INTRODUCTION

Internet

Origins:

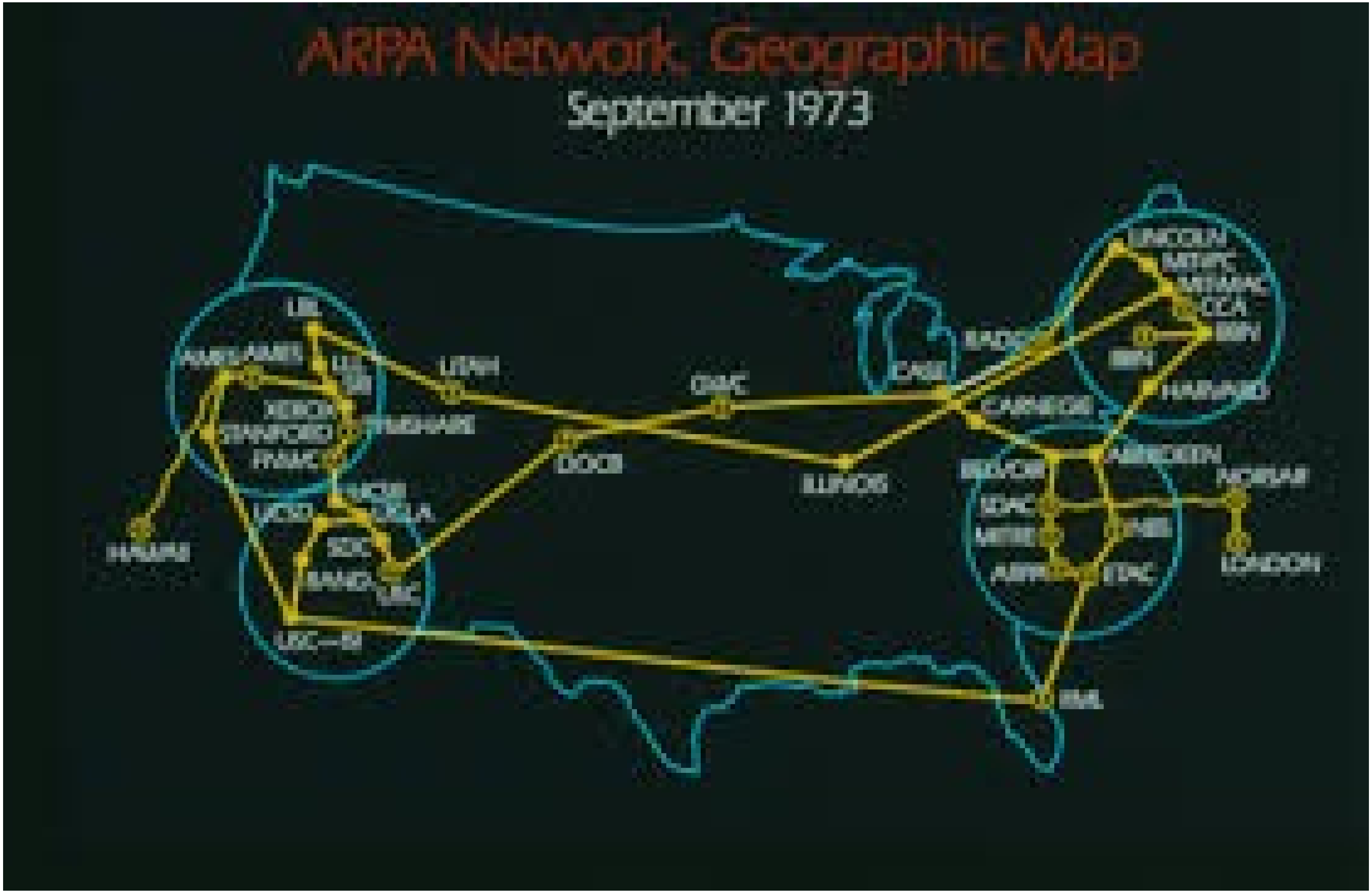
1960s

U.S. Department of Defence (DoD) became interested in developing a new large-scale computer network

The purposes of this network were communications, program sharing, and remote computer access for researchers working on defence-related contracts.

