World Wide Web Introduction

Fajiang Yu, fjyu@whu.edu.cn

School of Computer, Wuhan University

2017.2

Agenda

Agenda

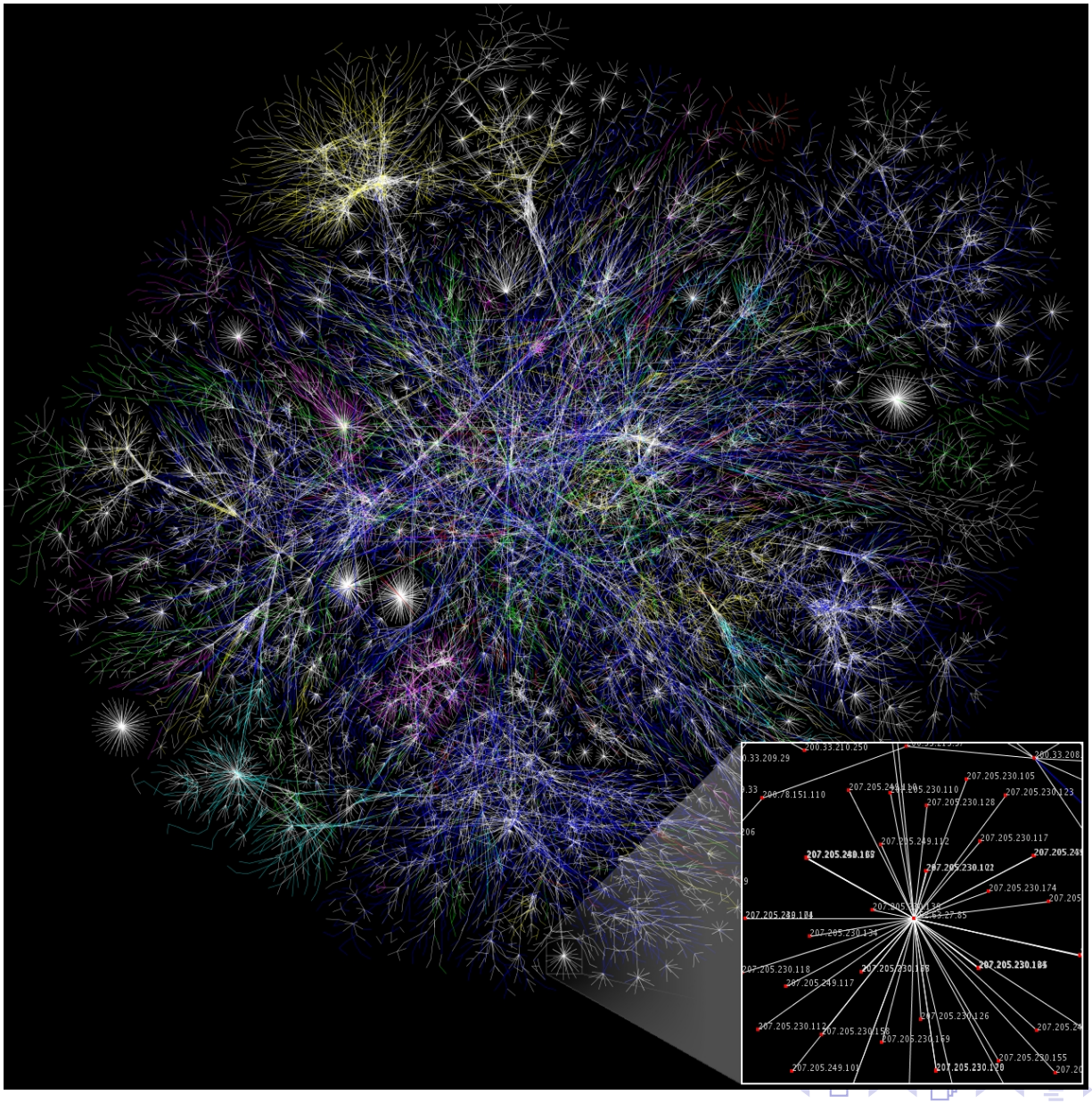
Internet and Web

Internet

A global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide.

