

# THE INTERNET

EGCO103 INFORMATION TECHNOLOGY IN THE DAILY LIFE

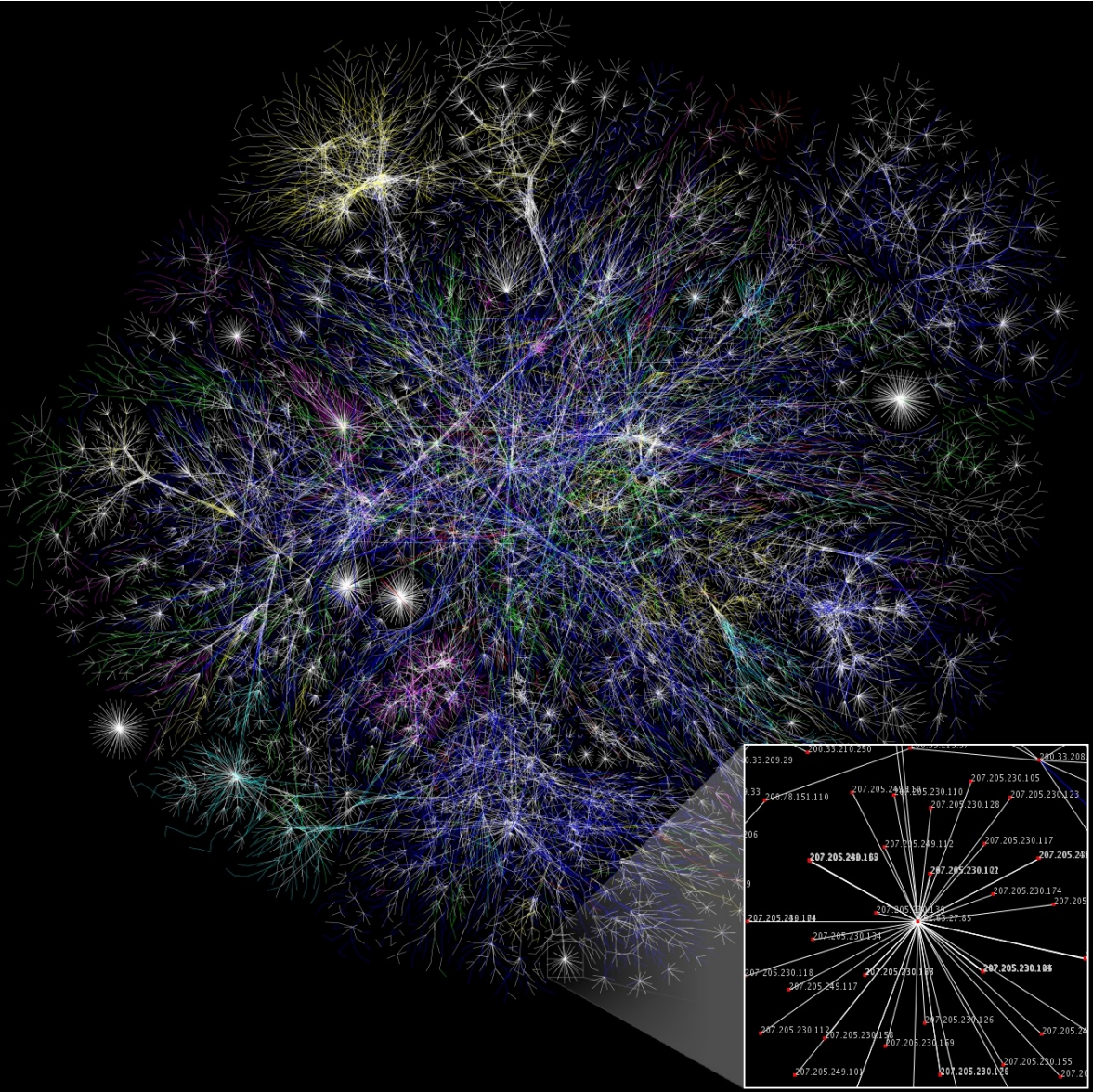


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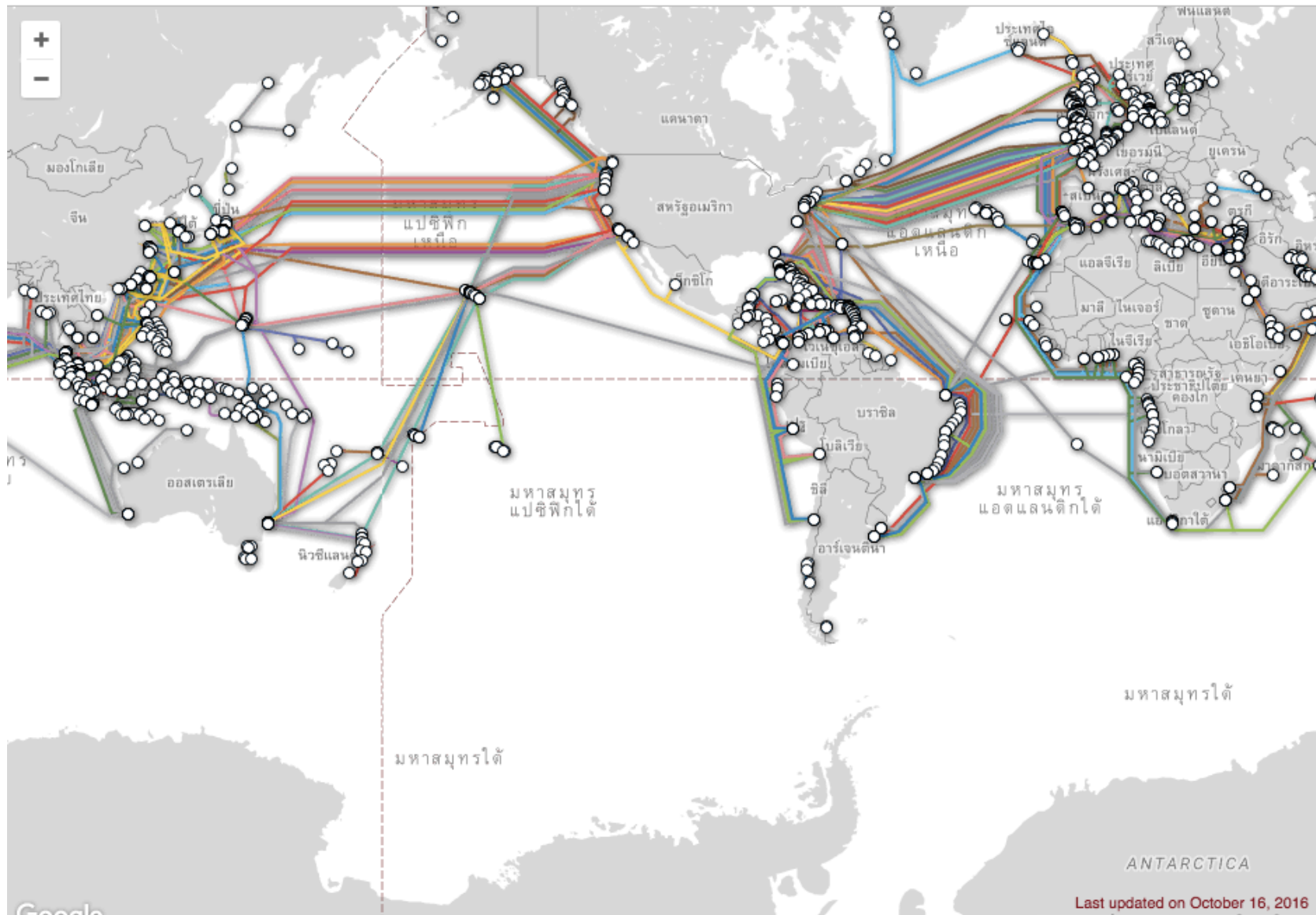
# ORIGIN OF THE INTERNET