The DoD's Advanced Research Projects Agency (ARPA) funded the construction of the first such network. Hence it was named as ARPAnet.

The primary early use of ARPAnet was simple text-based communications through e-mail


ARPA Network, Geographic Map
September 1973
UTAH
ILLINOIS
CASE
CARNEGIE
LINCOLN
HARVARD
BBN
ABERDEEN
NORSAR
LONDON
MITRE
ETAC
HAWAII
STANFORD
XEROX
TYMSHARE
SDC
RAND
USC–ISI

Internet

Late 1970s and early 1980s

BITNET, which is an acronym for Because It's Time NETwork, began at the City University of New York.

It was built initially to provide electronic mail and file transfers.

CSNET is an acronym for Computer Science NETwork. Its initial purpose was to provide electronic mail.

Internet

1990s

NSFnet which was created in 1986 replaced ARPAnet by 1990.

It was sponsored by the National Science Foundation (NSF).

By 1992 NSFnet, connected more than 1 million computers around the world.

In 1995, a small part of NSFnet returned to being a research network. The rest became known as the

Internet.

What Is the Internet?

The Internet is a huge collection of computers connected in a communications network.

The Transmission Control Protocol/Internet Protocol (TCP/IP) became the standard for computer network connections in 1982.

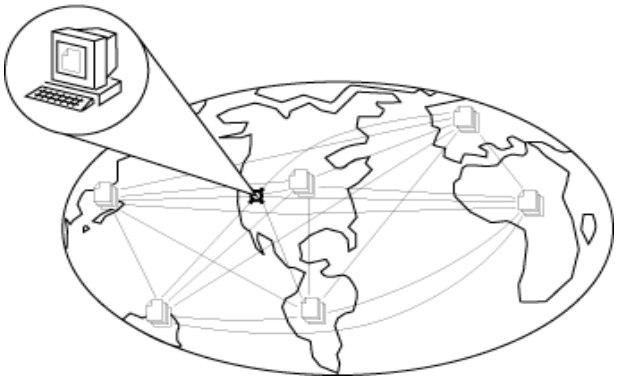
Rather than connecting every computer on the Internet directly to every other computer on the Internet, normally the individual computers in an organization are connected to each other in a local

Network.

One node on this local network is physically connected to the Internet.

So, the Internet is actually a network of networks, rather than a network of computers.

Obviously, all devices connected to the Internet must be uniquely identifiable.



Internet Protocol Addresses

The Internet Protocol (IP) address of a machine connected to the Internet is a unique 32-bit number.

IP addresses usually are written (and thought of) as four 8-bit numbers, separated by periods.

The four parts are separately used by Internet-routing computers to decide where a message must go next to get to its destination.

Although people nearly always type domain names into their browsers, the IP works just as well.

For example, the IP for United Airlines (www.rvce.edu.in) is 127.0.0.1. So, if a browser is

pointed at http://172.16.34.63, it will be connected to the United Airlines Web site.