`http://en.wikipedia.org/wiki/Internet`

Internet and Web

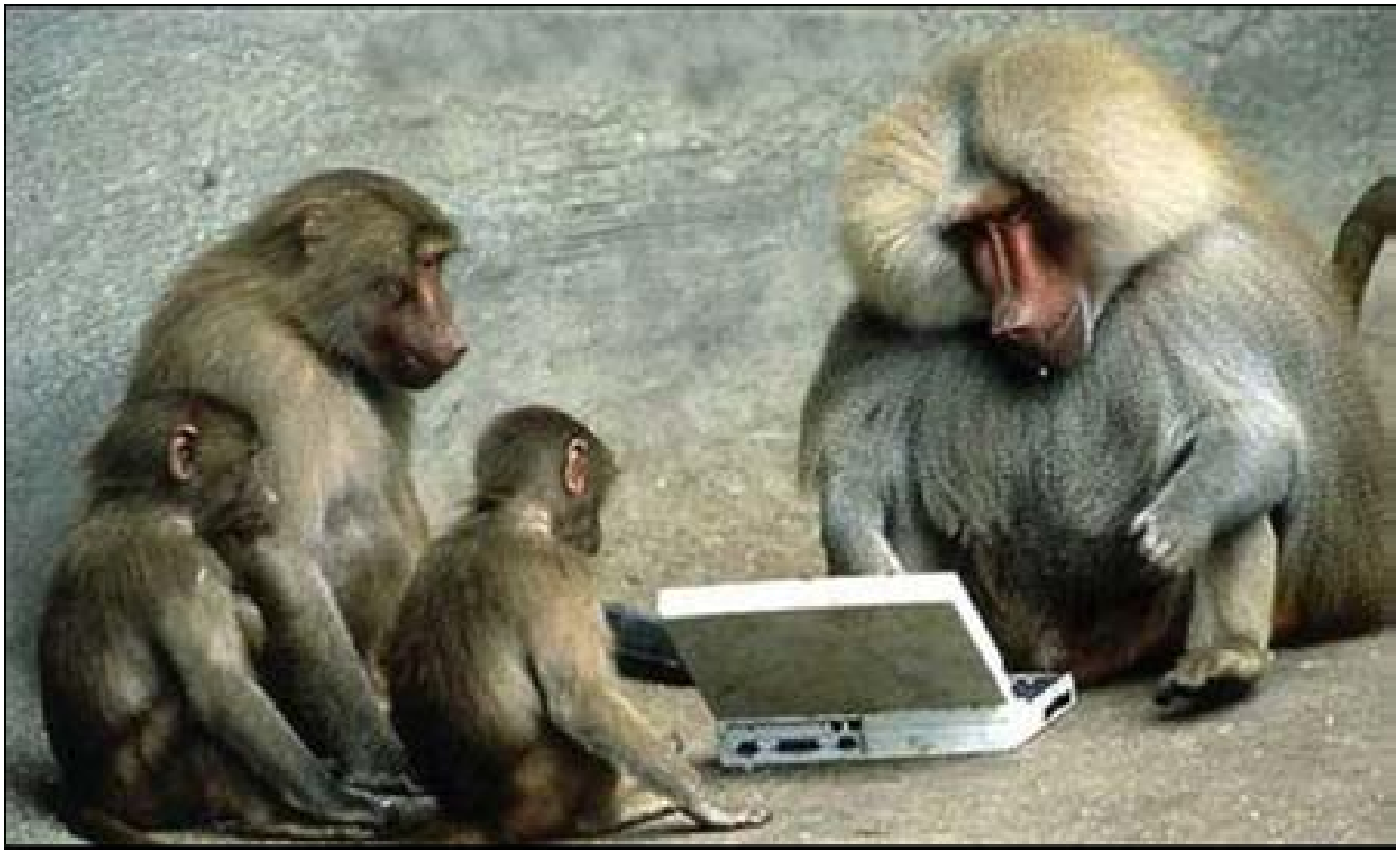


Internet and Web

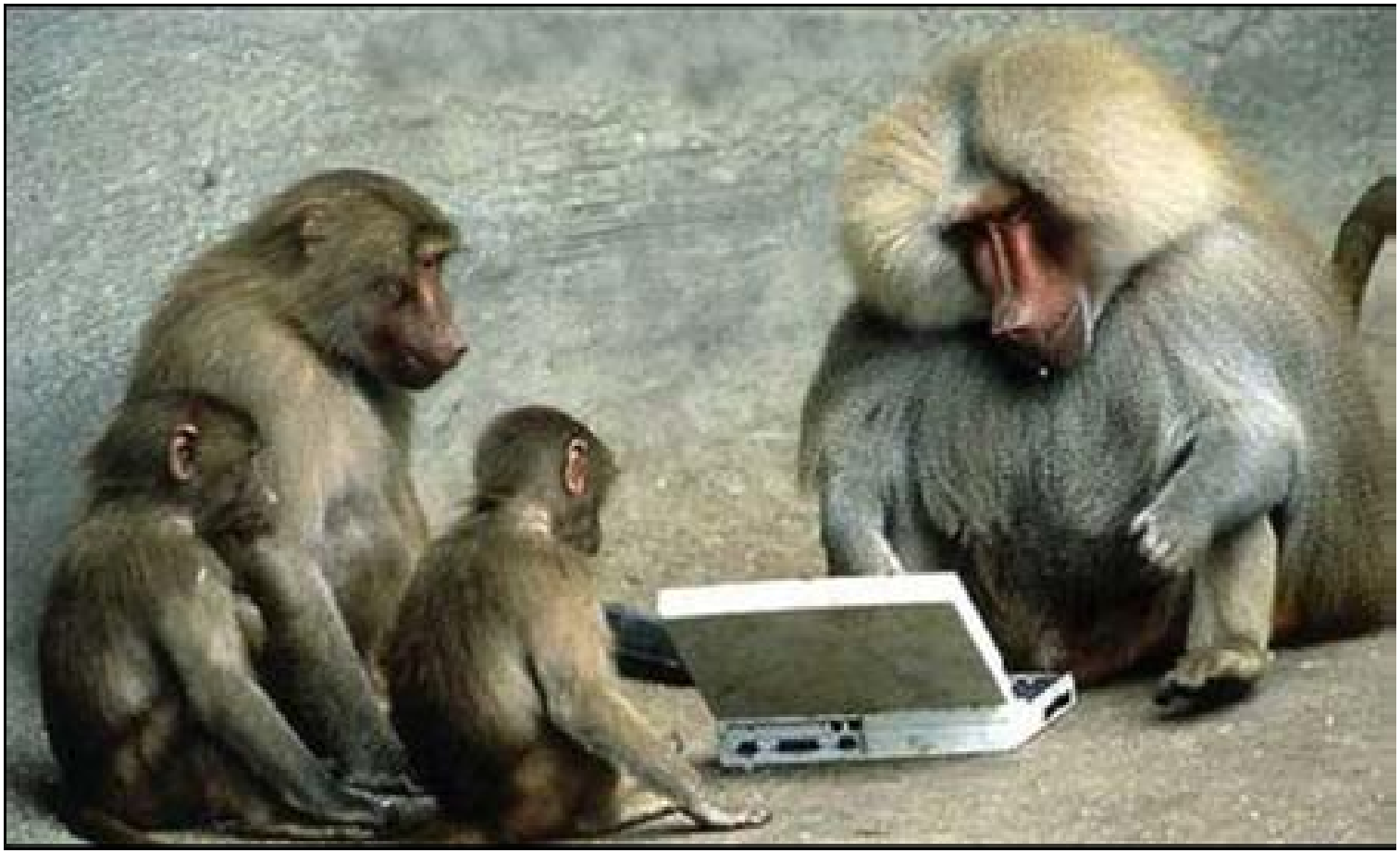
Internet Services

- Email
- FTP
- Instant communication: ICQ, OICQ, QQ, MSN, Skype, et al.
- Web, Blog, Twitter (Weibo)
- .....