- Developed while U.S. was in midst of Cold War with Soviet Union
- Created to respond to two concerns:
  - Establishing a secure form of military communications
  - Creating a means by which all computers could communicate
- Evolved from Advanced Research Projects Agency Network (ARPANET)
  - Vinton Cerf & Robert Kahn
- First communication occurred in 1969
- World Wide Web is subset of the Internet
  - Common protocols enable computers to talk to each other
  - Special links enable navigation

# THE INTERNET MAP

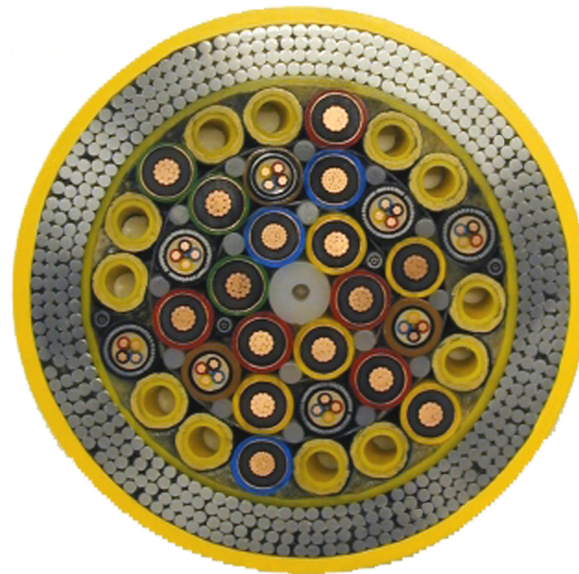


# THE PHYSICAL SIDE OF THE INTERNET (1)





# THE PHYSICAL SIDE OF THE INTERNET (2)



# THE INTERNET

- Computer Network
- Use IP (Internet Protocol) to communicate
  - Mostly through TCP/IP
- Connect world wide
  - <http://internet-map.net/>
- To go some where we need address
- Where does it come from?
  - ISP -> How did they get theirs?
- IP address is handed out by Internet Assigned Numbers Authority (IANA)
  - <http://www.iana.org>

# HOW MY COMPUTER GET AN (PRIVATE) IP?

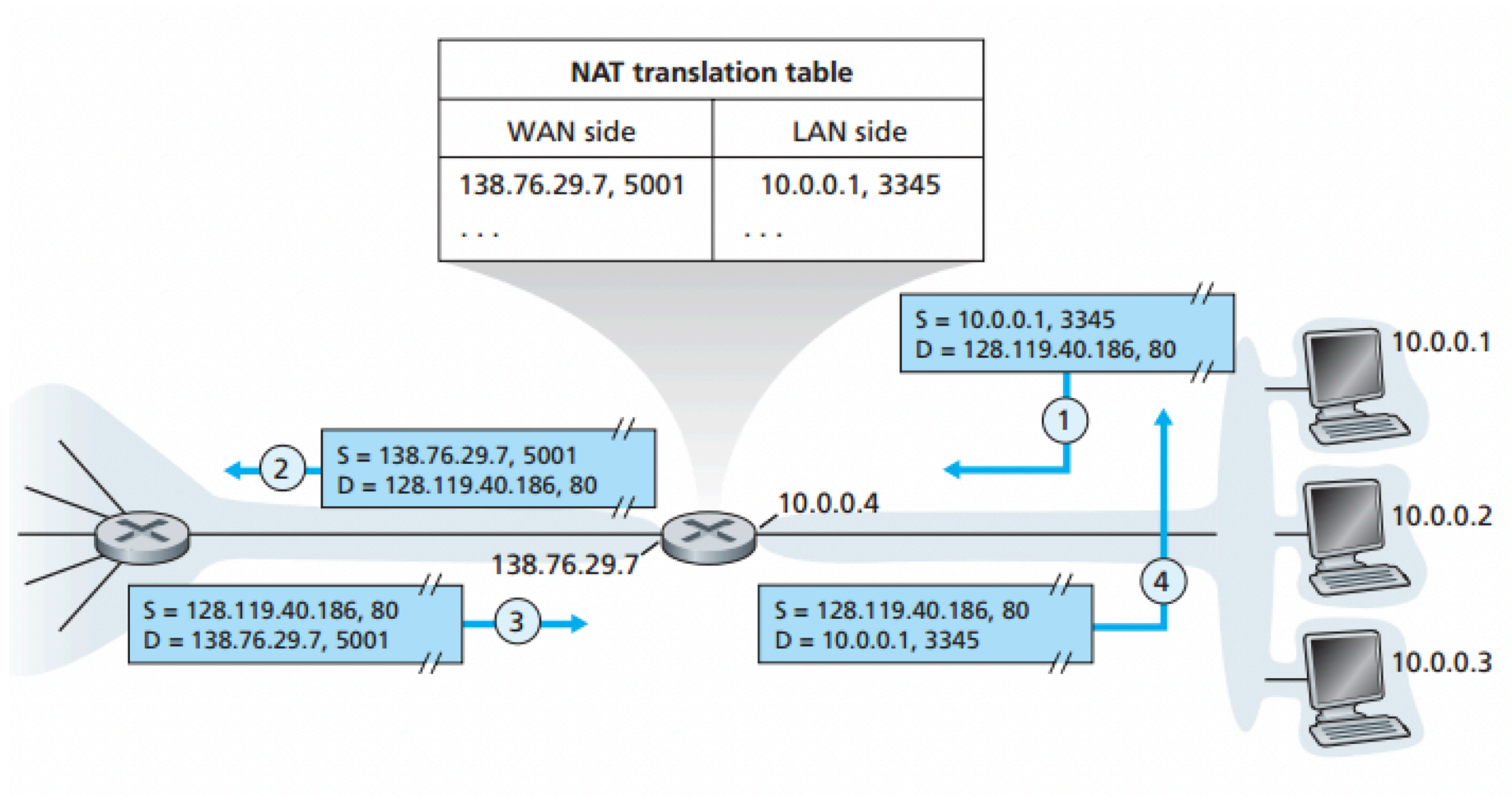
- Dynamic Host Configuration Protocol (DHCP)
- When you connect your computer yell "Who can give me IP"
- If there is a DHCP server listening, it will give your IP...  
Temporary.

# NETWORK ADDRESS TRANSLATION (1)

- Less than 4,228,250,625 IP addresses for use
- Only get 1 real IP from ISP.
- Network Address Translation (NAT) can help
  - Router replaces your local IP address and port with the real IP address and port for outgoing packet
  - Vice versa for the incoming packet



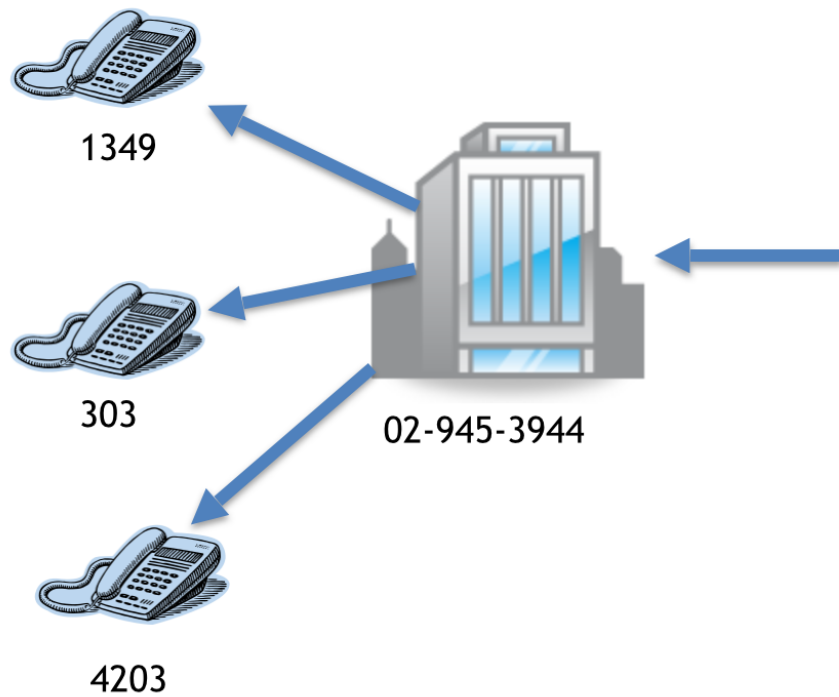
# NETWORK ADDRESS TRANSLATION (2)



