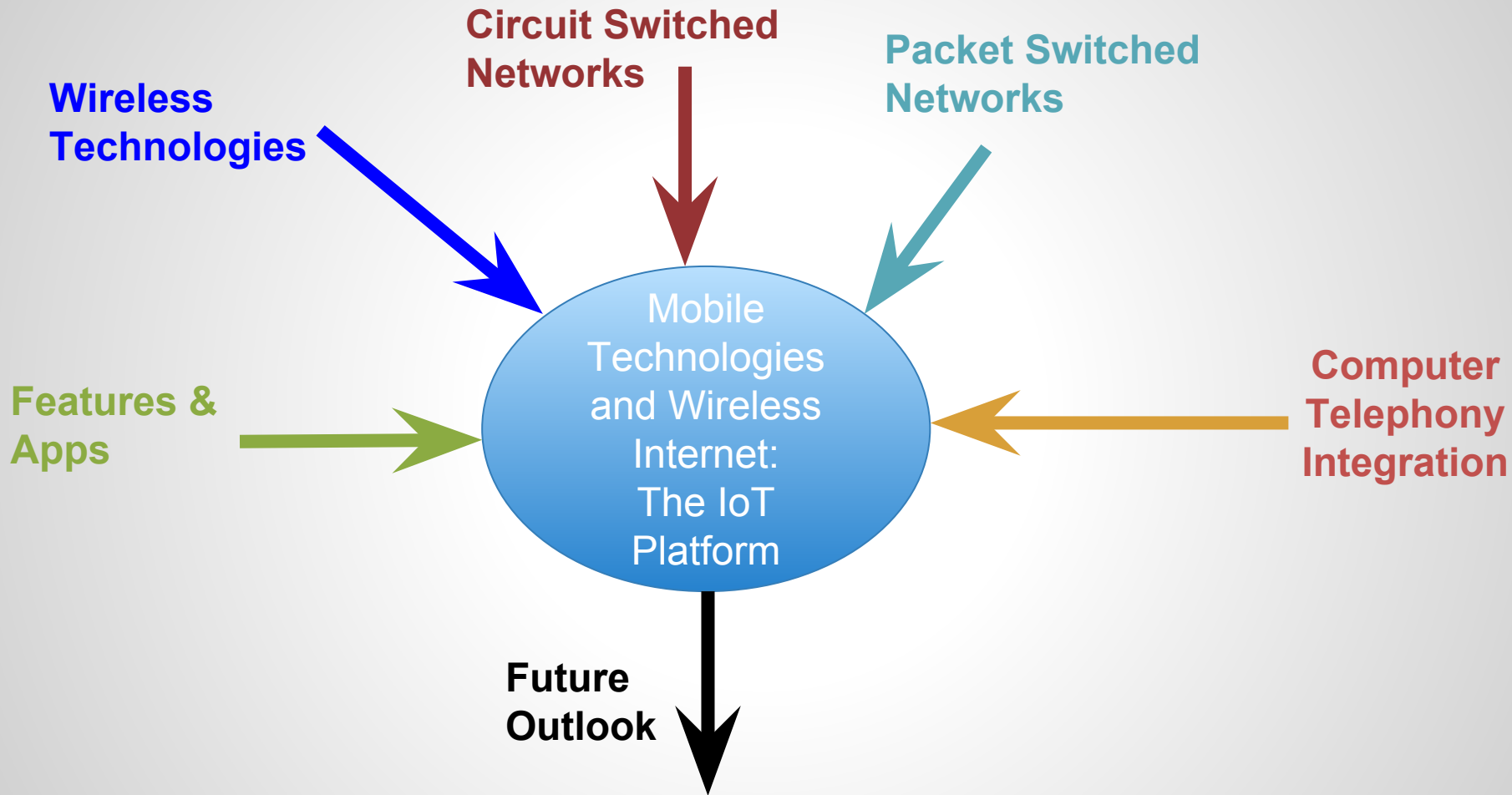


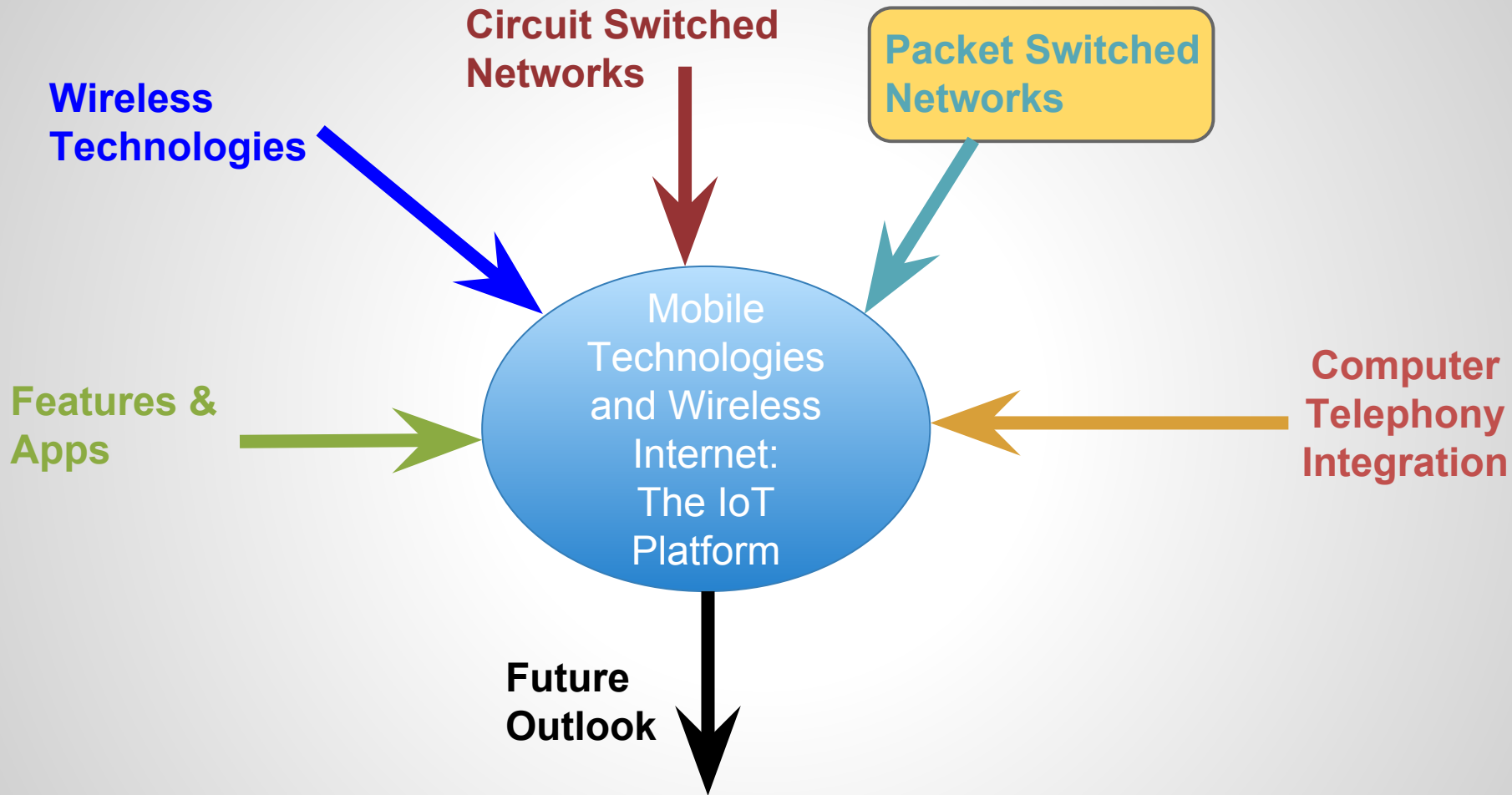
Internet of Things:

Packet Switched Networks

Harinath Garudadri and Ganz Chockalingam

Qualcomm Institute of Calit2
University of California, San Diego





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Module 2 | Packet Switched Networks

IF YOU THINK ONE IMAGINE THE SYSTEM

The Bell System. It's an incredible operation.

It takes a mind-bending multitude of cables and switches and gear to make 114 million telephones talk to each other.

It takes a master plan to keep this system running 24 hours a day.

It takes a totally unified system to make it all work together.

It takes people who invent, who design, who manufacture, who

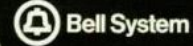
PHONE IS COMPLICATED, THAT LINKS 114 MILLION.

put it together and keep it together—so all the parts fit, all the pieces connect.

The result of all this planning is, quite simply, the best phone system in the world.

One Bell System.

It works.



