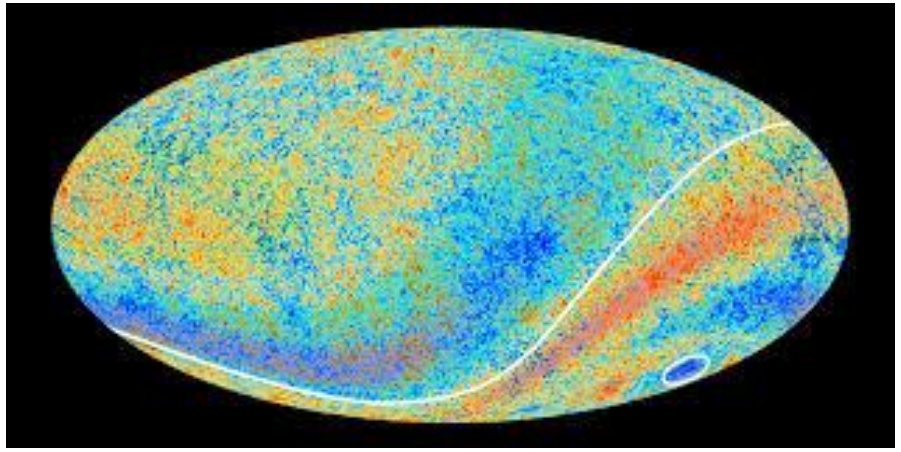
Cables of this strength are typically 69 mm in diameter and weigh over 10,000 kilograms a kilometer. In deeper waters, lighter and less insulated cables are used

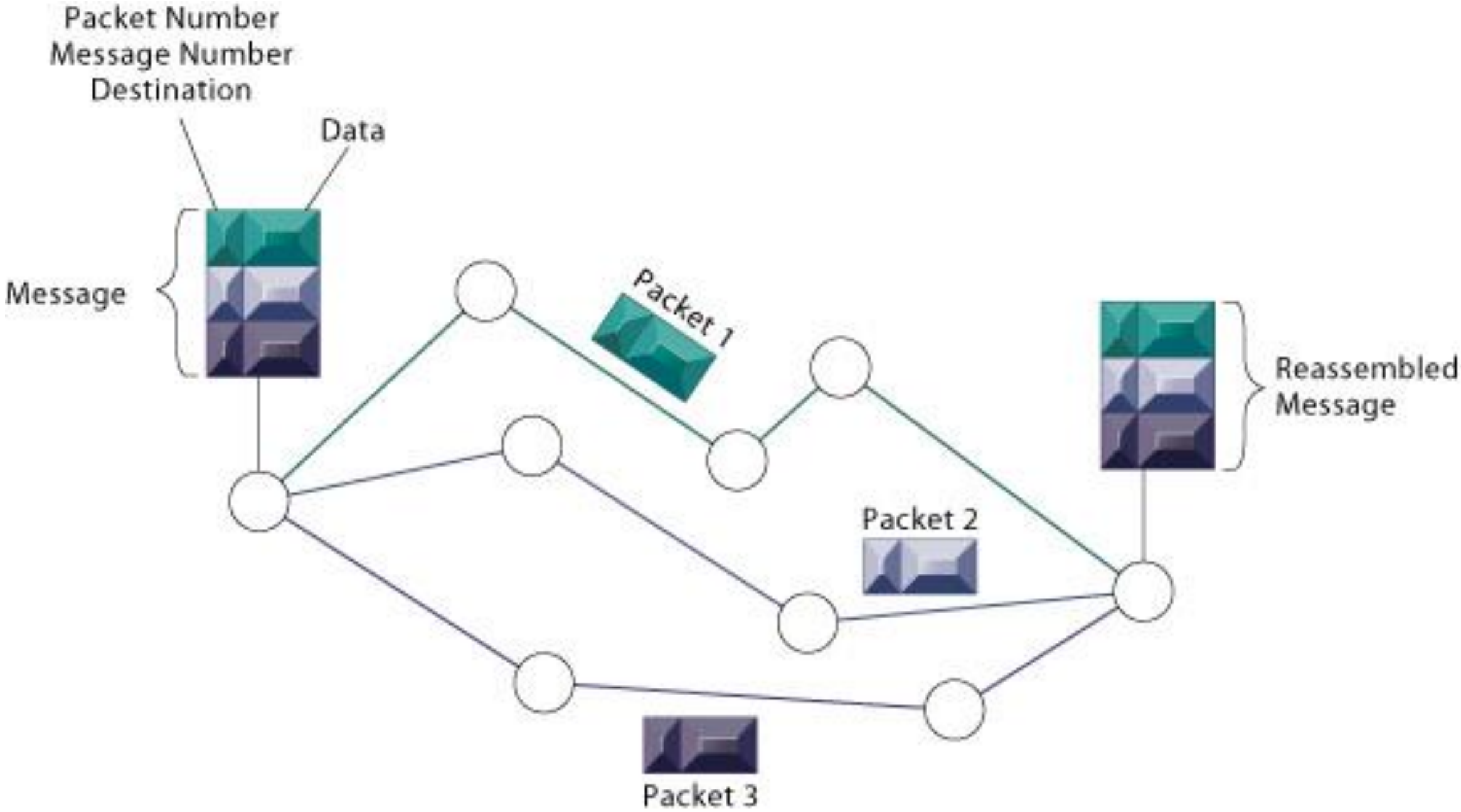


Cell Towers

Microwave - Satellite






Packet Number
Message Number
Destination
Data
Message
Packet 1
Reassembled
Message
Packet 2
Packet 3

Networks

2.7 C

The path of a packet

____ I am on my computer. I click on a link.
____ The packet with my request travels over the internet.
____ It is routed to my ISP and then to the server with the information on it.
____ The server reads my packet, finds the information, and divides it into a series of packets.
____ The packets with my requested information travel back to me.
____ I reassemble the packets and I can view the file.