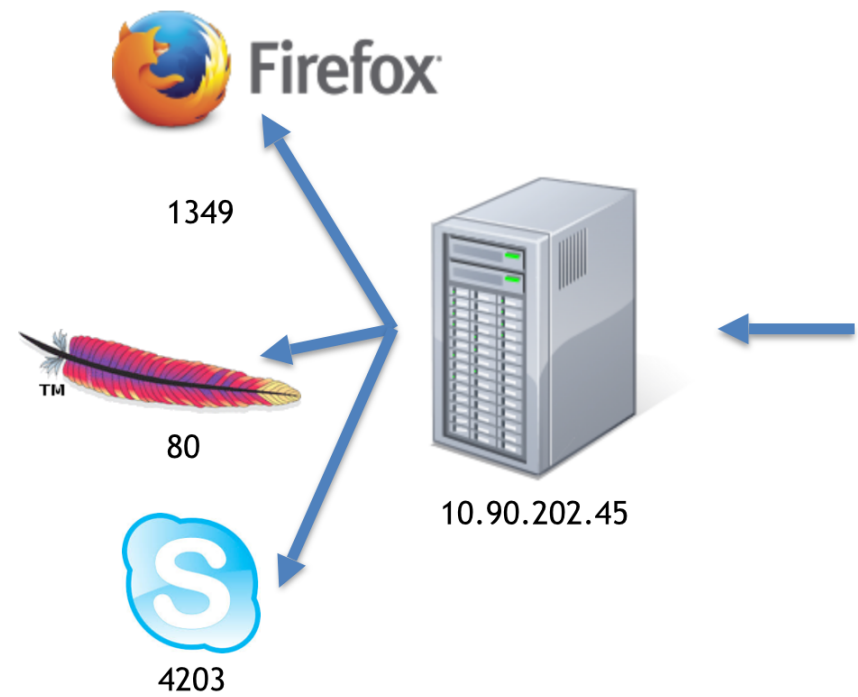
# NETWORK ADDRESS TRANSLATION (3)

- Help protect your computer network
  - Outside cannot come inside
- Difficult for outside to reach your computer

# PORT NUMBER (1)



(a)



(b)

# PORT NUMBER (2)

- IP:Port e.g. 10.90.203.45:6830
- Each program can send and receive data. How does a computer know whose data it is receiving?
- Each communication is done through a "port"
- Works like an extension number on the phone.
- Sending to a wrong port = talking to a wrong person.
- How do we know what port we should connect to?
  - Task -> Protocol for the task -> Official port for protocol
- Example
  - Get a webpage -> Protocol http -> port 80



# PORT NUMBER (3)

## TCP/UDP Port Numbers

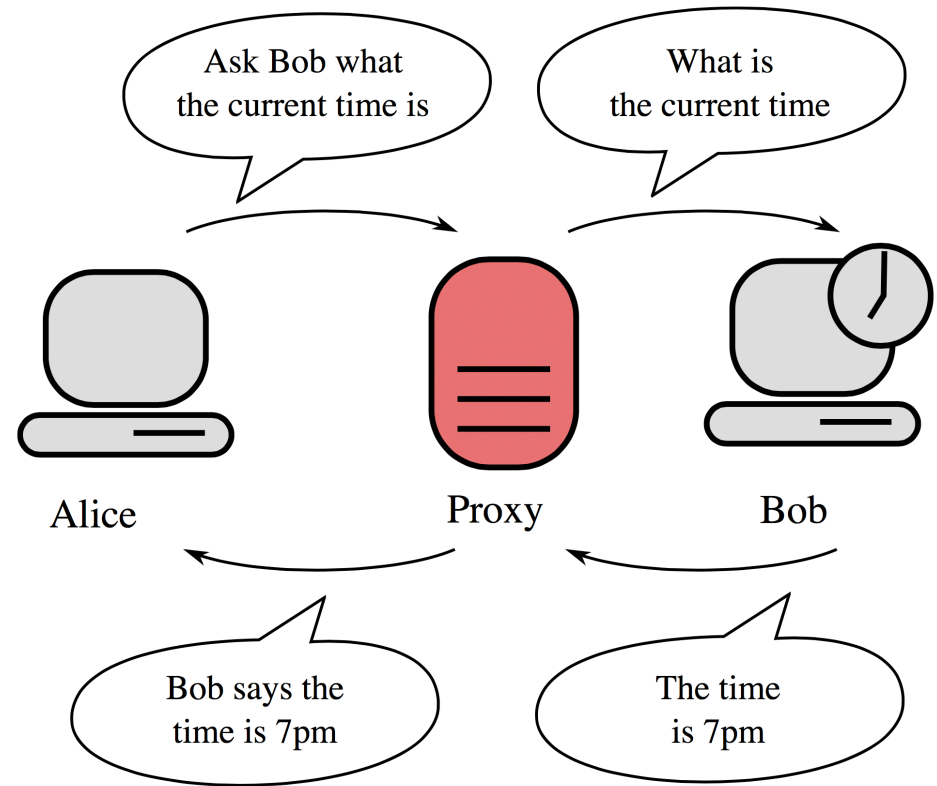
7 Echo	554 RTSP	2745 Bagle.H	6891-6901 Windows Live
19 Chargen	546-547 DHCPv6	2967 Symantec AV	6970 Quicktime
20-21 FTP	560 rmonitor	3050 Interbase DB	7212 GhostSurf
22 SSH/SCP	563 NNTP over SSL	3074 XBOX Live	7648-7649 CU-SeeMe
23 Telnet	587 SMTP	3124 HTTP Proxy	8000 Internet Radio
25 SMTP	591 FileMaker	3127 MyDoom	8080 HTTP Proxy
42 WINS Replication	593 Microsoft DCOM	3128 HTTP Proxy	8086-8087 Kaspersky AV
43 WHOIS	631 Internet Printing	3222 GLBP	8118 Privoxy
49 TACACS	636 LDAP over SSL	3260 iSCSI Target	8200 VMware Server
53 DNS	639 MSDP (PIM)	3306 MySQL	8500 Adobe ColdFusion
67-68 DHCP/BOOTP	646 LDP (MPLS)	3389 Terminal Server	8767 TeamSpeak
69 TFTP	691 MS Exchange	3689 iTunes	8866 Bagle.B
70 Gopher	860 iSCSI	3690 Subversion	9100 HP JetDirect
79 Finger	873 rsync	3724 World of Warcraft	9101-9103 Bacula
80 HTTP	902 VMware Server	3784-3785 Ventrilo	9119 MXit
88 Kerberos	989-990 FTP over SSL	4333 mSQL	9800 WebDAV
102 MS Exchange	993 IMAP4 over SSL	4444 Blaster	9898 Dabber
110 POP3	995 POP3 over SSL	4664 Google Desktop	9988 Rbot/Spybot
113 Ident	1025 Microsoft RPC	4672 eMule	9999 Urchin
119 NNTP (Usenet)	1026-1029 Windows Messenger	4899 Radmin	10000 Webmin