Lesson 1

The Internet Initiative

Lesson 1 | The Internet Initiative

1 – CS and PS

2 – Brief History

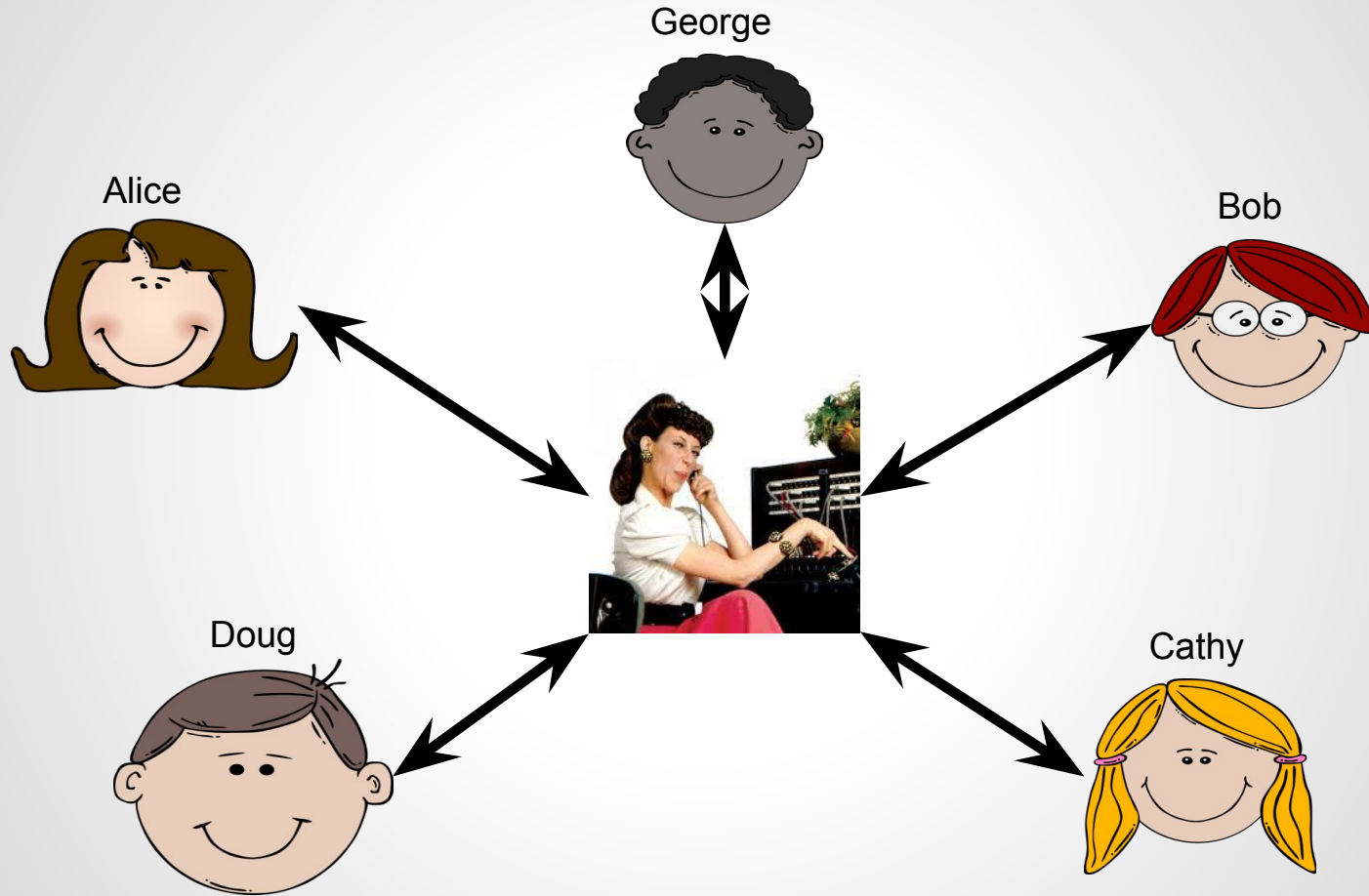
3 – TCP/IP Protocols

4 – Open Standards

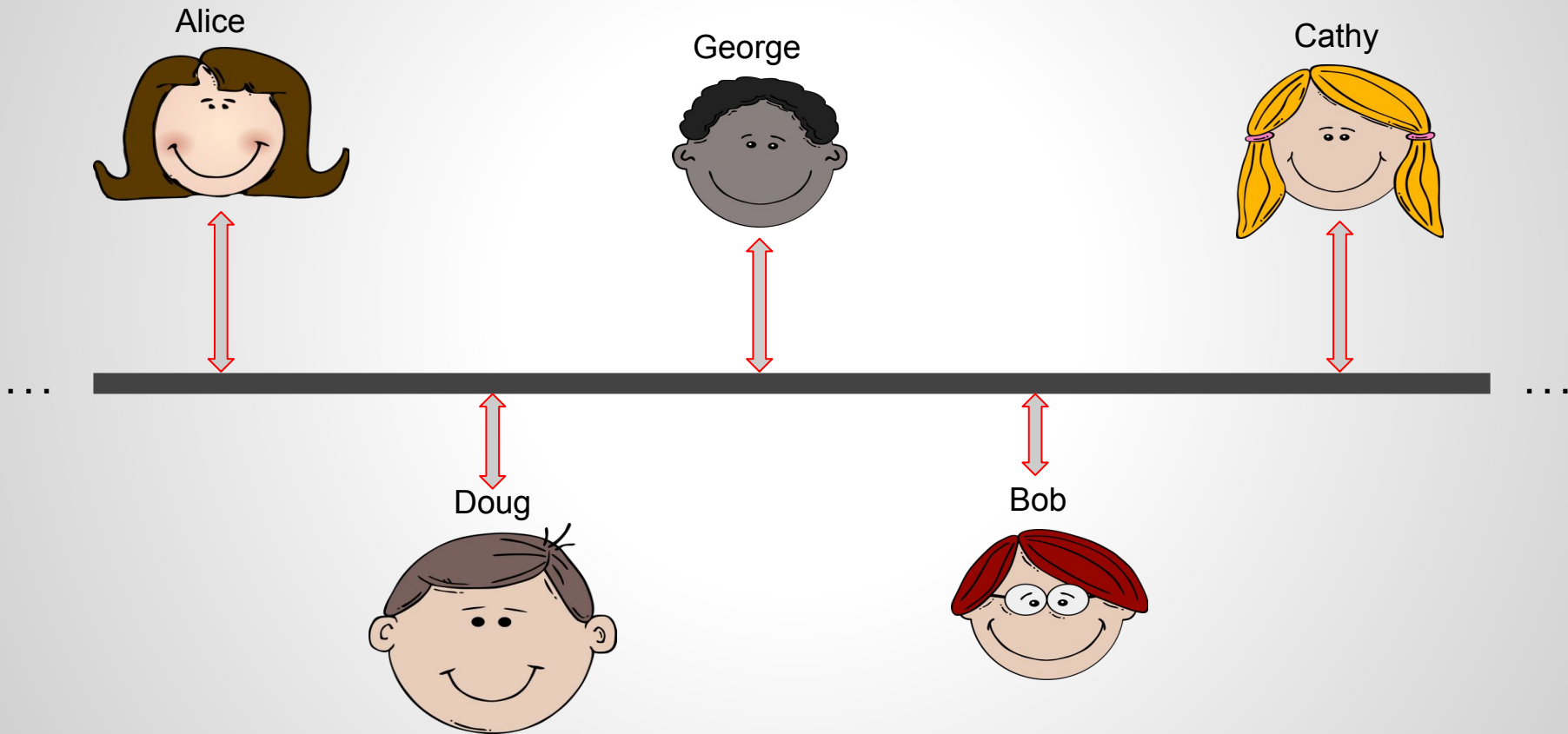


1 - CS and PS

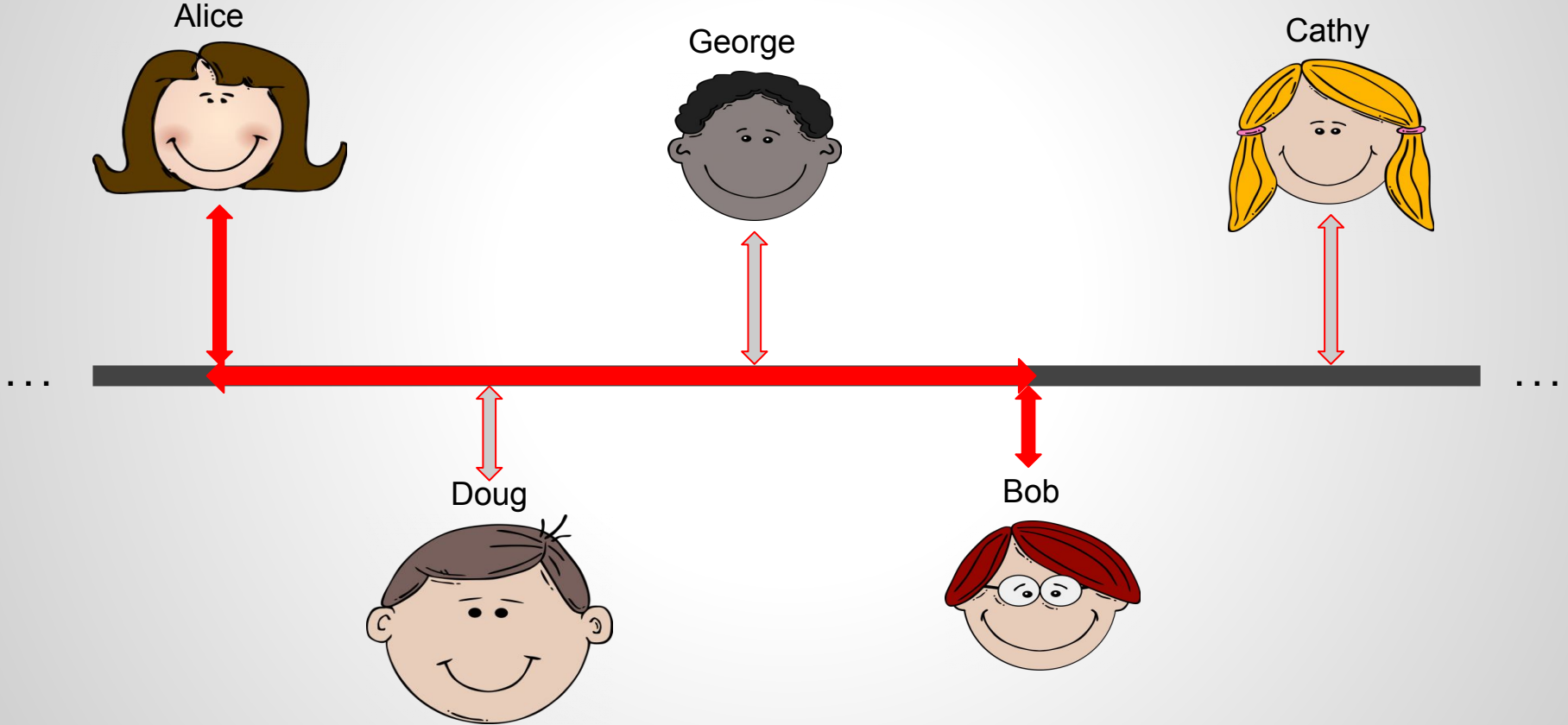
1 | CS and PS



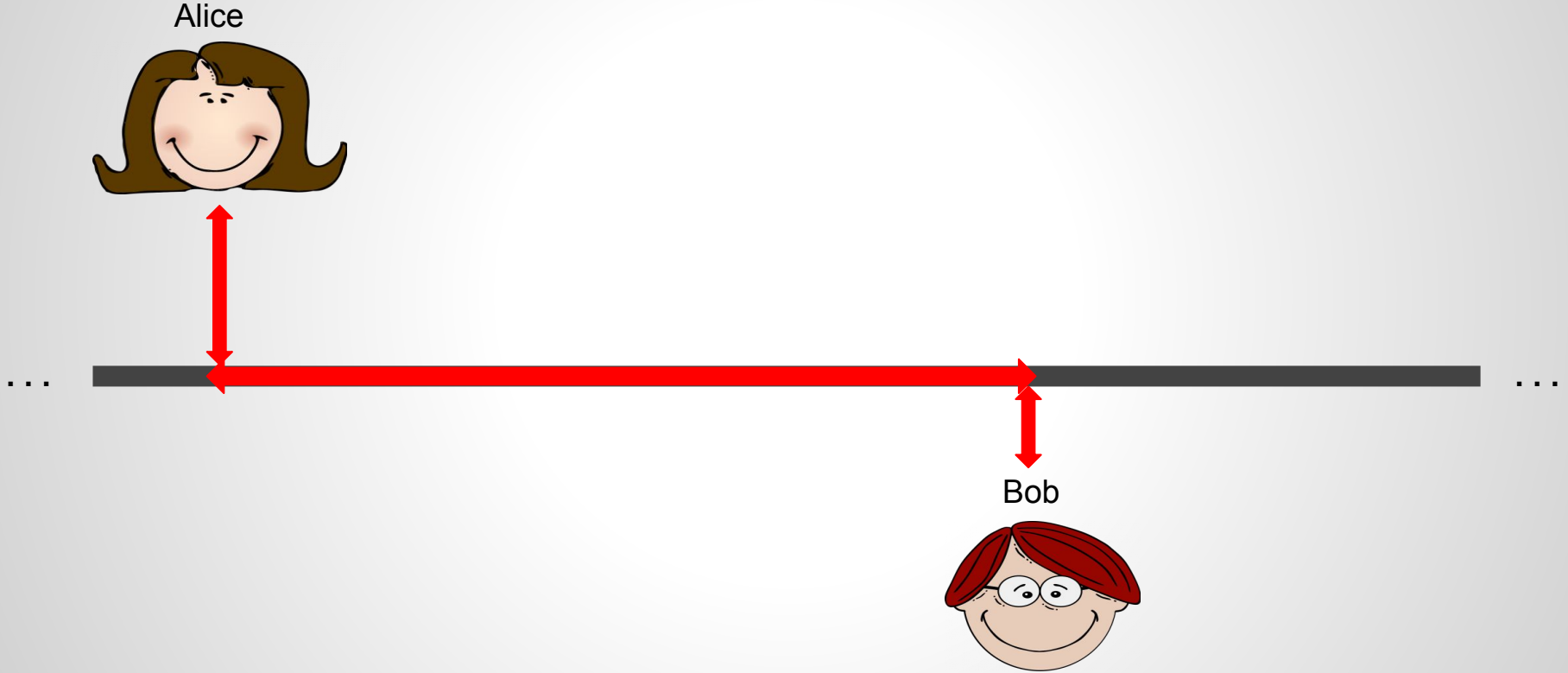
1 | CS and PS



1 | CS and PS

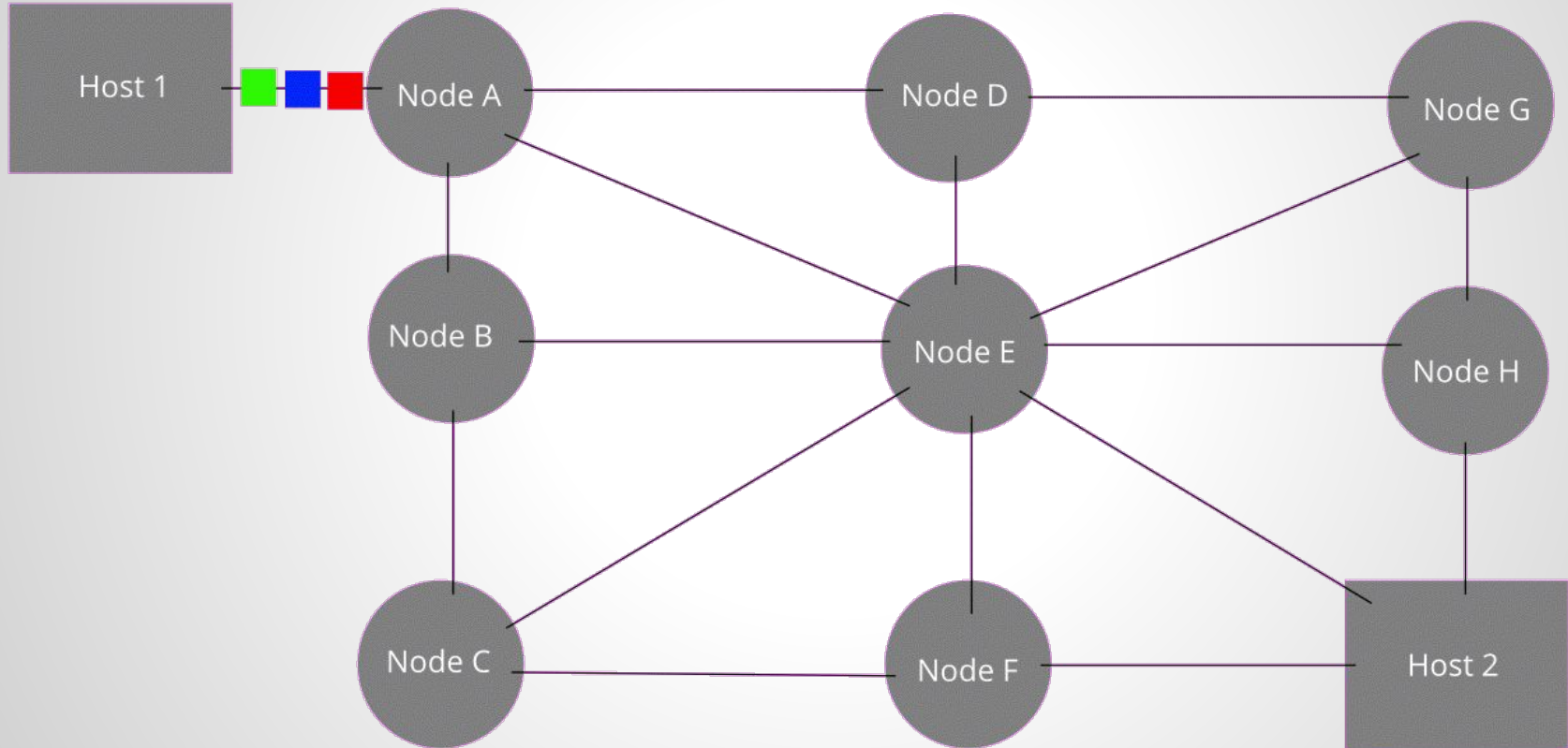


1 | CS and PS



1 | CS and PS

The original message is **Green**, **Blue**, **Red**.



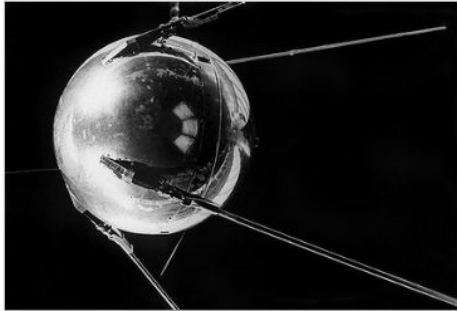
2 - Brief History

2 | A Brief History

INTERNET HISTORY

[HOME](#) / [INTERNET HISTORY](#) / [TIMELINE](#)

Timeline



WELCOME TO THE INTERNET HALL OF FAME'S LIVING HISTORY TIMELINE

Sputnik Image

1957

USSR Launches Sputnik

USSR launches Sputnik into space and, with it, global communications.