Domain Name

HTTP

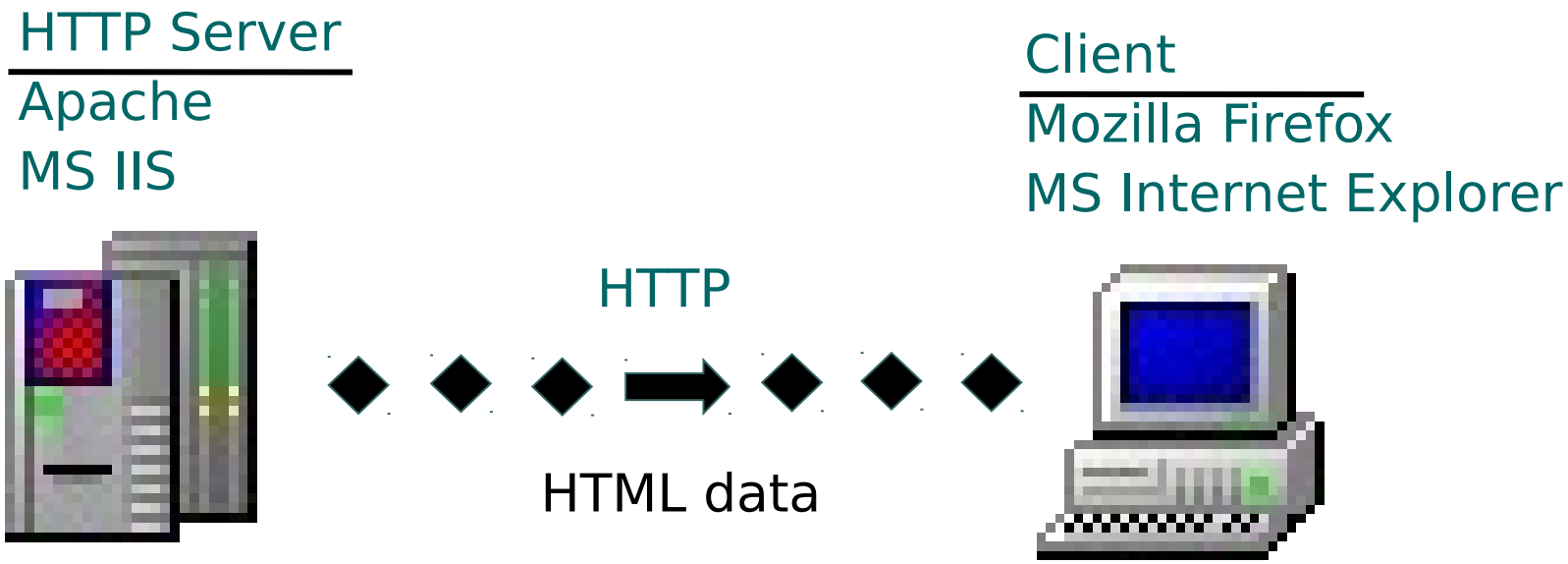
HTTP(Hyper Text Transfer Protocol)

- generic, stateless protocol
- governs the transfer of files across a network
- developed at CERN (Central European Research Network), they also came up with the name WWW
- supports access to SMTP,FTP and other protocols
- was designed to support hypertext

HTTP

- Exchanged information, can be static or dynamic
- Every resource, accessible over the Web has a URL(Uniform resource locator)
- HTTP mechanism is based on client/server model typically using TCP/IP sockets

World Wide Web



Web Browsers

- Mosaic - NCSA (Univ. of Illinois), in early 1993 - First to use a GUI, led to explosion of Web use - Initially for X-Windows, under UNIX, but was ported to other platforms by late 1993

- Browsers are clients - always initiate, servers react (although sometimes servers require responses from the clients)

- Most requests are for existing documents, using HyperText Transfer Protocol (HTTP)

- But some requests are for program execution, with the output being returned as a document

The Internet and the WWW

The WWW is one service running over the Internet -

Before the WWW

The Internet was used by scientists, researchers, large (usually governmental) organisations