# PORT NUMBER (4)

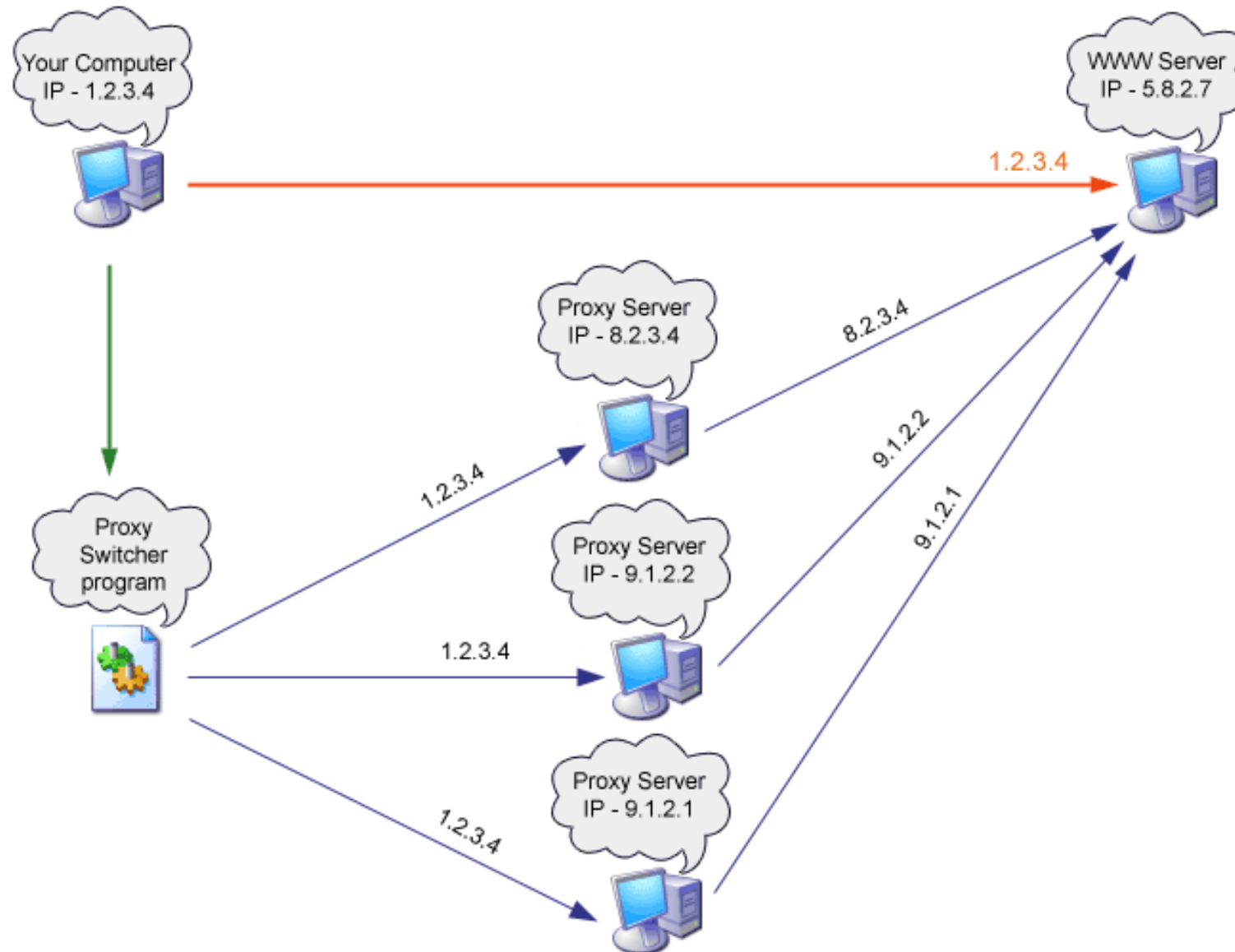
- Total possible ports = 65,535
- Official ports for protocols
  - <http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml>

# PROXY (1)

- Sit between your computer and the internet
- Cache previously visited contents to increase loading speed
- Transparent Proxy



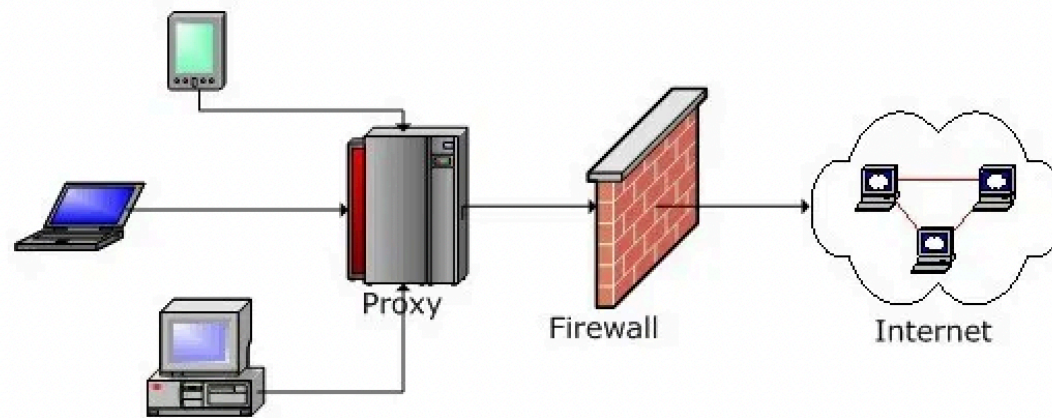
# PROXY (2)





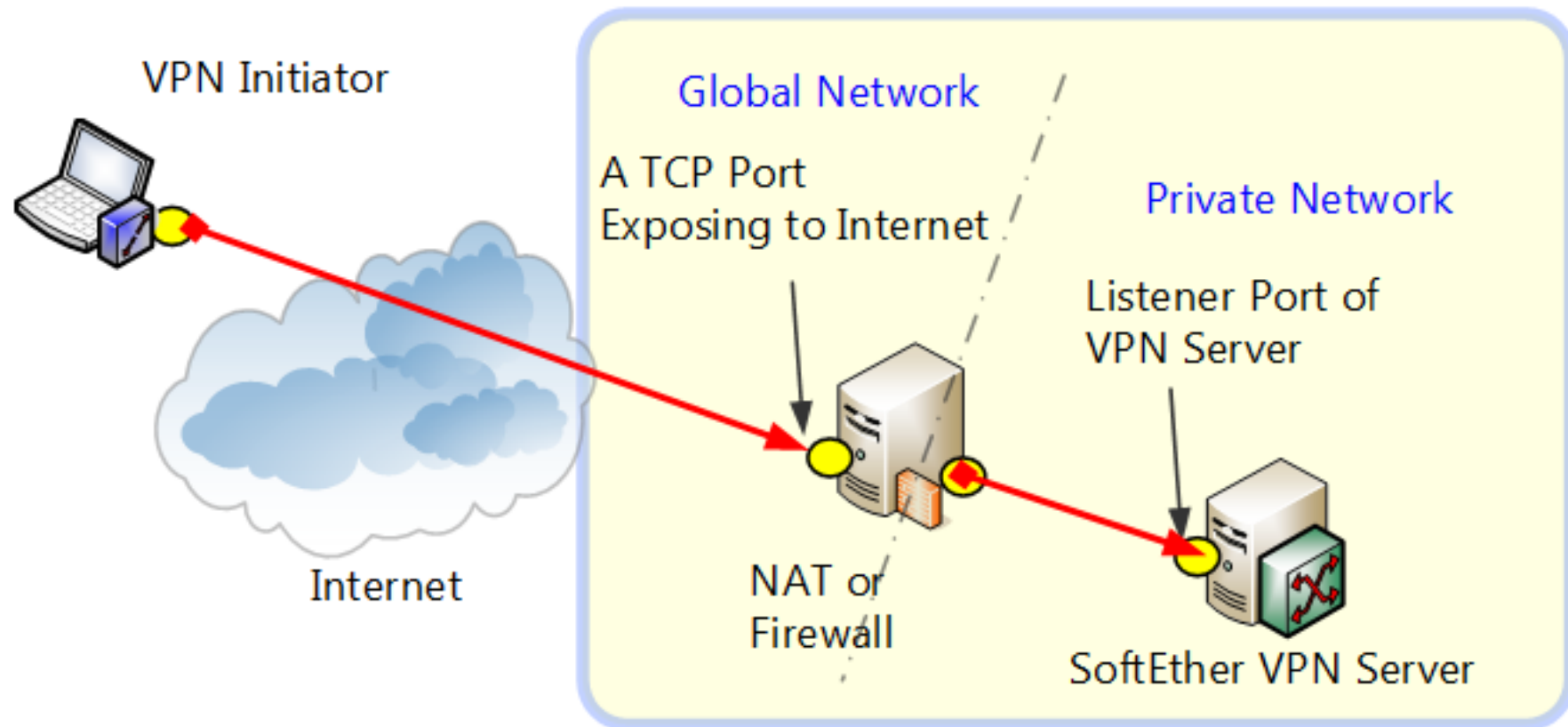
# FIREWALL

- Block incoming connection by port and address
- Block any incoming is usually a good idea for most user.
- Behind NAT doesn't mean safe. Your friend can be your worst nightmare.