1958

Bell Labs Invents Modem

←

→

←

→

⌕

⌕

1956

1957

1958

1959

USSR Launches Sputnik

Bell Labs Invents Modem

U.S. Government Creates ARPA

2 | A Brief History

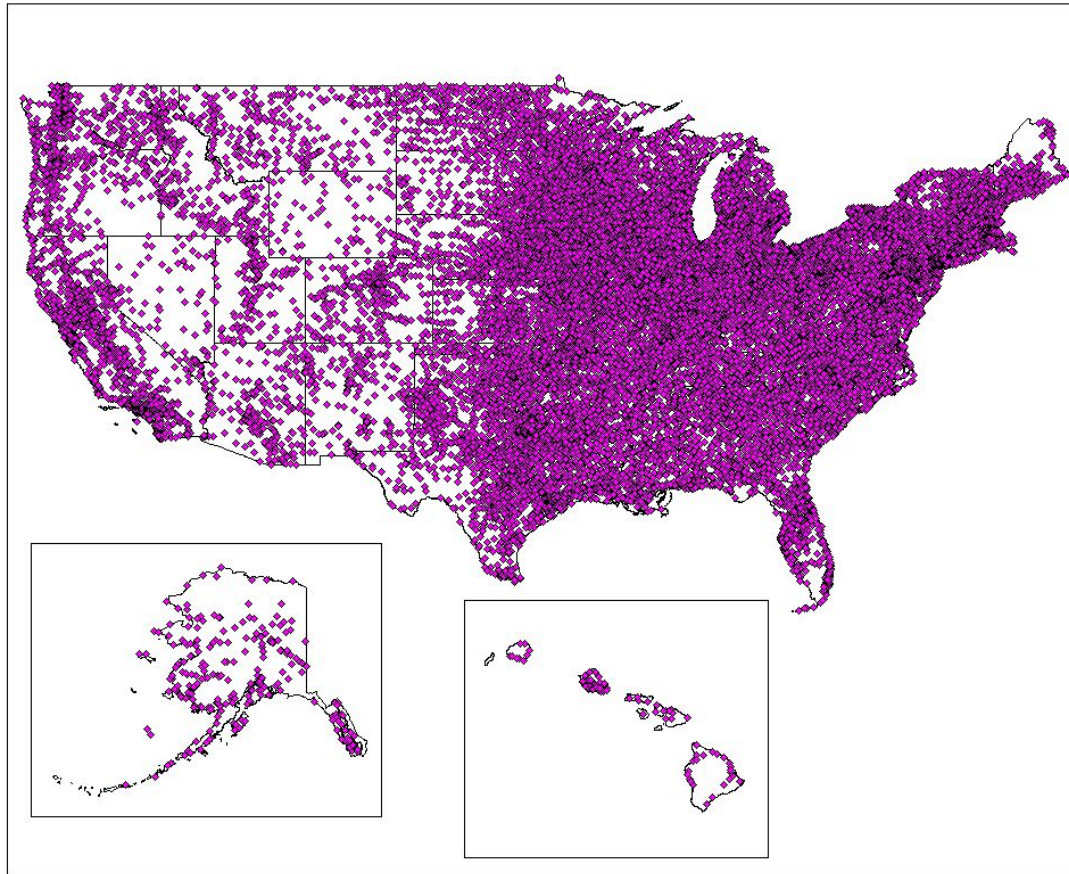


2 | A Brief History



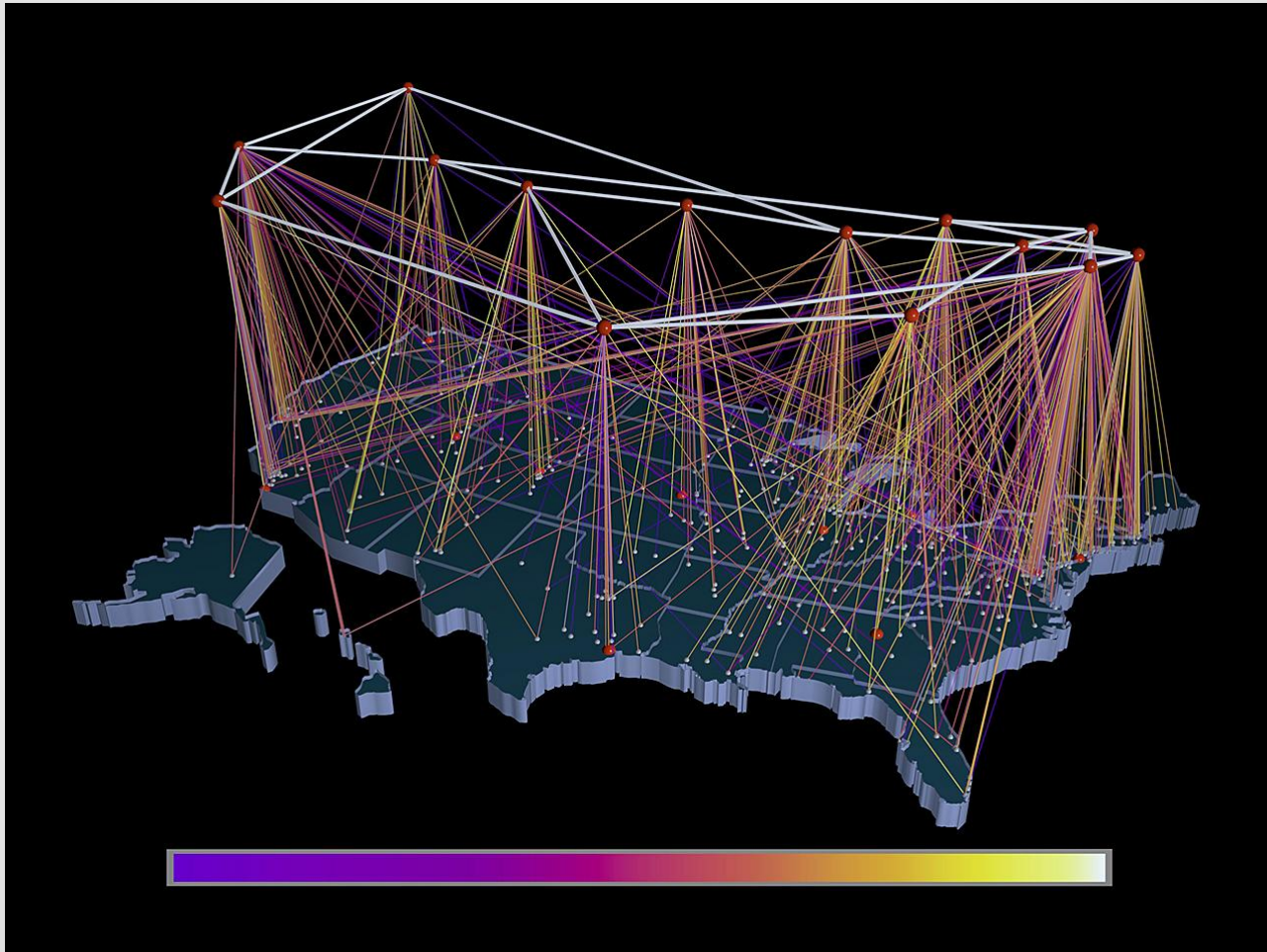
Symbolic representation of the Arpanet as of September 1974