No Web



No Web



上個破網比上樹還難！

Internet and Web

Web is one of the services that runs on the Internet.

- There is a unified user interface in Web and user operations are very simple and visual.
- Web is composed of distributed resources on different computers, whose redirections and links are transparent to users. It possible for someone to link to another resource without action by the owner of that resource.
- Web pages contain text, images, videos, and other multimedia.
- Wide application

Agenda

Web History

In 1980, Tim Berners-Lee `http://www.w3.org/People/Berners-Lee/`, a brilliant independent contractor at the European Organization for Nuclear Research (CERN), Switzerland, built a prototype system named ENQUIRE, which is based on the concept of **hypertext**, and to facilitate sharing and updating information among researchers.

During 1984 Berners-Lee returned to CERN as a fellow.

During 1989, CERN was the largest Internet node in Europe, and Berners-Lee recognized an opportunity to join hypertext with the Internet. He made his initial proposal during March 1989. and during 1990, with the help of Robert Cailliau, produced a revision, and sought resources within CERN.

Web History

Berners-Lee and Cailliau pitched their ideas to the European Conference on Hypertext Technology in September 1990, but found no vendors who could appreciate their vision of marrying hypertext with the Internet.

By Christmas 1990, with the help of Robert Cailliau and a young student at CERN, Berners-Lee had built all the tools necessary:

- the HyperText Transfer Protocol (HTTP) 0.9,
- the HyperText Markup Language (HTML),
- **the first Web browser-editor, named World Wide Web**,
- the first HTTP server software (later known as CERN httpd),
- the first web server (`http://info.cern.ch`),
- and the first Web pages that described the project itself.

Web History

Figure: Berners-Lee in 2005

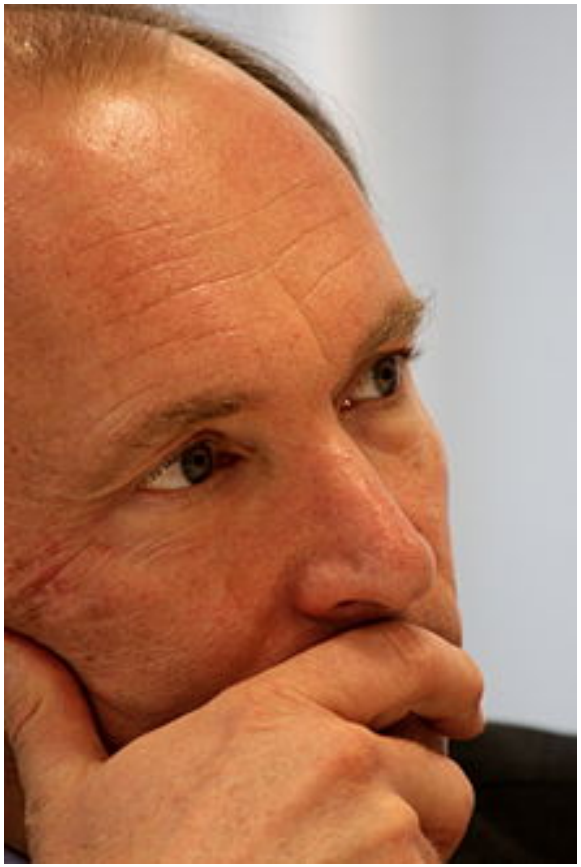


Figure: Berners-Lee in 2010

Web History

Figure: The NeXT Computer used by Berners-Lee became the first Web server. The hand label declares, "This machine is a server. DO NOT POWER IT DOWN!!"