Proxy vs. Firewall

# VIRTUAL PRIVATE NETWORK (VPN)



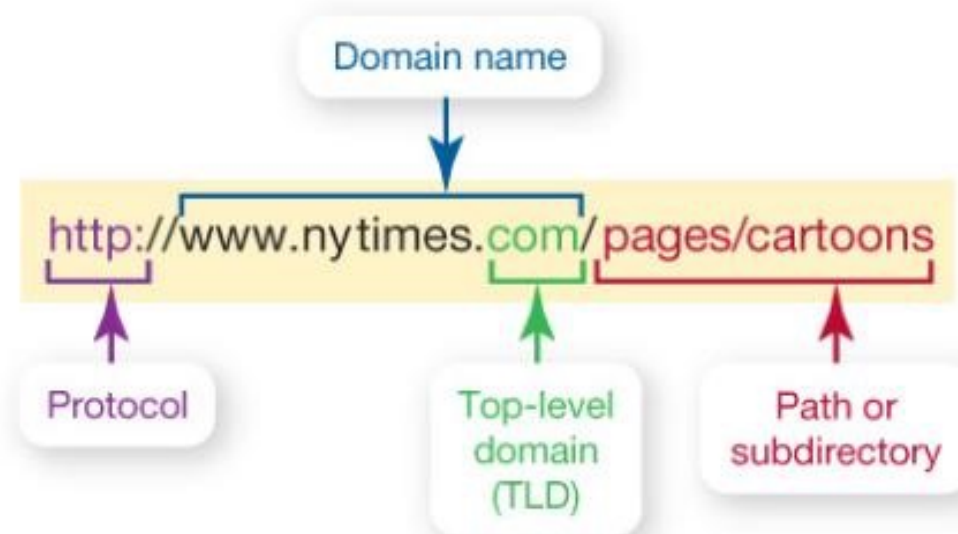
Mahidol VPN: <https://vpn.mahidol.ac.th>

# GETTING AROUND THE WEB: URLS, HYPERLINKS, AND OTHER TOOLS (1)

- How do we find anything in the Internet
- IP address?
  - Too hard to remember something like  
113.21.241.54 (Do you know whose IP is this?)
- Name is easier for human but bad for computer
- Solution: Map a name to an IP

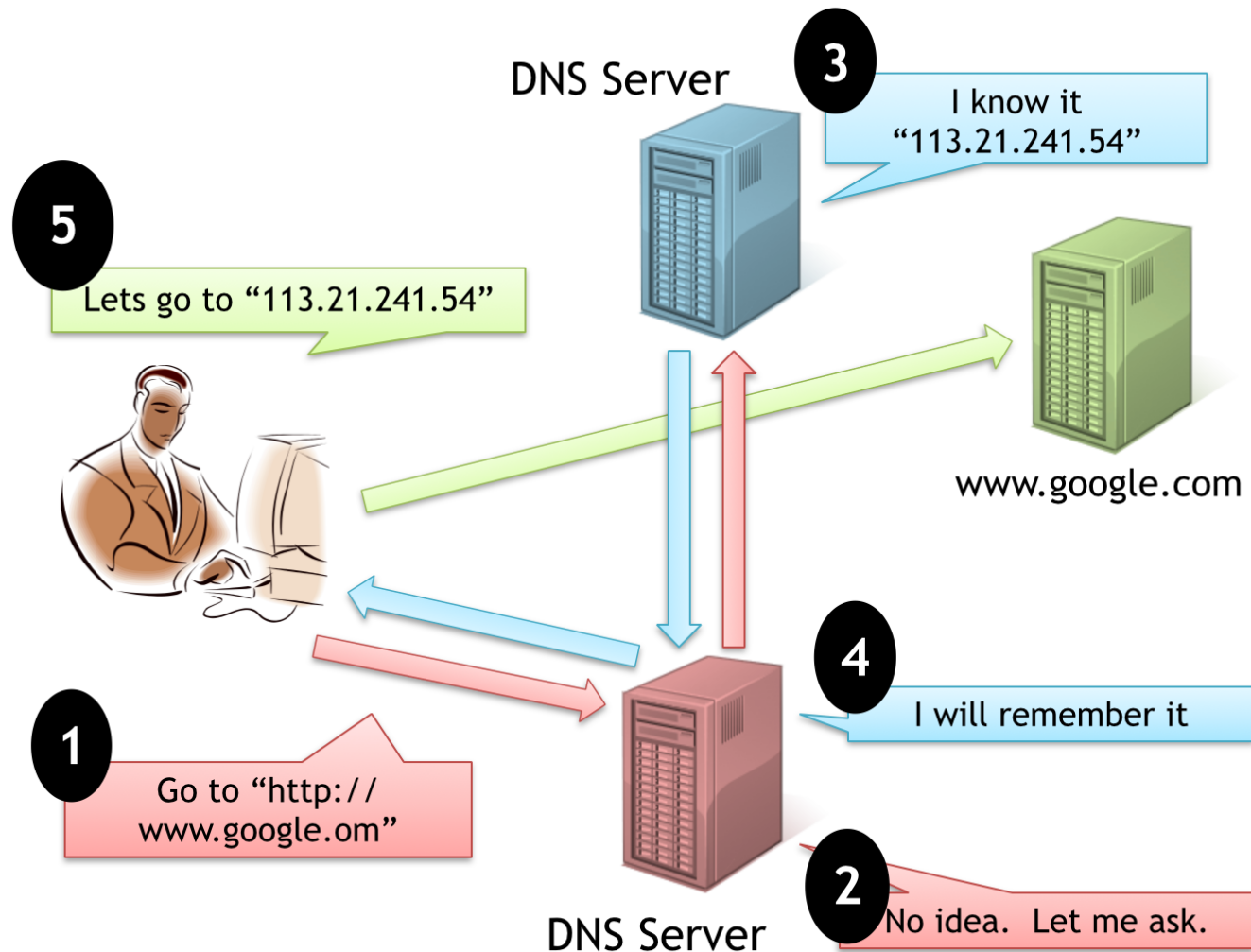
# GETTING AROUND THE WEB: URLS, HYPERLINKS, AND OTHER TOOLS (2)

- Every Web site has a unique address
- Uniform Resource Locator (URL)
- Type URL in browser to connect to home page
- Move around site using hyperlinks





# GETTING AROUND THE WEB: URLS, HYPERLINKS, AND OTHER TOOLS (3)



# GETTING AROUND THE WEB: URLS, HYPERLINKS, AND OTHER TOOLS (4)

- Who controls DNS?
- <http://www.icann.org> controls the top
- .com, .th, .org, ...

www.mahidol.ac.th

The diagram illustrates the components of the domain 'www.mahidol.ac.th'. A single blue arrow points from the text 'Host Name' to the 'www' part of the domain. Three blue arrows point from the text 'Domain Name' to the 'mahidol', 'ac', and 'th' parts of the domain.

Host Name      Domain Name

- You can register your own domain – Pay

# GETTING AROUND THE WEB: URLS, HYPERLINKS, AND OTHER TOOLS (5)

<b>Domain Name</b>		<b>Who Can Use the Domain Name</b>
.com	.co.th	Originally for commercial sites but can be
.edu	.ac.th	Degree-granting institutions
.gov	.go.th	Local, state, and United States government
.name	.in.th	Individuals
.mil	.mi.th	United States military
.org	.or.th	Organizations (often nonprofits)
.net	.net.th	Originally for networking organizations, no
.biz	-	Businesses
.info	-	Information service providers

# WHAT IS E-MAIL ?

- Electronic mail (E-Mail) is an electronic form of the traditional postal mail.
- An e-mail message can reach the recipient's e-mail account within a few seconds.
- You can also send pictures, data files, audio, and even video clips with your e-mail messages.