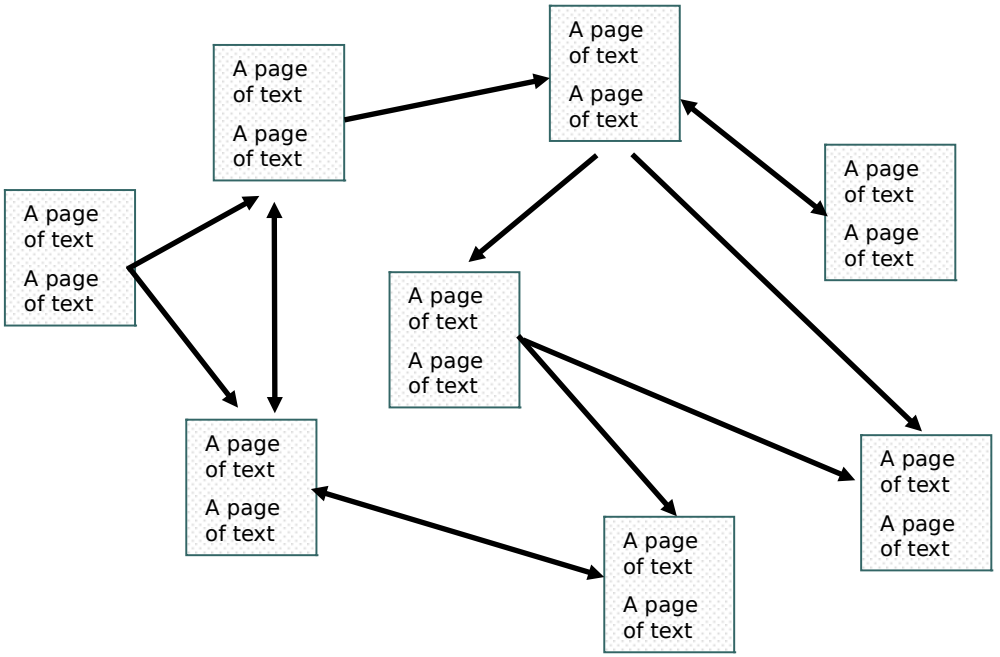
Commerce on the Internet was almost unknown

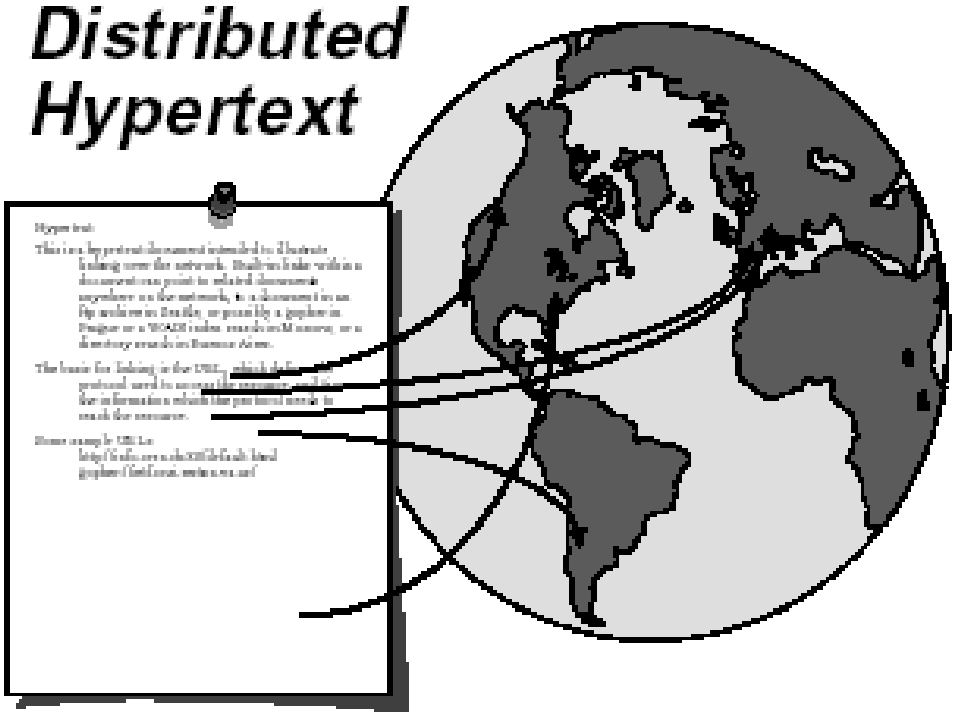
The WWW is now the major conduit to the Internet and the major vehicle for e-commerce, but this is not what it was designed for!

Hypertext

"Non-linear reading and writing"

Ted Nelson





Application Servers Vs Web Servers

Web Server

A Web server handles the HTTP protocol

When the Web server receives an HTTP request, it responds with an HTTP response, such as sending back an HTML page.

To process a request, a Web server may respond with a static HTML page or image, send or redirect, or delegate the dynamic response generation to some other program such as CGI scripts, JSPs (JavaServer Pages), servlets, ASPs (Active Server Pages), server-side JavaScripts, or some other server-side technology.

