Introduction to the Internet

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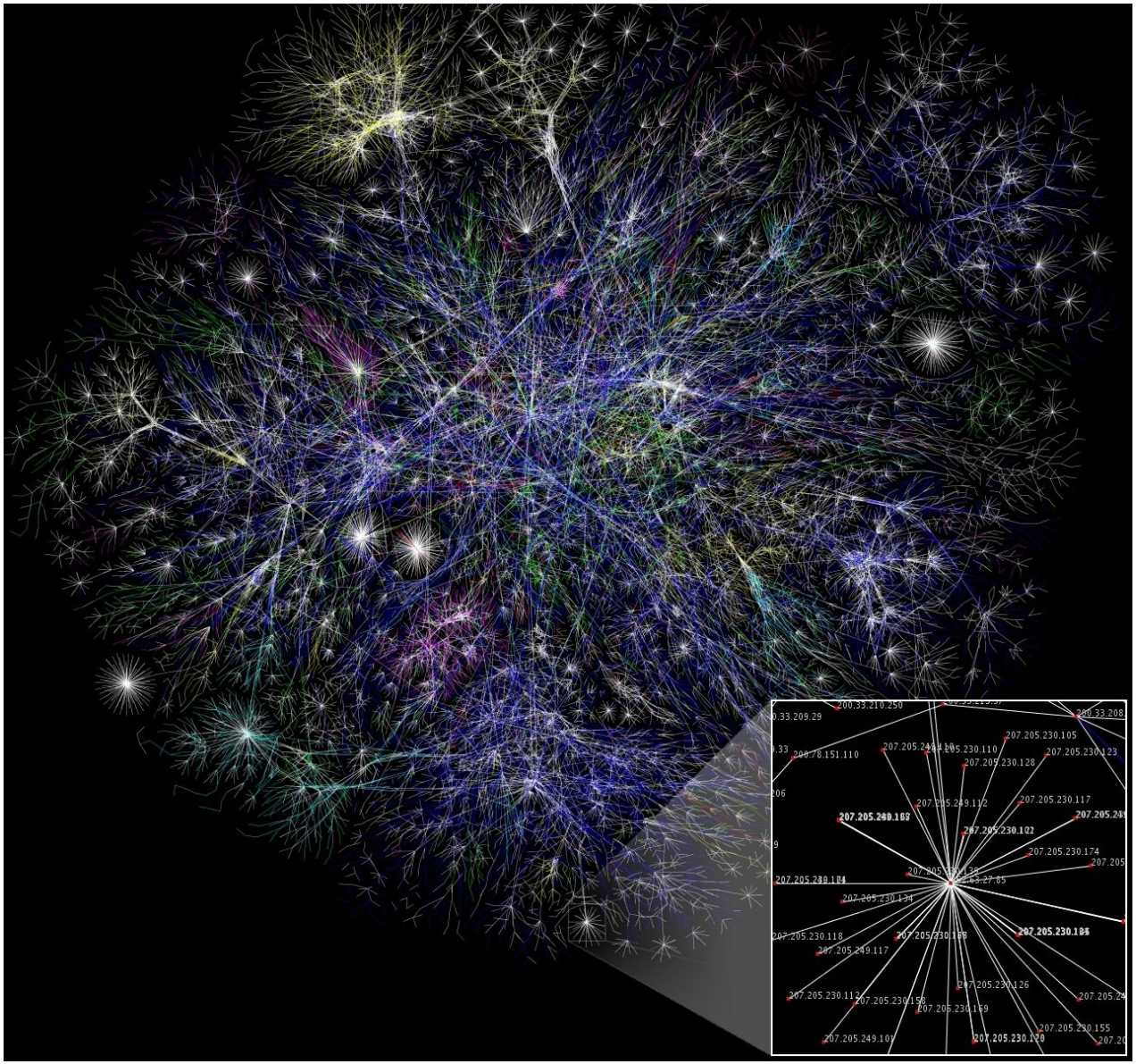
Internet, Packets and Routing

- Internet is a network of computer networks
- Data is transmitted by packet switching using the standard **Internet Protocol (IP)**
- **Packet** – a unit of information carriage
- **Packet switching** – process of moving packets from one node (computer device) to another