# HOW E-MAIL WORKS ? (1)

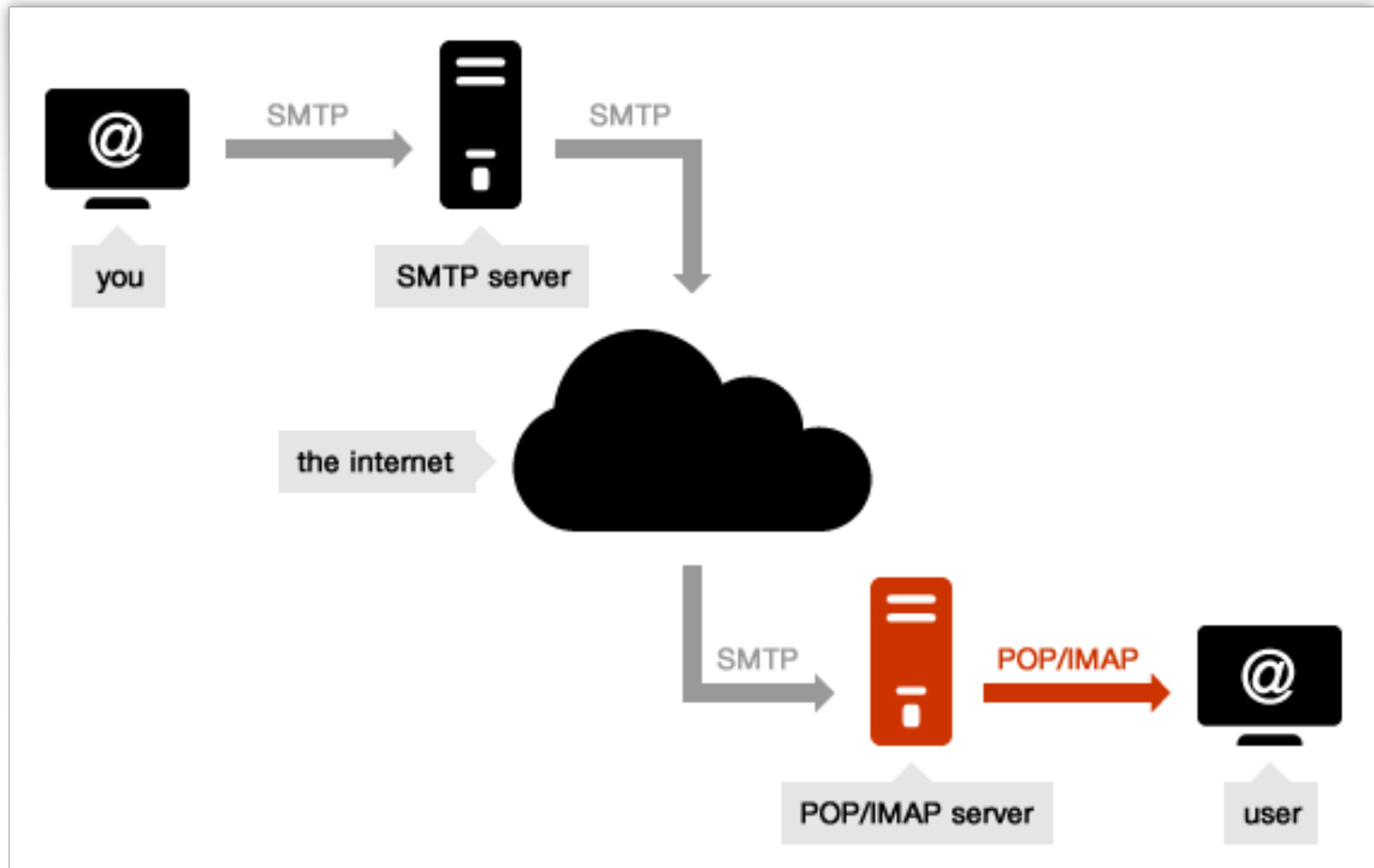
- To exchange e-mail messages with other people, you need to have an e-mail address for yourself.
- You can obtain an e-mail address by opening an account with an e-mail service provider.
- You need to know the e-mail address of the person to whom you want to send the e-mail message.

# HOW E-MAIL WORKS ? (2)

- An e-mail address has two parts separated by the @ symbol: johndoe@example.com

Information	Description
someone	This is the name you use to create your e-mail address. People recognize the e-mail address with the help of the user name. When you open an account with an e-mail service provider, you can specify your user name. The user name that you specify should be unique. The e-mail service provider checks if the user name you provide already exists. If it exists, you need to provide another user name.
@	The @ symbol separates the user name from the remaining part of the e-mail address.
example.com	This represents the domain name of the mail server, where all your e-mail messages are stored.

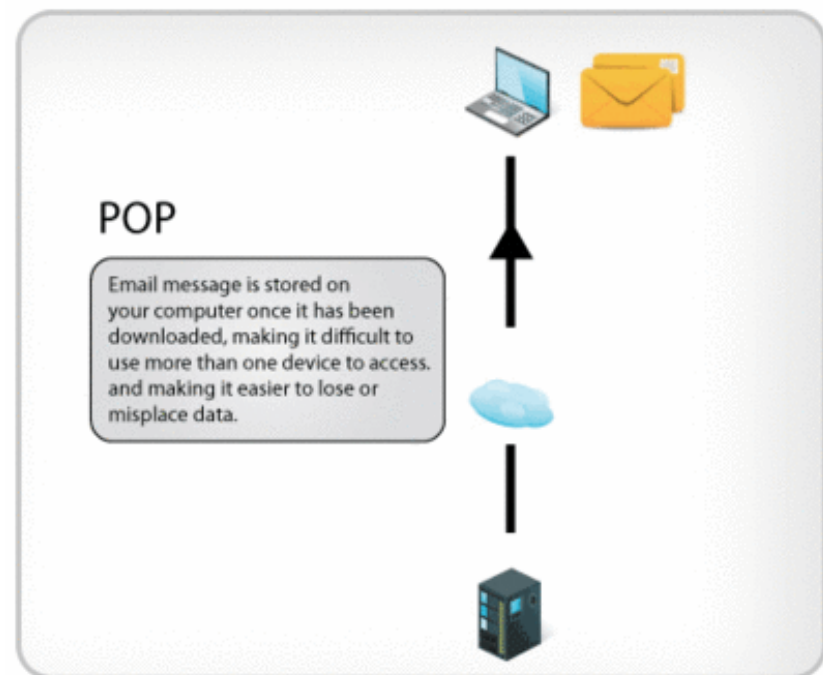
# HOW E-MAIL WORKS ? (3)