Figure: The CERN datacenter in 2010 housing some www servers.

Web History

Figure: Sir Tim Berners-Lee live-tweets during the 2012 Olympics opening ceremony, with a NeXT Cube by his side

Web History

On April 30, 1993, CERN announced that the World Wide Web would be free to anyone, with no fees due.

The World Wide Web Consortium (W3C) `http://www.w3.org/` was initiated by Tim Berners-Lee after he left CERN in October, 1994. It was founded at the Massachusetts Institute of Technology Laboratory for Computer Science (MIT/LCS) with support from the Defense Advanced Research Projects Agency (DARPA), which had pioneered the Internet.

Tim Berners-Lee now is the director of W3C.

Many of the web technologies and standards documents are the work of W3C, but some are produced by the Internet Engineering Task Force (IETF) and other organizations.

Web History

1980 - 1991: Development of the World Wide Web

1992 - 1995: Growth of the WWW

1996 - 1998: Commercialization of the WWW

2002 - present: The Web becomes ubiquitous

Web 2.0, Semantic Web `http://semanticweb.org/`

Agenda

Web Architecture

Client - Server architecture

- Client: client computer, client browser
- Server: Web server computer, Web server software

C/S architecture has some drawbacks,
which leads to the appearance of Peer to Peer (P2P).

Web Server Software and Web Browsers

Web server software

- Microsoft Internet Information Server (IIS) (part of Windows) `http://www.iis.net/`
- Apache Web Server `http://httpd.apache.org/`
- nginx `https://nginx.org/`
- Apache Tomcat `http://tomcat.apache.org/`

Web browsers

- Microsoft Internet Explorer `http://windows.microsoft.com/en-NZ/internet-explorer/products/ie/home`
- Google Chrome `http://www.google.com/chrome`
- Apple Safari `http://www.apple.com/safari/`
- Mozilla Firefox `http://www.mozilla.org/en-US/firefox/`
- Opera `http://www.opera.com/`

Web Request and Response

Web request and response steps

1) Typing the **Uniform Resource Locator (URL)** of the page into a web browser, or by following a hyperlink to that page or resource.
2) The browser resolves the server-name portion of the URL into an Internet Protocol (IP) address using the globally distributed database known as the Domain Name System (DNS).
3) The browser then requests the resource by sending an **Hypertext Transfer Protocol (HTTP)** request across the Internet to the computer at that particular address.
4) The computer receiving HTTP request (distinguish from other network protocols) delivers it to Web server software.
5) If the web server can fulfill the request it sends an HTTP response back to the browser indicating success, and followed by the content of the requested page.
6) The web browser parses the **Hypertext Markup Language (HTML)**, interpreting the markup to display resources on screen.
7) A browser may make additional HTTP requests to the web server for other Internet media types.

Web Technologies

Three essential technologies

- a system of globally unique identifiers for resources on the Web and elsewhere, Uniform Resource Locator (URL) and Uniform Resource Identifier (URI)
- the publishing language HyperText Markup Language (HTML) (eXtensible HyperText Markup Language, XHTML; eXtensible Markup Language, XML)
- the Hypertext Transfer Protocol (HTTP) (HTTP Secure, HTTPS)

Uniform Resource Locator (URL)

a basic URL

$$\underbrace{\texttt{http}}_{\text{protocol}} : // \underbrace{\texttt{www.fajiangyu.net}}_{\text{host}} \underbrace{\texttt{/info/webprogram/index.htm}}_{path}$$

Agenda

Microsoft Internet Information Server (IIS) Setup

Setup

- Adding Windows components
- IIS package
- Test `http://localhost` or `http://127.0.0.1`

Setting

- IP address and port
- main directory
- virtual directory
- security

Microsoft Internet Information Server (IIS) Setup

Problem

- Can not be requested by other computers in local area network
- Firewall setting

Request by other computers in Internet

- Internet IP
- Static IP and Dynamic IP

Thank You!
Any Questions?