A Visualization of Internet



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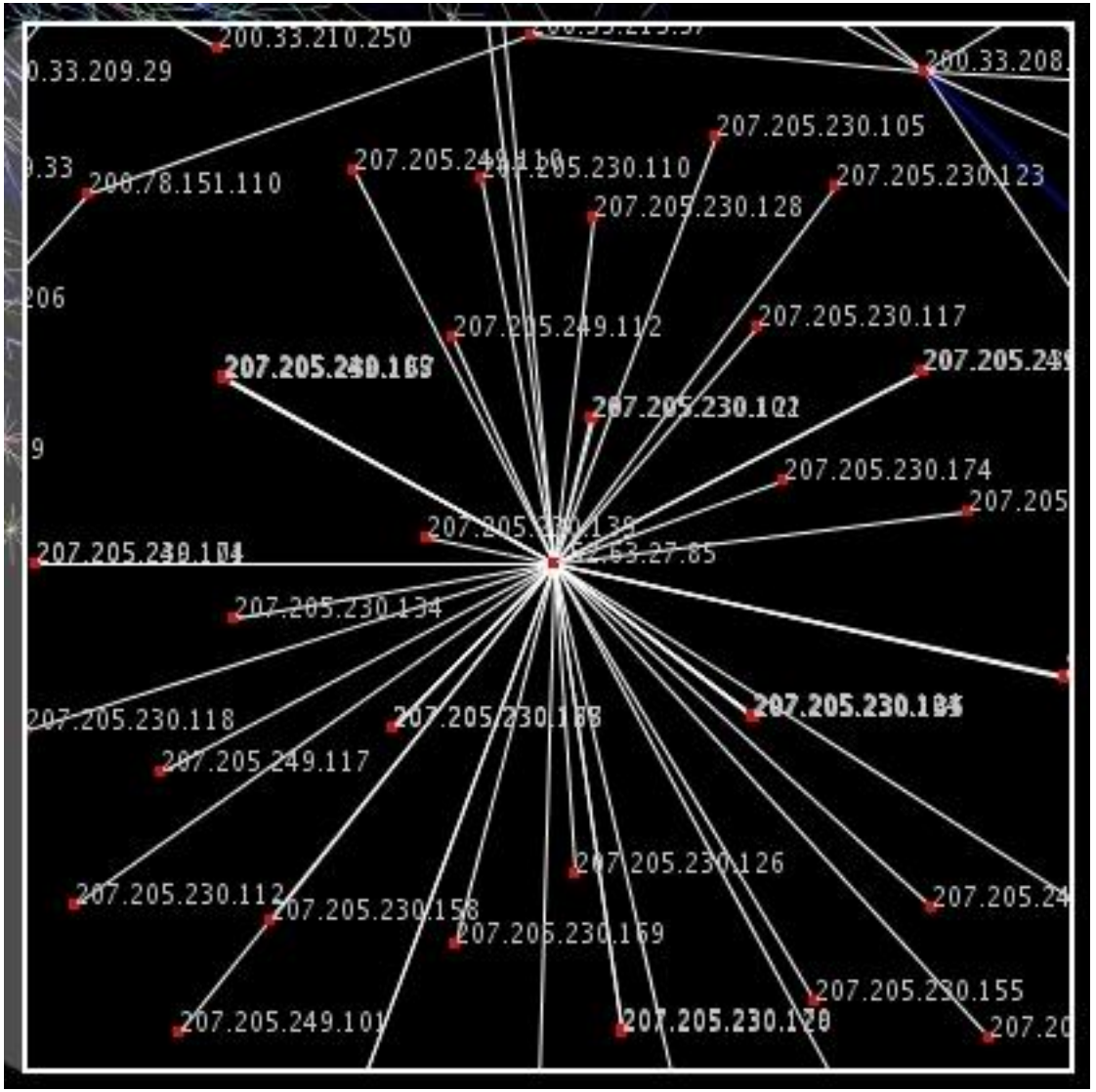
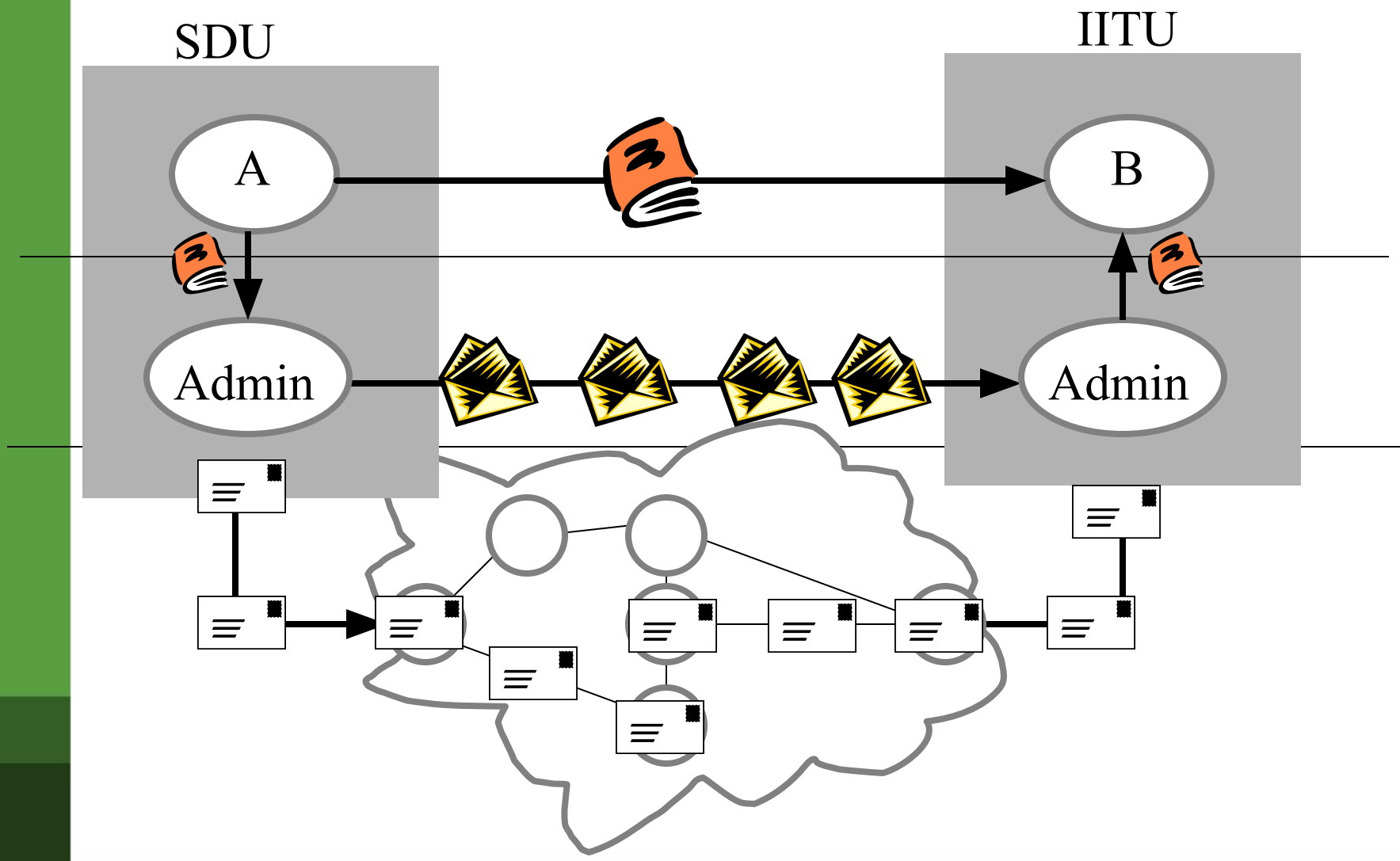