2 | A Brief History

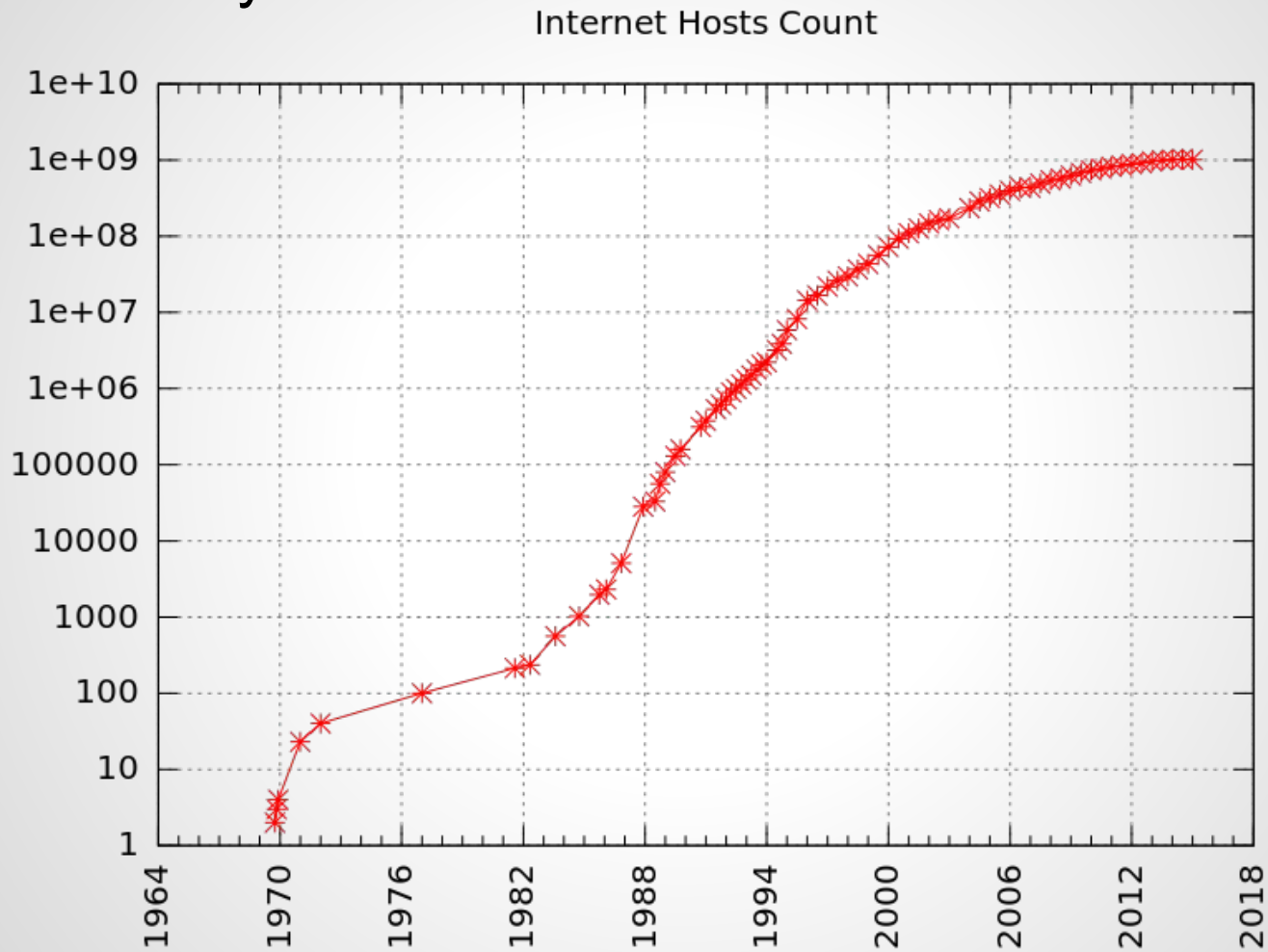


Map of the Central Office locations in the US

2 | A Brief History

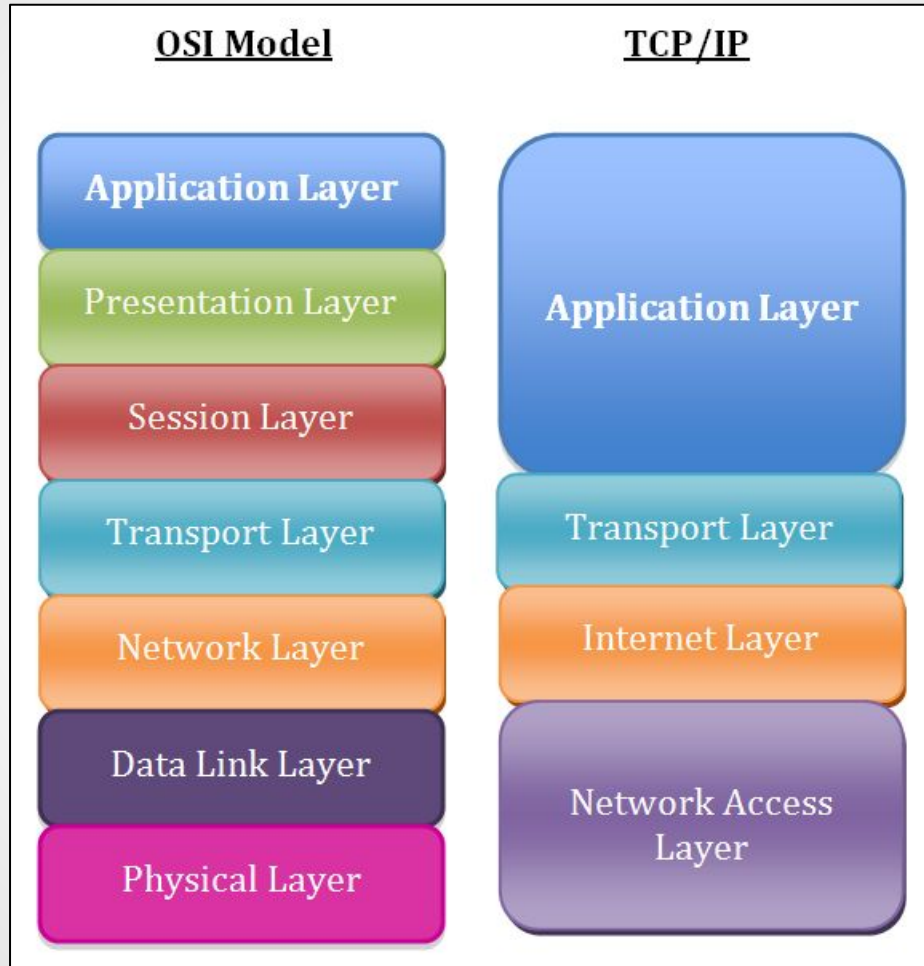


2 | A Brief History



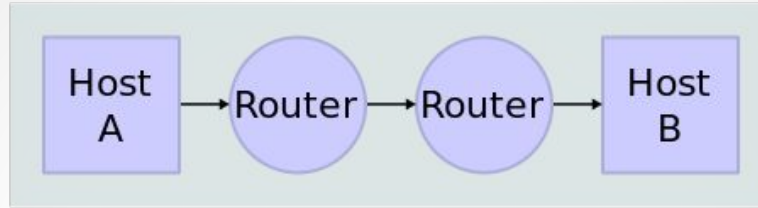
3 - TCP / IP Protocols

3 | TCP / IP Protocol

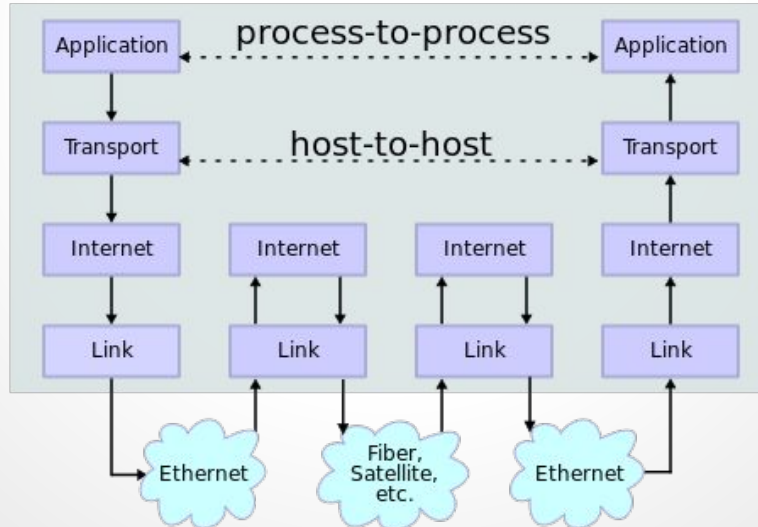


3 | TCP / IP Protocol

Network Topology

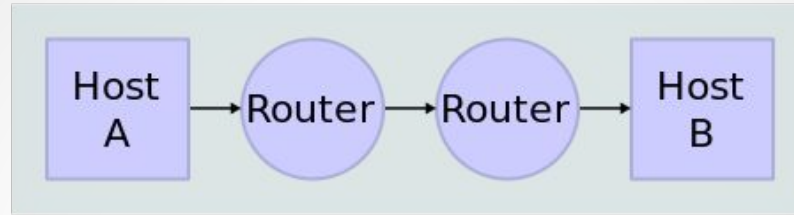


Data Flow

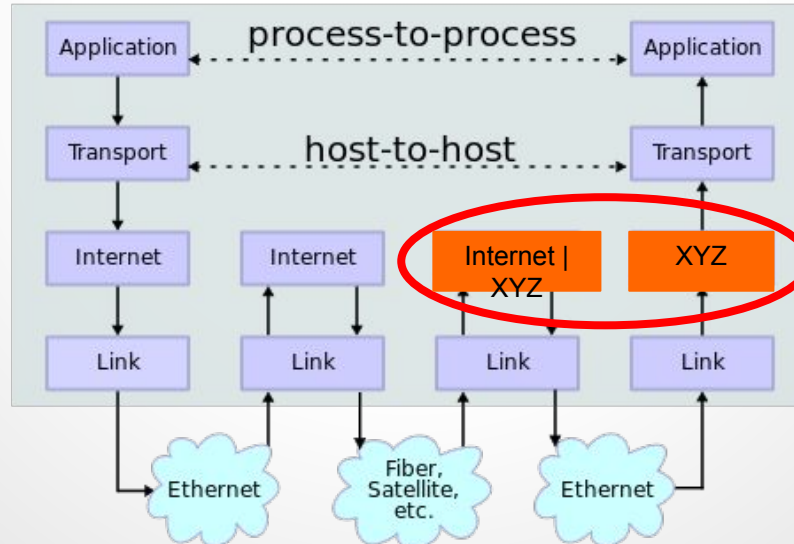


3 | TCP / IP Protocol

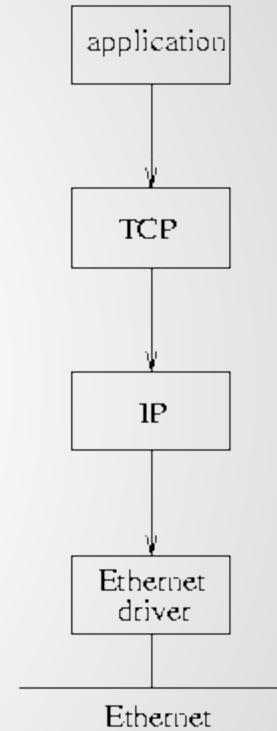
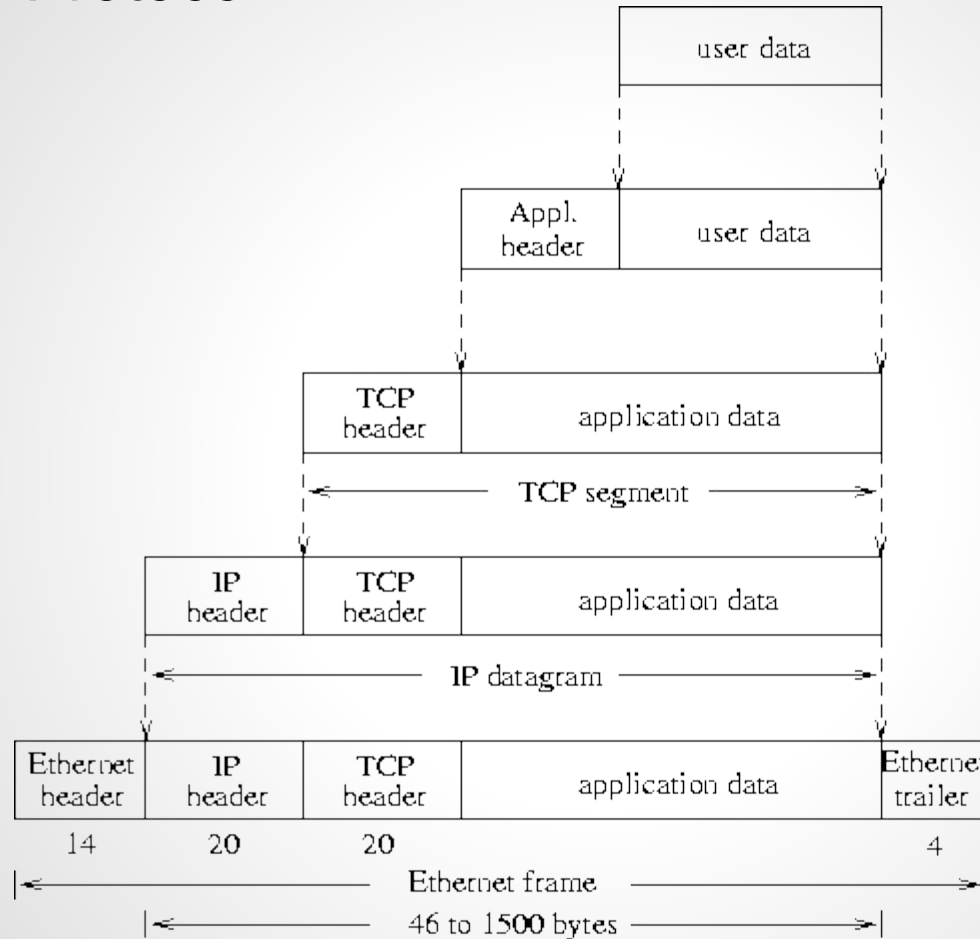
Network Topology