Things on the internet:

_____ - a regular computer connected to the internet
_____ - a giant computer on the internet with files or movies or a video game that people want.
_____ - a company who owns cables and routers on the internet. You pay them to use the internet.
_____ - a small computer that routes packets towards their final destinations.

Pieces of a packet

- Header Contains
  - Destination IP address (who it is to)
  - Origin IP address (who it is from)
  - The packet number
  - Error checking information
- Data Contains
  - The piece of the giant file that you are receiving
  - OR the message for the server about what you want.

Guest speaker’s message inspires students

An EQAO question

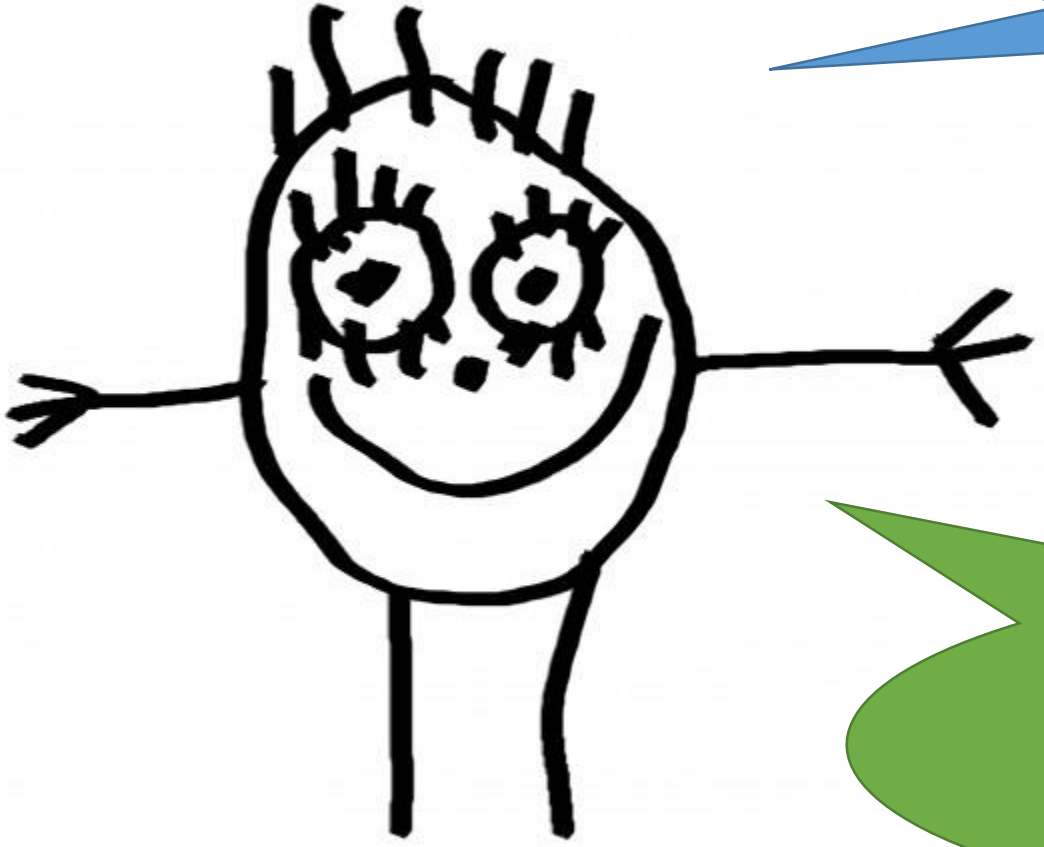
Student volunteers improve school grounds

An EQAO question

Students Participate in Important Election

An EQAO question

You need two specific characters with quotes for your article.



My name is John Smith.

I am the school principal of Middlewood Elementary.

The students are my school are exceptional: they are always looking for ways to give back to their community.

Make up another character for the story.

Proper Name

Detailed position

Quote

Mind your P's and Q's

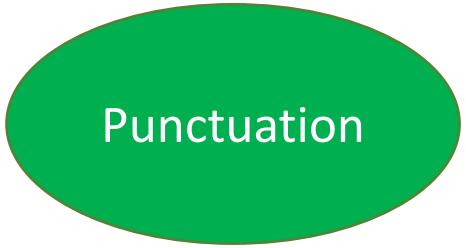
"Mr. Frank," I can hear you saying, "you're crazy. There aren't any quotation marks on this page."

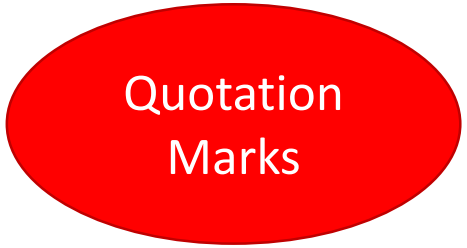
I say, "Look again. You will see some."

"Unhand that damsel in distress!" commanded Quixote.

"Make me, you cardboard-wearing, half-dead horse-riding, long-word-using wimp!" said the salesman.

Mind your P's and Q's





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Mind your P's and Q's

Punctuation

Quotation Marks

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"Make me, you cardboard-wearing, half-dead horse-riding, long-word-using wimp!" said the salesman.

Why are packets important for internet functionality?

"Packets allow us to break up large files into smaller ones that can travel over the internet," explained Ms. Gorski, a computer science teacher at BCSS.

Which is used more often, cables or wireless transmission?

"Wireless transmission," explained Ida Knowe, a network analyst at NASA, "is very slow, so as soon as possible, all messages are transferred to cables. These cables can carry much network traffic, so they are used more often."