Application Server

While an application server exposes business logic to client applications through various protocols like HTTP, TCP-IP etc.

All the web servers mainly deals with sending HTML for displaying to a Web browser.

The application server is used to run business logic or dynamically generating presentation code.

Multipurpose Internet Mail Extensions (MIME)

"MIME, stand for *Multi-purpose Internet mail Extensions*, is a freely available specification that offers a way to interchange text in languages with different character sets,and multimedia e-mail among many different computer system that use Internet mail standards."

Multipurpose Internet Mail Extensions (MIME)

MIME extends the format of Internet mail to allow non-US-ASCII textual messages, non-textual messages, multipart message bodies, and non-US-ASCII information in message headers.

Multipurpose Internet Mail Extensions (MIME)

In 1992, a new standard was defined by an Internet engineering task force working group in RFC1521 & 1522 called MIME.

MIME is an extension to the Internet mail standard, known as Simple Mail Transfer Protocol (SMTP) that allows mail messages containing different type of multimedia information to be sent across the network this includes, but is not limited to, word-processor documents, spreadsheets, programs, graphics, audio, and motion picture files, as well as links that enable users to retrieve information from remote databases from within a mail message.

Static vs. dynamic pages

most Web pages are *static*

- contents (text/links/images) are the same each time it is accessed

  e.g., online documents, most homepages

  HyperText Markup Language (HTML) is used to specify text/image format

as the Web moves towards online services and e-commerce, Web pages must also provide *dynamic* content

- pages must be fluid, changeable (e.g., rotating banners)
- must be able to react to the user's actions, request and process info, tailor services

  e.g., amazon.com, www.thehungersite.com

this course is about applying your programming skills to the development of dynamic Web pages and applications

Client-side programming

can download program with Web page, execute on client machine

- simple, generic, but insecure

JavaScript

- a scripting language for Web pages, developed by Netscape in 1995
- uses a C++/Java-like syntax, so familiar to programmers, but simpler
- good for adding dynamic features to Web page, controlling forms and GUI
- see `www.creighton.edu/~davereed/Memory`

Java applets

- can define small, special-purpose programs in Java called applets
- provides full expressive power of Java (but more overhead)
- good for more complex tasks or data heavy tasks, such as graphics
- see `www.creighton.edu/~davereed/csc107.F03/Labs/MontePI.html`

Server-side programming

can store and execute program on Web server, link from Web page

- more complex, requires server privileges, but secure

CGI programming

- programs can be written to conform to the *Common Gateway Interface*
- when a Web page submits, data from the page is sent as input to the CGI program
- CGI program executes on server, sends its results back to browser as a Web page
- good if computation is large/complex or requires access to private data

Active Server Pages, Java Servlets, PHP, Server Side Includes

- vendor-specific alternatives to CGI
- provide many of the same capabilities but using HTML-like tags

Web Programmer’s Toolbox

HTML/XHTML

CSS

XML

JavaScript

PHP

Web application frameworks - Ruby on Rails, TurboGears, CakePHP, ASP.NET

HTML/XHTML

Describes the general form and layout of documents

An HTML document is a mix of content and controls

Controls are tags and their attributes

Tags often delimit content and specify something about how the content should be arranged in the document

Attributes provide additional information about the content of a tag

CSS

A language for defining stylesheets that was developed for HTML

Provide the means to control and change presentation of HTML documents

Style sheets allow you to impose a standard style on a whole document, or even a whole collection of documents

XML

- A meta-markup language
- Used to create a new markup language for a particular purpose or area
- Because the tags are designed for a specific area, they can be meaningful
- No presentation details
- A simple and universal way of representing data of any textual kind

JavaScript

A client-side HTML-embedded scripting language

Only related to Java through syntax

Dynamically typed and not object-oriented

Provides a way to access elements of HTML documents and dynamically change them

PHP

A widely used server-side scripting language

Similar to JavaScript

Great for form processing and database access through the Web

Free software released under the PHP License