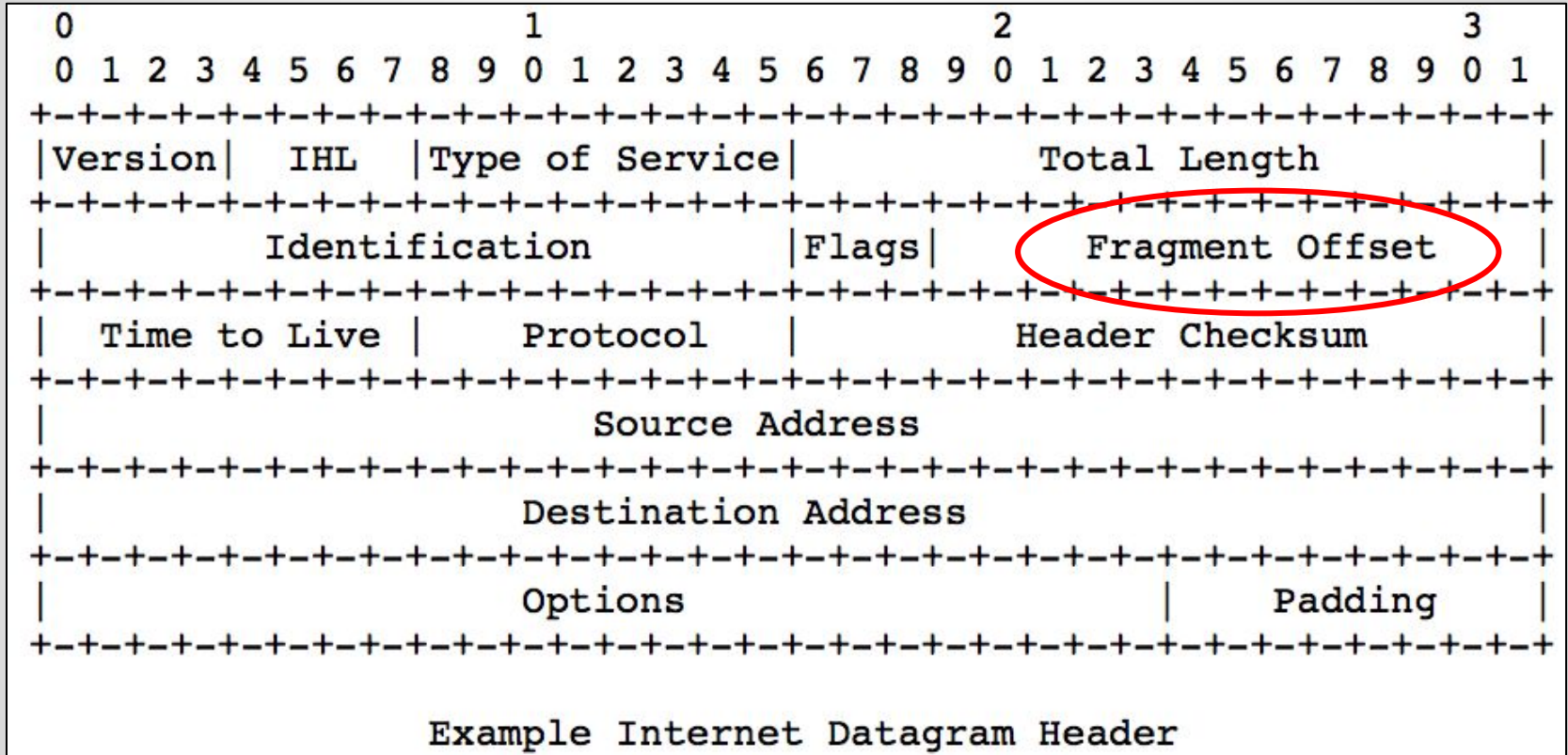
Data Flow



3 | TCP / IP Protocol

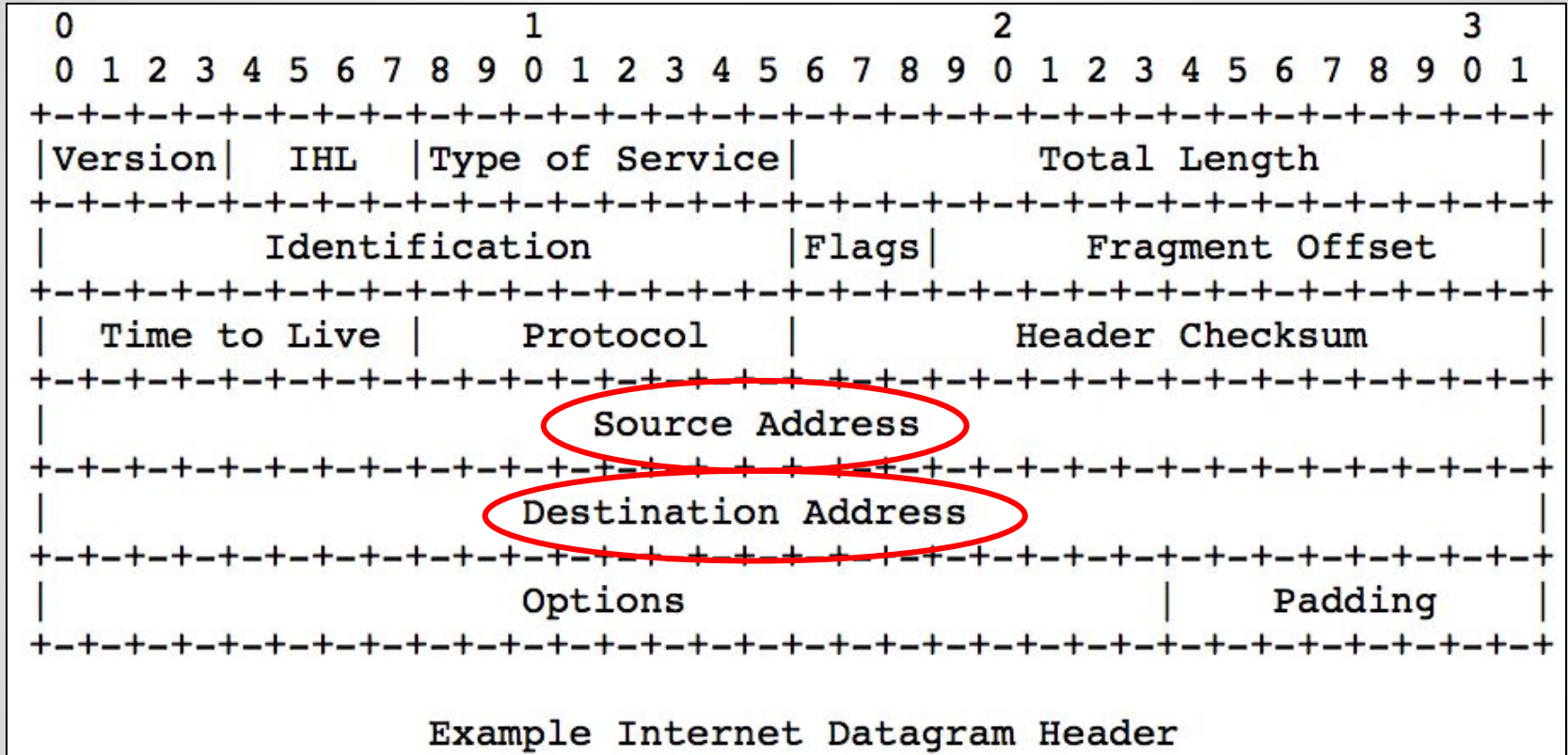


3 | TCP / IP Protocol



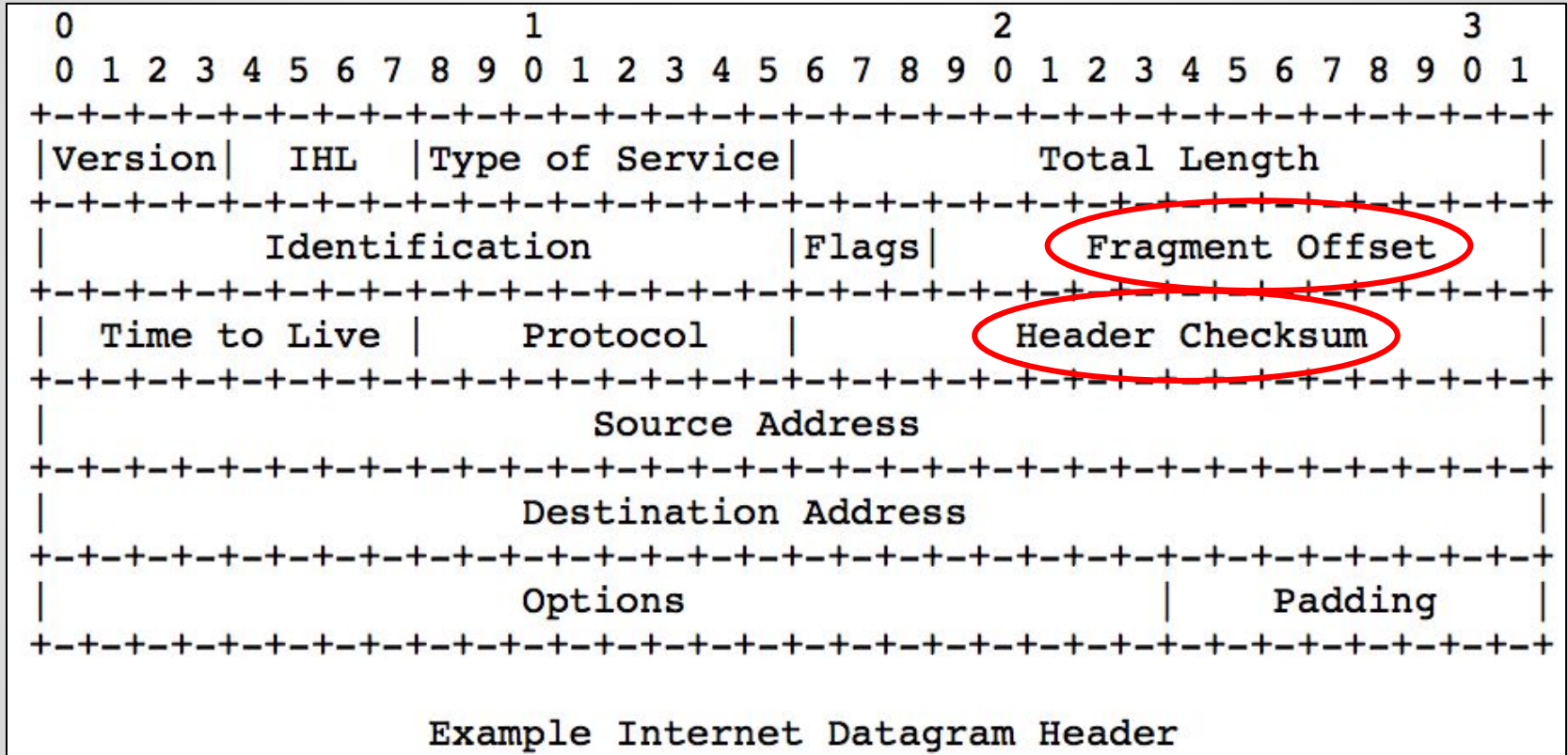
RFC 791 Internet Protocol

3 | TCP / IP Protocol



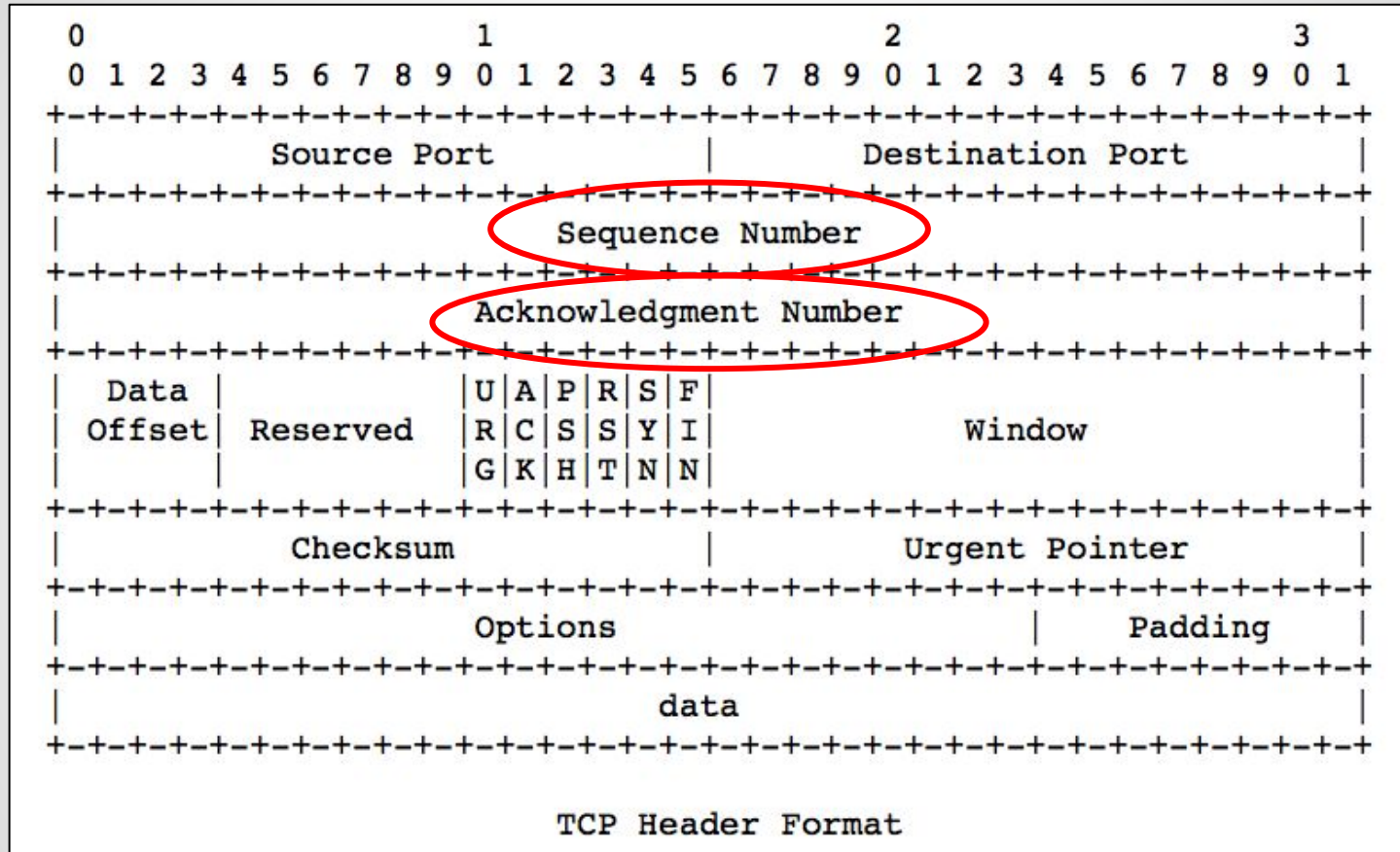
RFC 791 Internet Protocol

3 | TCP / IP Protocol



RFC 791 Internet Protocol

3 | TCP / IP Protocol



4 - Open Standards

The Internet Engineering Task Force (IETF®)

The goal of the IETF is to make the Internet work better.