# POP3 VS. IMAP

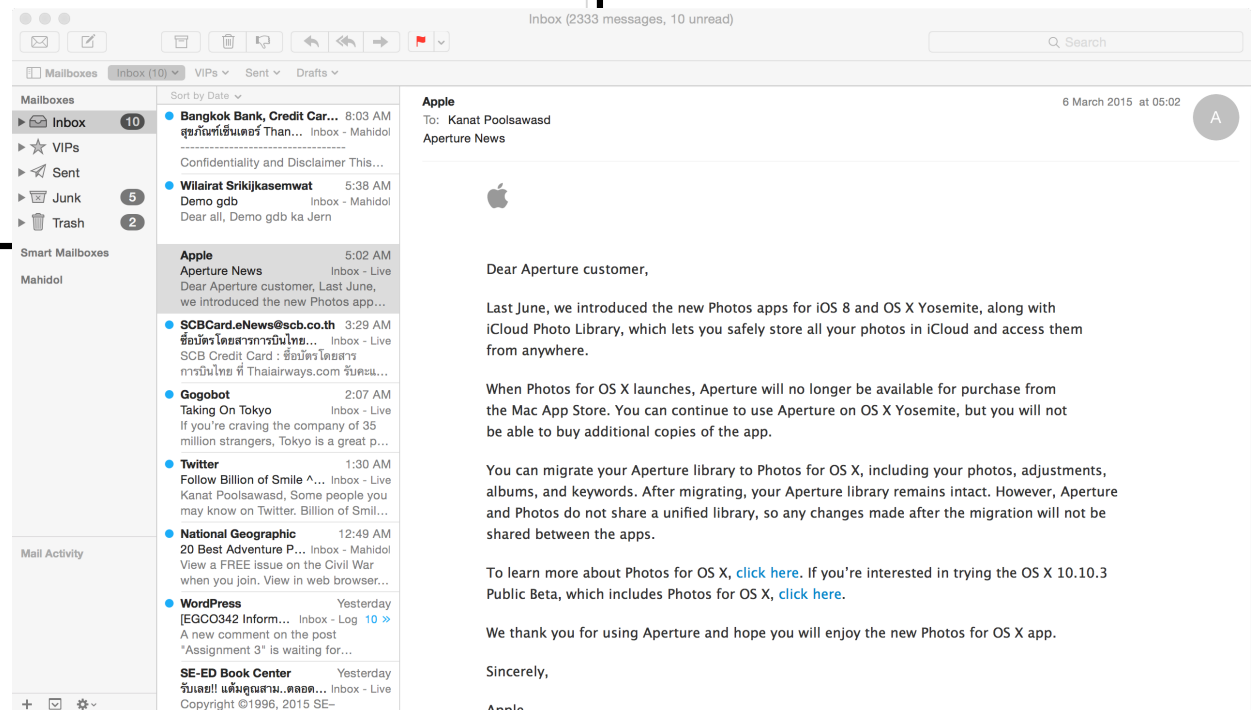
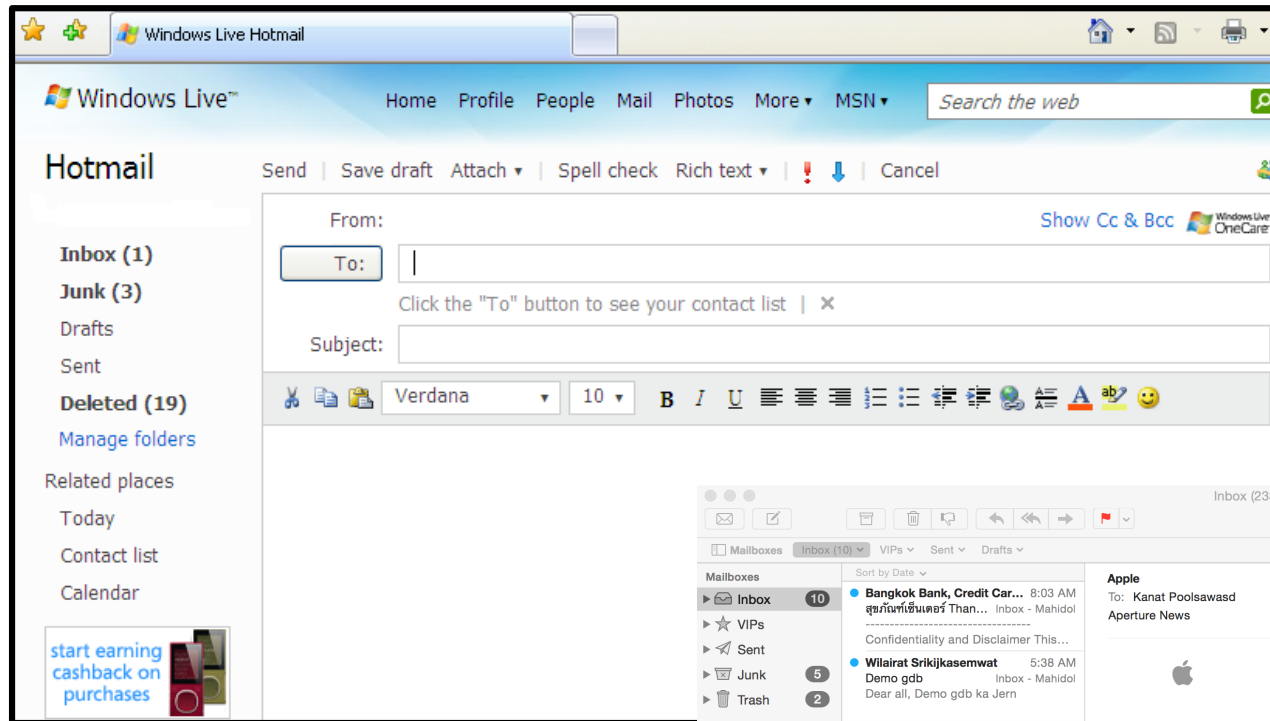
- Post Office Protocol v.3 (POP3)
- Internet Message Access Protocol (IMAP)



# E-MAIL CLIENT (1)

- There are two types of e-mail clients, local and Web-based.
  - Local e-mail clients are installed on your computer, and you can use them to save e-mail messages to your hard disk. Microsoft Outlook® Express is an example of a local e-mail client.
  - Web-based e-mail clients : You can send and open e-mail messages by using the Web-based e-mail client. MSN Hotmail® is an example of a Web-based e-mail client.

# E-MAIL CLIENT (2)



# THE PARTS OF AN E-MAIL

- To : enter the exact email address of your recipient  
(remember: name@provider.domain)
  - For multiple recipients, separate each address with a comma
- CC : Carbon Copy
- BCC : Blind Carbon Copy
- Subject : the topic of your email – very important
- Body : the message of your email
- Attachments : the paperclip symbol - files or photos

# REPLYING TO AN E-MAIL

- Reply vs Reply All
- When you click on Reply, your message will automatically be sent to the person who sent you the email (FROM field in header.)
- When you click on Reply All, your message will automatically be sent to the person who sent you the email AND everyone in the TO and CC fields in the header.

# FORWARDING AN E-MAIL

- When you click on FORWARD, you may share the email you've received by sending it to others.
- You may add your own message before sending.

# OPENING ATTACHMENTS















- Usually photos or documents
- If you don't know the sender, do NOT open the attachment
- SAVE vs OPEN file dialog box



# DELETING E-MAIL & TRASH CAN

- Once you've read an email, you must decide if you want to save it or delete it.
- Click on delete to send the email to the TRASH CAN
- The message disappears from your list of messages but is not truly deleted yet, so if you make a mistake you can get the message back.
- Just look in the Trash folder. However, once you exit the program, the messages are usually deleted for good.

# EMOTICONS

Facebook Emoticon	Meaning	Shortcut
	Smile	:-) :) :] =)
	Sad	:-( :( :[ =(
	Tongue	:-P :-p :-p :p =P
	Wink	;-) ;)
	Big Smile	:-D :D =D
	Surprised	:-O :O :-o :o
	Cry	:'(
	Geek	8-) 8) B-) B)
	Cool	8-  8  B-  B
	Mad	>:( >:-(
	Very Angry	>:O >:-O >:o >:-o
	Thinking	:/ :-/ :  :-\
	Confused	o.O O.o
	Kiss	:-* :*
	Devil	3:) 3:-)
	Angel	O:) O:-)
	Heart	<3
	Very happy	^_^
	Moody One	^-^
	Pacman	:v
	Curly Lips	:3
	Robot	: ]
	Chris Putnam	:putnam:
	Shark	(^^^)
	Penguin	<(")

# SEARCHING THE WEB EFFECTIVELY

- Narrow down the vast quantity of Web information by using:
  - Search engine: a set of programs that searches the Web for keywords
  - Subject directory: a structured outline of Web sites organized by topics
  - Metasearch engine: searches other search engines rather than individual Web sites