Internet, Packets and Routing

- At the sender, data is **broken into packets** and sent to the nearest node (**router**)
- At each router, it sends the packet to another router that is closer to the final destination
- At the receiver, packets are **reassembled** to get the original data
- A simple analogy: mailing system

Mailing System



TCP/IP and Domain Names

- Basic task of IP – moving packets as quickly as possible from one router to another
- Yet, it doesn't check whether packets are delivered successfully, thus need **TCP**
- **TCP** (**Transmission Control Protocol**) – disassemble/reassemble packets, error checking, ACK packets

TCP/IP and Domain Names

- We need some sort of address in order to identify different nodes, as if every house has a mailing address in order to receive mail from others
- The one used by Internet Protocol is called **IP address**
- Every host on the Internet has a unique IP address, made up of four numbers. E.g.. 192.56.215.131, each number is between 0 and 255

TCP/IP and Domain Names

- The numbers in an IP address is hard to remember, while names are easier
- **Domain Name System** – a mapping between the human-readable name (domain name) of a host and its IP address
- A **domain name** consists of two or more parts, e.g. *csse.iitu.kz*
- The rightmost label conveys the top-level domain, e.g. *kz*

TCP/IP and Domain Names

- Each label to the left specifies a subdomain, in our example, subdomain is *iitu* (IT University), and sub-subdomain is *csse* (computer science & software engineering).
- A top-level domain contains of multiple subdomains, each subdomain can contain multiple sub-subdomain, so on.
- Mapping between a domain name and an IP address is stored on **DNS server**.