The mission of the IETF is to make the Internet work better by producing high quality, relevant technical documents that influence the way people design, use, and manage the Internet. Newcomers to the IETF should [start here](#).

News



- [New Internet Engineering Steering Group and Internet Architecture Board Members Selected](#)
- [Contract Awards January 2015](#)
- [IETF 97 - Seoul, South Korea!](#)
- [IETF 98 - Montreal!](#)
- [IETF 95 - Buenos Aires!](#)
- [Juniper to Host IETF 96 in Berlin!](#)
- [Chair's Blog](#)
- [IETF Daily Dose](#)

Next Meeting: [IETF 94, Yokohama, Japan](#)

[IETF 94, Yokohama, Japan](#) (UTC +9)
November 1-6, 2015

- [Register](#)
- [Important Dates](#)
- IETF 94 Agenda
- [Meeting Materials](#)
- Venue Information
- Remote Participation



Lesson 2

Reliable Services

Lesson 2 | Reliable Services

1 – Email

2 – Browsing



1 - Email

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1 | Email

SMTP – Simple Mail Transfer Protocol, RFC 5321 (2821, 821)

IMAP – INTERNET MESSAGE ACCESS PROTOCOL - VERSION 4rev1, RFC 3501

MIME – Multipurpose Internet Mail Extensions, RFC 2405—2409

2 - Browsing

2 | Browsing



2 | Browsing



Cross-Site Scripting

HTML Code Injection

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Lesson 3

Realtime Services

Lesson 3 | Realtime Services

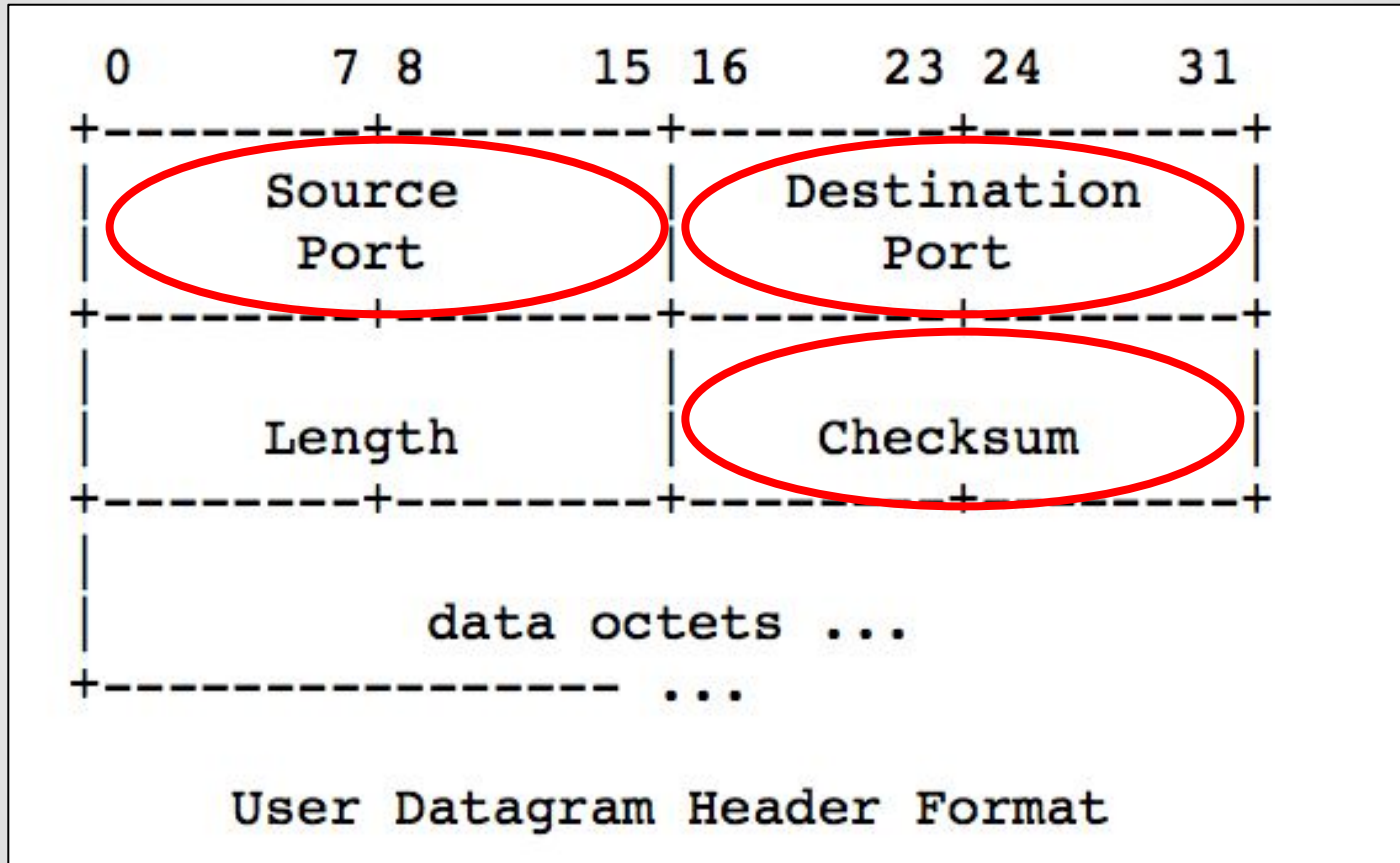