# HOW GOOGLE WORKS

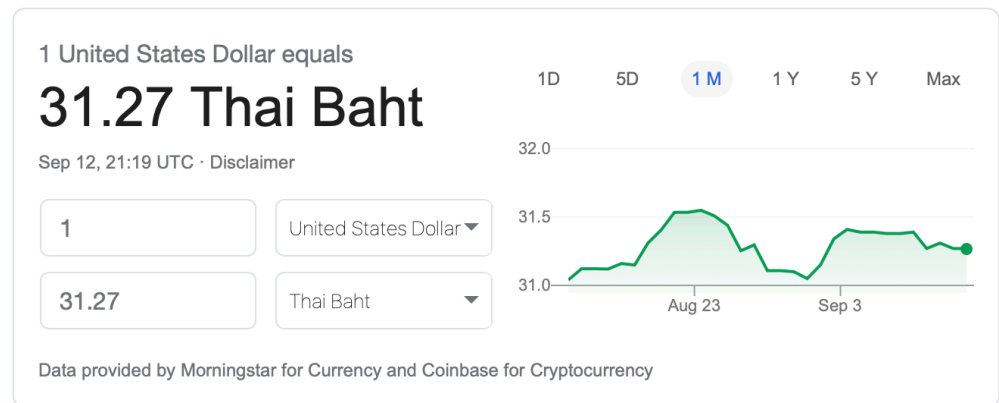
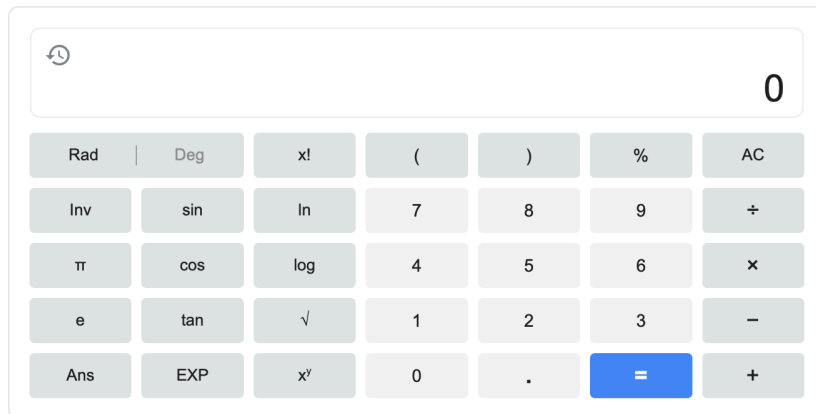
- Google takes
  - The phrase hits (the Xs),
  - The adjacency hits (the Ys),
  - The weights hits (the Zs), and
- About 100 other secret variables
- Throws out everything but the top 2,000
- Multiplies each remaining page's individual score by it's "PageRank"
- And, finally, displays the top 1,000 in order.

# GOOGLE SEARCH STRATEGIES (1)

- Use Quotes
- Boolean operators (AND, NOT, OR)
- Use a colon to search specific sites
  - Example: Students site: mahidol.ac.th
  - Example: "Mahidol University" filetype: pdf
- Use a wild card
  - Example: "Google \* my life"
- Use near me to search location around me.
  - Example: Pizza near me
  - Example: Pizza nearby Salaya

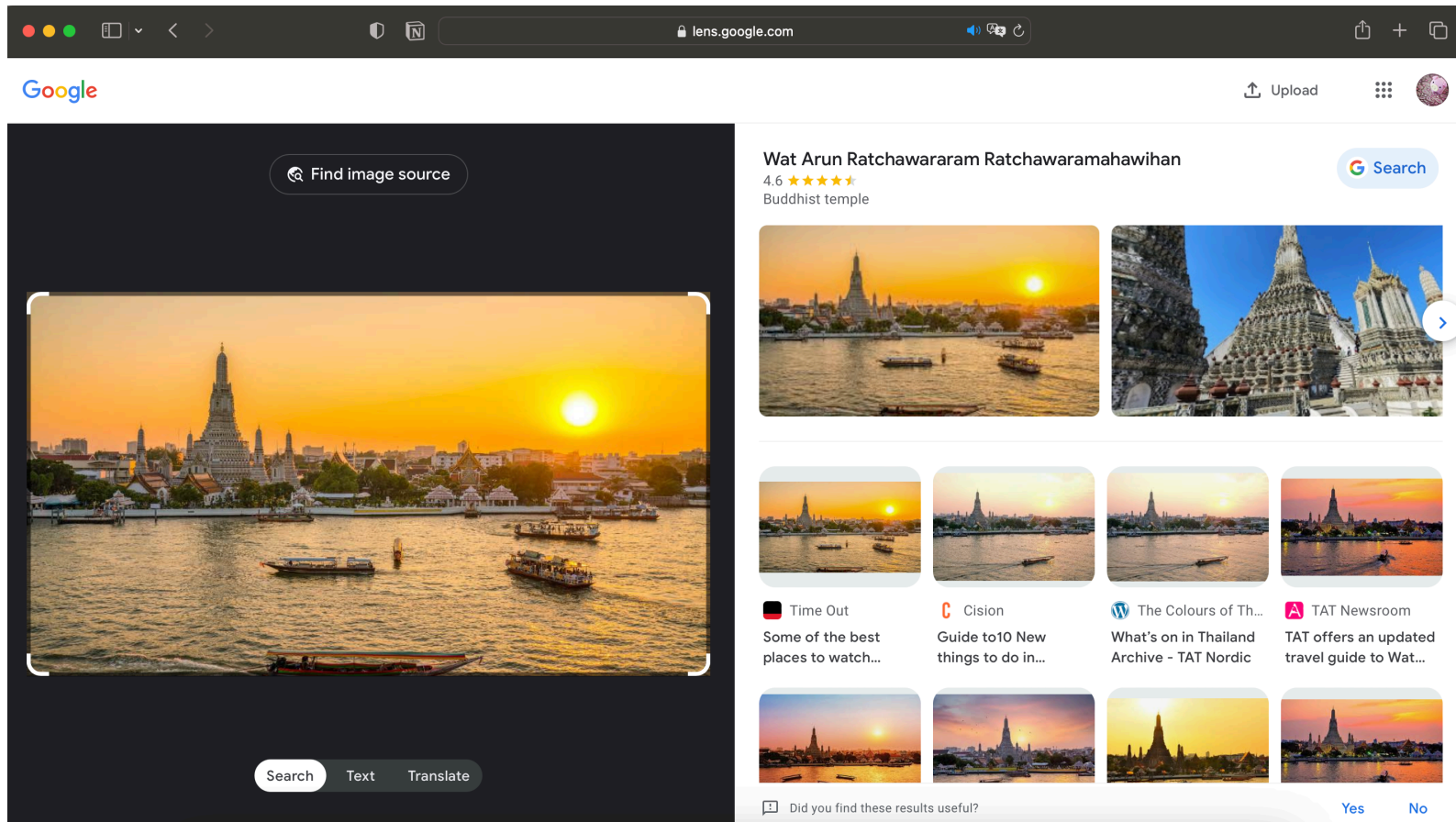
# GOOGLE SEARCH STRATEGIES (2)

- Search a range of numbers
  - Example: ရတနာ 100,000 .. 500,000
- Use Google search to do math or unit conversion



# GOOGLE IMAGES SEARCH

- You can upload the image to google lens.
  - <https://images.google.com>





# OTHER FEATURE IN GOOGLE (1)

- Google Lens
- Google Maps, Google Earth
- Google Drive
- Google Mail (GMail)
- Youtube (Google bought it in 2006)

# OTHER FEATURE IN GOOGLE (2)

- WebGL
  - Try:  $\sqrt{x^2+y^2}+3*\cos(\sqrt{x^2+y^2})+5$  or
  - Try:  $5+(-\sqrt{1-x^2-(y-\text{abs}(x))^2})*\cos(30*((1-x^2-(y-\text{abs}(x))^2)))$ , x is from -1 to 1, y is from -1 to 1.5, z is from 1 to 6
  - Visit: <http://www.webgl.com/2012/03/webgl-demo-google-search-3d-graph/>

**INTERESTING THINGS**

# ELECTRONIC TATTOOS



# MASSIVE-SCALE ONLINE COLLABORATION



# ASSIGNMENT 4

- Answer the following questions:
  - What is the age of the oldest living person? What are your sources?
  - For writing a research paper, find 3 methods for detecting fake images? What are your sources?  
(Note: You don't have to understand how they do it.)
  - Find out about dangers of Dihydrogen Monoxide. What are your sources?