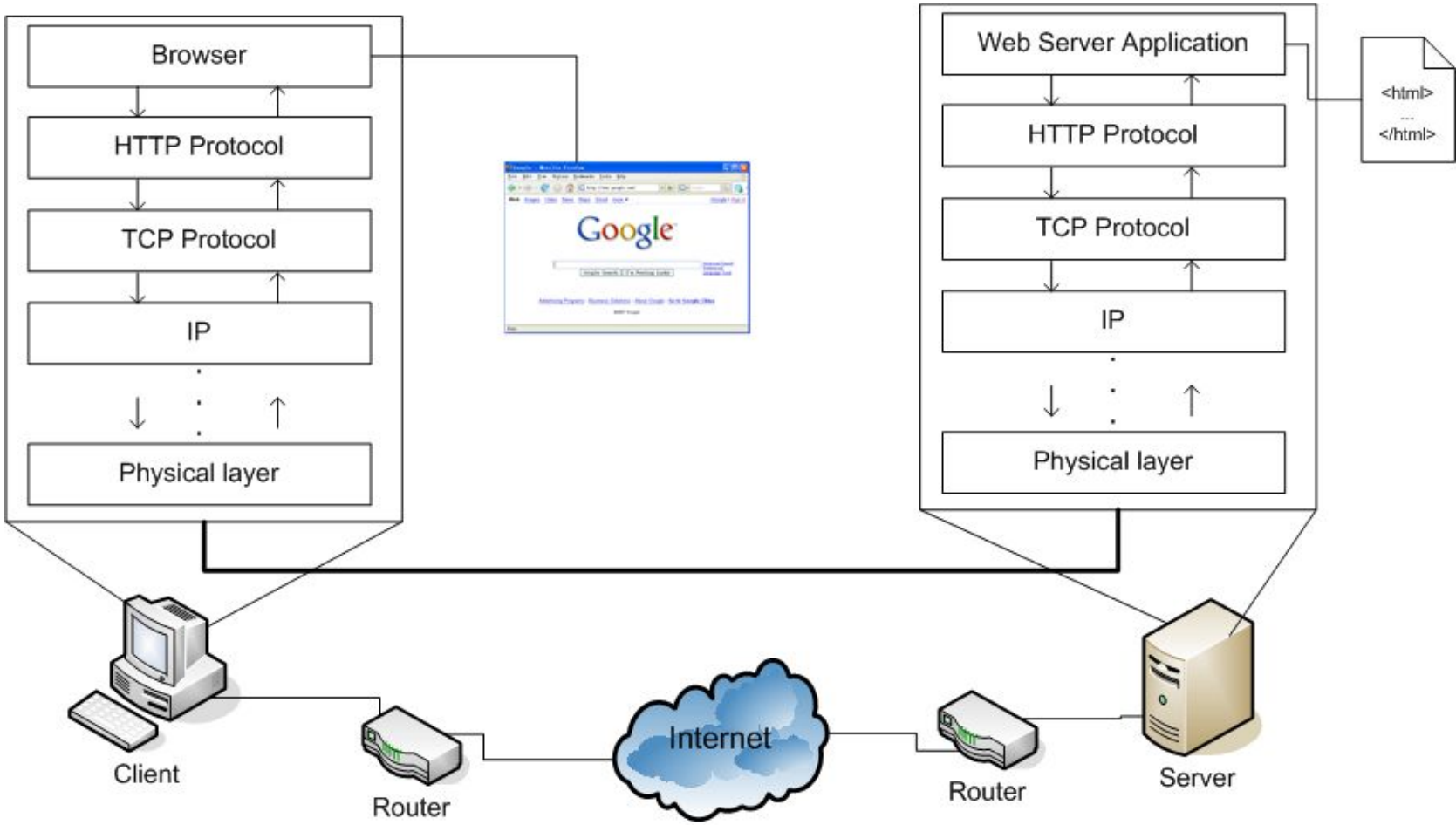
World Wide Web

- The **World Wide Web** (commonly shortened to the **Web**) is a system of interlinked, hypertext documents accessed via the Internet.
- It is created to share files/documents and overcome the barrier of different file formats
- **Hypertext** refers to text on a computer that will lead the user to other, related information on demand.

World Wide Web

- hypertext documents are created using a special kind of document formatting or "markup" language called **HyperText Markup Language (HTML)**.
- HTML is sent or received over the network using **HyperText Transfer Protocol (HTTP)**.
- A **browser** is a software program which interprets the HTML documents and displays it on the user's screen.

URLs and Client-Server Model

- Two things are given by the URL
  - Exact location of the document
  - The method or protocol by which to retrieve and display the document
- Example, http://www.dl.iitu.kz/index.html
  - http:// – specifies the protocol
  - www.dl.iitu.kz – specifies the host name / domain name
  - index.html – specifies the path of the document on the host

Putting it All Together