1 – Voice over RTP/UDP/IP or VoIP

2 – Broadcast/Multicast



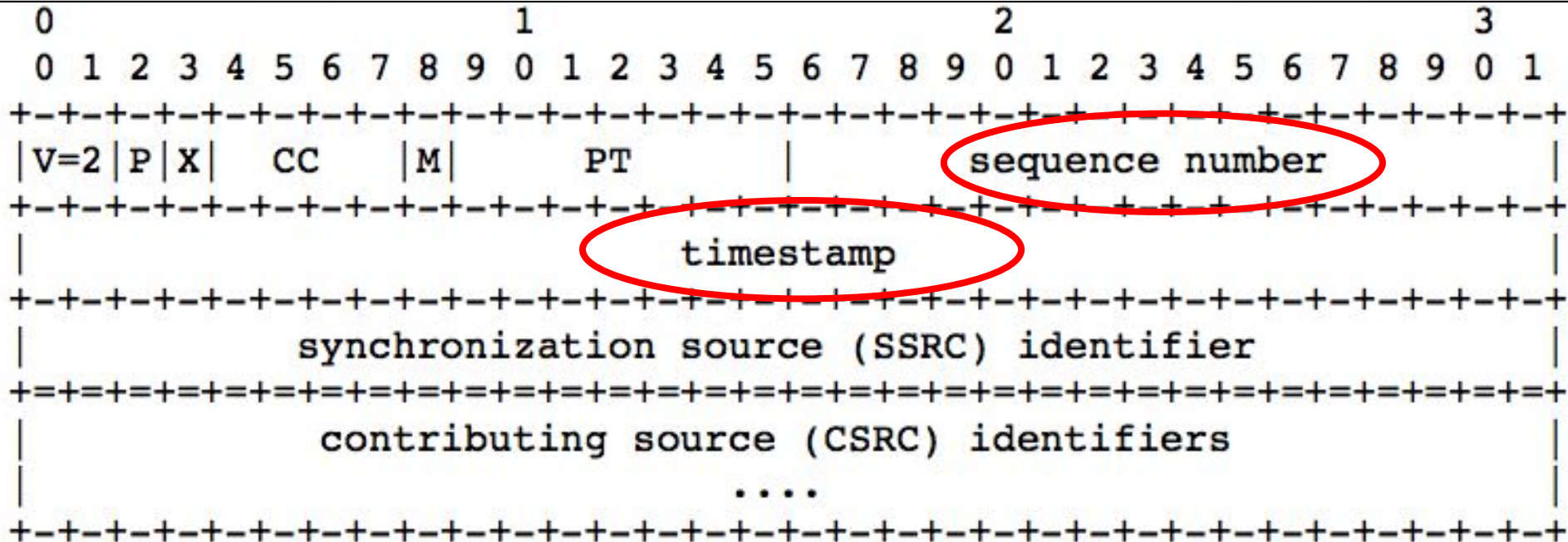
1 - Voice over RTP/UDP/IP or VoIP

1 | Voice over RTP/UDP/IP or VoIP



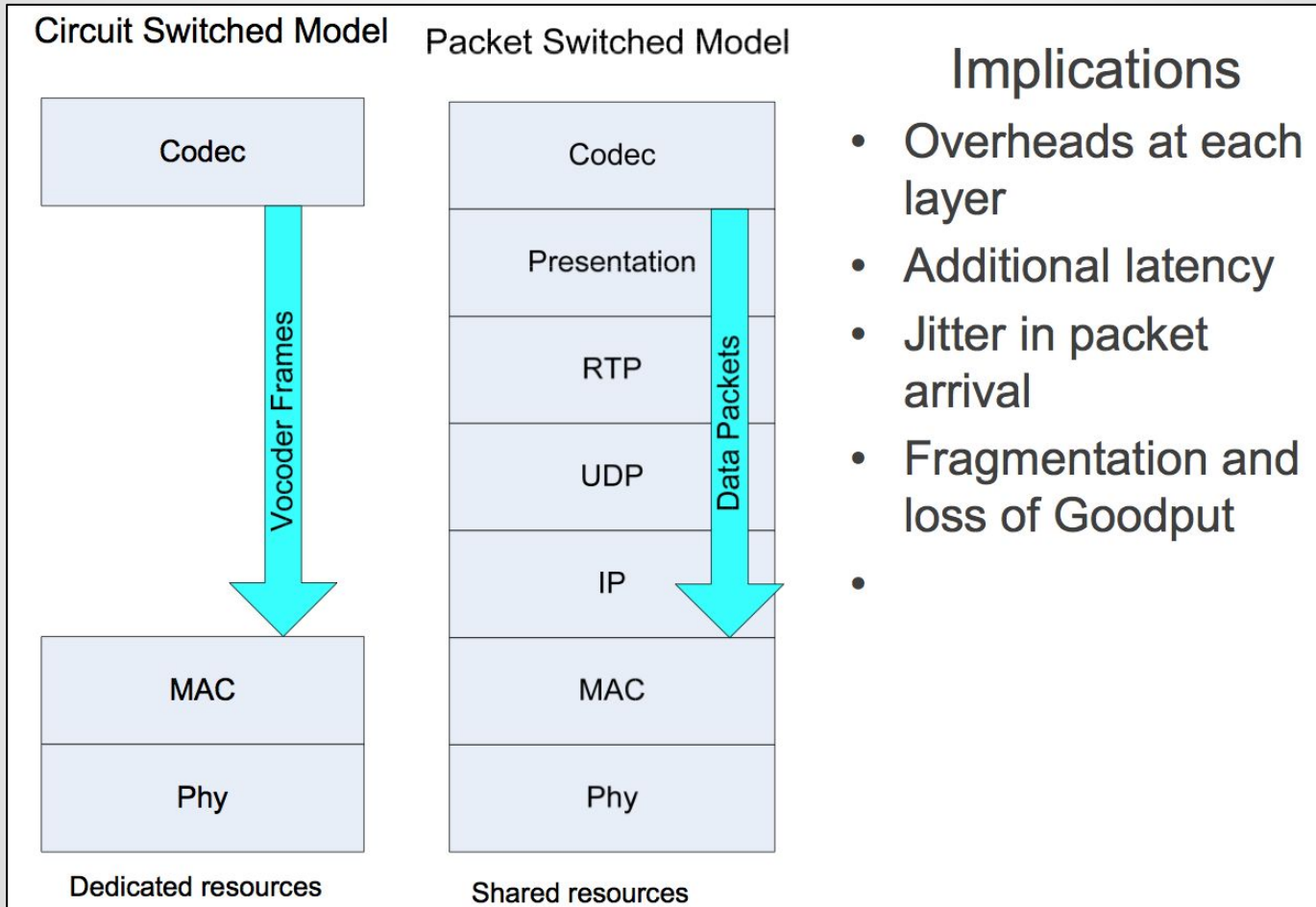
RFC 768 User Datagram Protocol

1 | Voice over RTP/UDP/IP or VoIP



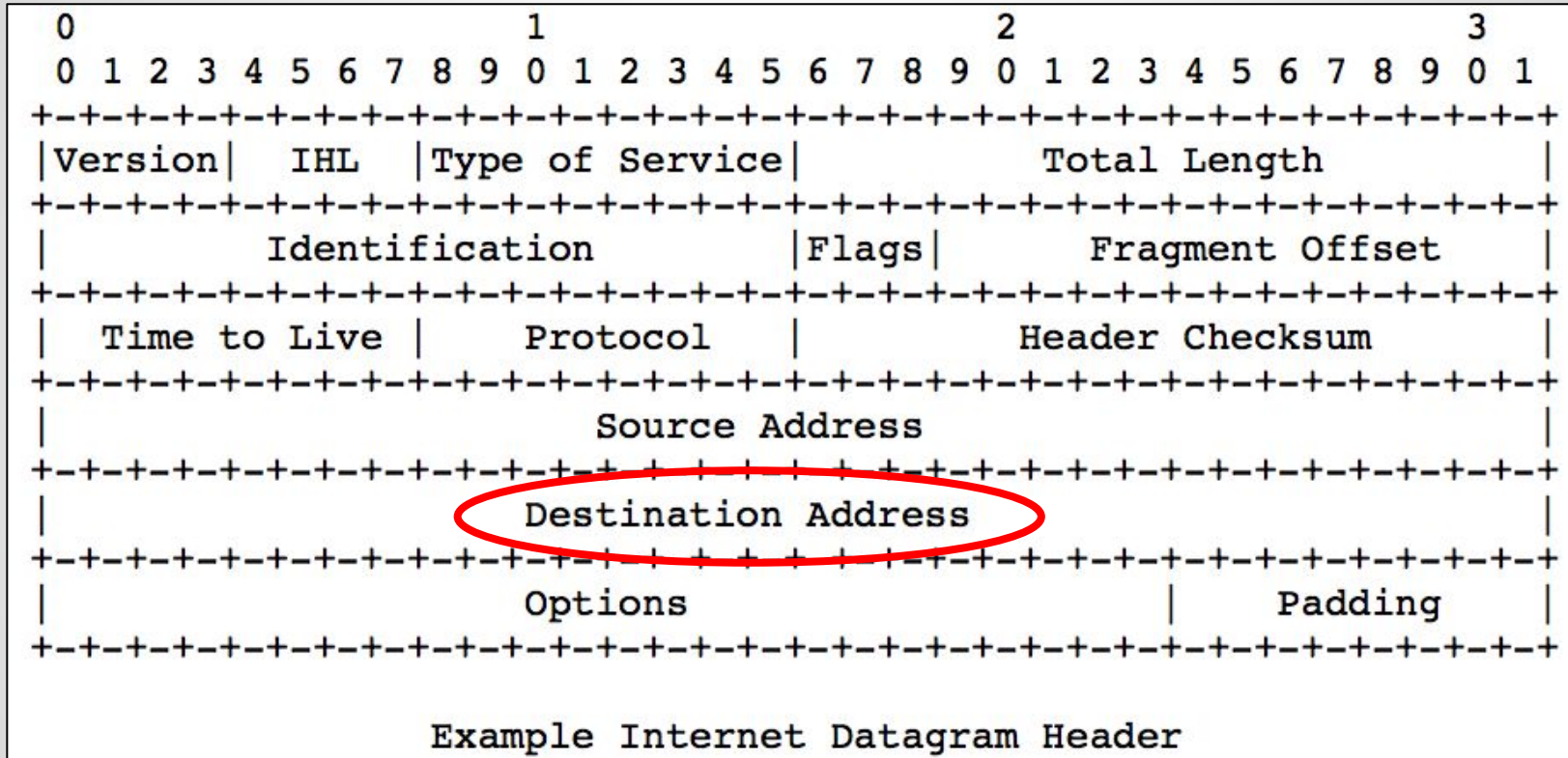
RFC 3550 Real-time Transport Protocol

1 | Voice over RTP/UDP/IP or VoIP



2 - Broadcast / Multicast

2 | Broadcast / Multicast



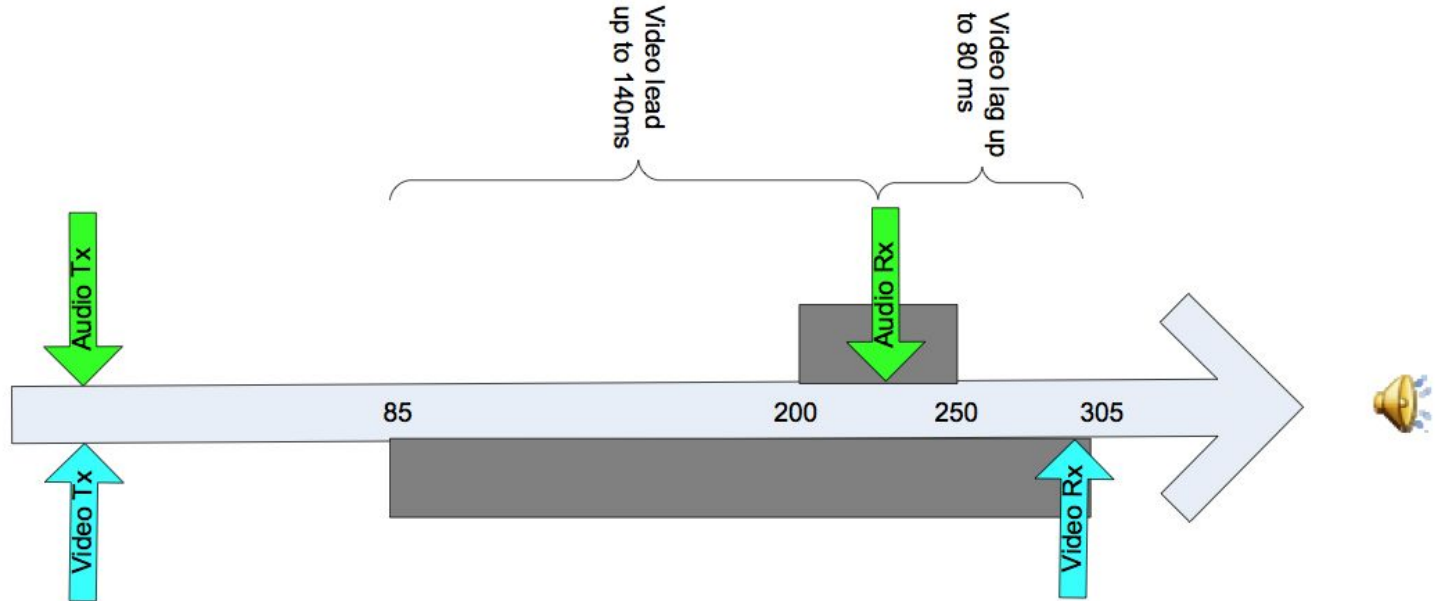
Address 255.255.255.255 for local broadcast

Addresses 224.0.0.0 – 239.255.255.255 for multicast

RFC 791 Internet Protocol

2 | Broadcast / Multicast

- Video one-way latency for synchronization with voice
 - Video arriving after voice by no more than 80 ms
 - Video arriving before voice by no more than 140 ms
 - Based on perceptual studies in lip reading; Hearing aids



2 | Broadcast / Multicast

The YouTube logo, featuring the word "You" in blue and "Tube" in white inside a blue rounded rectangle.

2 | Broadcast / Multicast



2 | Broadcast / Multicast



1,990,020,598

Google searches **today**



1,837,604

Blog posts written **today**



398,918,690

Tweets sent **today**



4,252,441,890

Videos viewed **today**
on YouTube



106,768,918

Photos uploaded **today**
on Instagram



88,020,698

Tumblr posts **today**

<http://www.internetlivestats.com>