

Data, Web and Web Application

CS 324 Web Application Development

Spring 2024

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Internet

- **Can you picture a world without the Internet?**
- There would be no access to the mighty Google!
- No information stored inside Wikipedia!
- No ability to instantly contact people through e-mail!
- Social networking!
- Instant messaging!
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- Intranet
- Extranet

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Dependency on Internet

- We, as members of a modern society, depend on the Internet for everything ...
- Making new friends from all over the world
- Delivering high-quality savings on the kinds of goods we once bought at premium stores
- Checking our Bank accounts
- Latest news
- Some businesses are entirely run through the Internet without having a physical presence!
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Internet and World Wide Web

- The Internet and the World Wide Web are different things ...

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- The **Internet** is made up of hardware (think of your computer) and has lots of cables streaming out of the back leading in different directions keeping in constant communication with other machines that are hooked up to the Web.
- The Internet supports everything that you choose to run on it.

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World Wide Web

- The **World Wide Web**, on the other hand, is the software and goes through a series of processes to send and receive information, which is controlled by the behavior of the people who use it.
- Simply Web ...

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Website

- A **website** is a collection of documents, images, and other digital media that have been written specially for the Web so that they are suitable for viewing within a browser.
- All websites are summoned through a website address, which will direct the end user to the place where the site itself is held.
- Websites are made up of pages that are joined up by **hyperlinks**. You click these links to navigate from one page to another as you browse the site. You

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Browser

- The **web browser** is the piece of software you use to visit websites, and browsers normally have a wide range of tools and support for the different technologies on the Web.
- Internet Explorer, Mozilla Firefox, Opera, Apple Safari, Google Chrome, and many more

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Protocol

- Information is transferred around the Web using a variety of methods;
- Each method of transferring information has its own specific purpose and is commonly referred to as a **protocol**
- You will notice (perhaps for the first time) that before the `://www`, which shows your website address, there will be an acronym like `http`, `https`, or `ftp` listed before it, which indicates the protocol your web browser is using.

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Client - Server / Host

- The place where your web site will be hosted is, called the **host** or the **server** (that is, the machine that serves information to your computer).
- Likewise, the computer that accesses the website through a web browser is called a **client** (like being a customer of the Internet).

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- A **Web application** is an Internet based application, an application that is delivered over the internet. This usually takes the form of a browser based front end, some middleware implementing business logic and a back end database all working in concert. The application could be a piece of business logic, an internet shopping site or anything like that. The application is the whole bunch of stuff that makes the website work.
- eBay is a **Web Application**. `www.ebay.co.uk` is the **website**, the public users interface into the ebay application and the outside worlds view of the ebay application.

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- A **Web form** is a web based form that a user fills in, the data of which is either mailed to someone or may be submitted into some middle layer application. A form is also a segment of an HTML browser page.
- A **web farm** is usually used to refer to a collection of **web servers** (the hardware that serves up the code that delivers the pages to your browser) these are configured to spread the load of many public users connecting (with their browser or client) simultaneously to an application.

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Web Application Architectures

- Server-side HTML : The server generates HTML-content and sends it to the client as a full-fledged HTML-page.
- JS generation widgets (AJAX): Evolved architecture of the first type. The difference is that the page, which is displayed in the browser, consists of widgets (functionally independent units) – Asynchronous JavaScript and XML
- Service-oriented single-page Web apps (Web 2.0, HTML5 apps): The term "Web 2.0" means projects and services which are actively developed and improved by users themselves: blogs, wikis, social networks. This means Web 2.0 isn't bound to one technology or a set of technologies.

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Web 3.0

- Web 3.0, also known as the third-generation internet, is **the next evolution of the World Wide Web**. It provides a data-driven Semantic Web employing a machine-based understanding of data with the objective of developing a more intelligent and connected web experience for users.
- What is clear, though, is that Web 3.0 have a strong emphasis on decentralized applications, like extensive use of [blockchain](#)-based technologies.
- Web 3.0 also makes use of machine learning and artificial intelligence ([AI](#)) to help empower more intelligent and adaptive applications.

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Examples of Websites Web 2.0/3.0

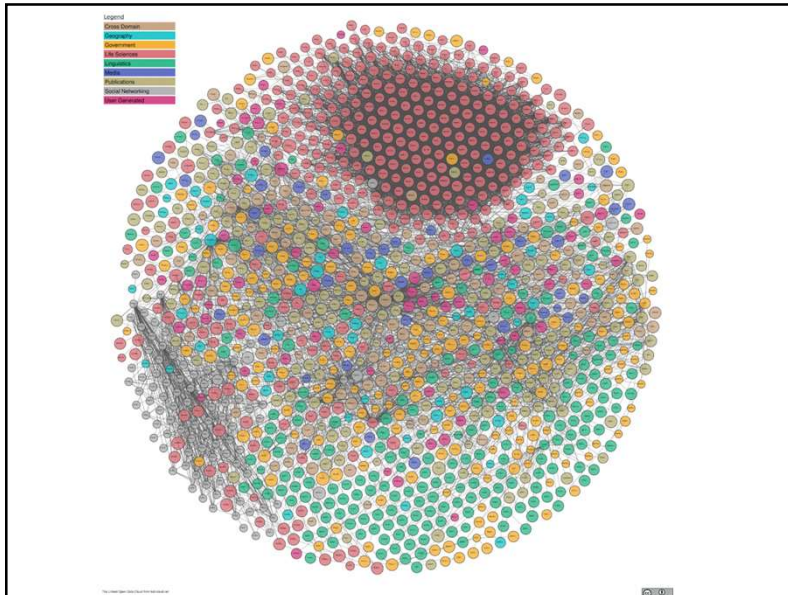
- Gapminder
- Programmableweb
- Stumbleupon
- Facebook
- Twitter
- Youtube
- Dota 2
- Clash of Clans
- Windyty.....

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The word E ...

- E-Health
- E-Government
- E-Science
- E-Society
- E-Commerce
- E-Collaboration (Crowd Sourcing)
- ...

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E-Society

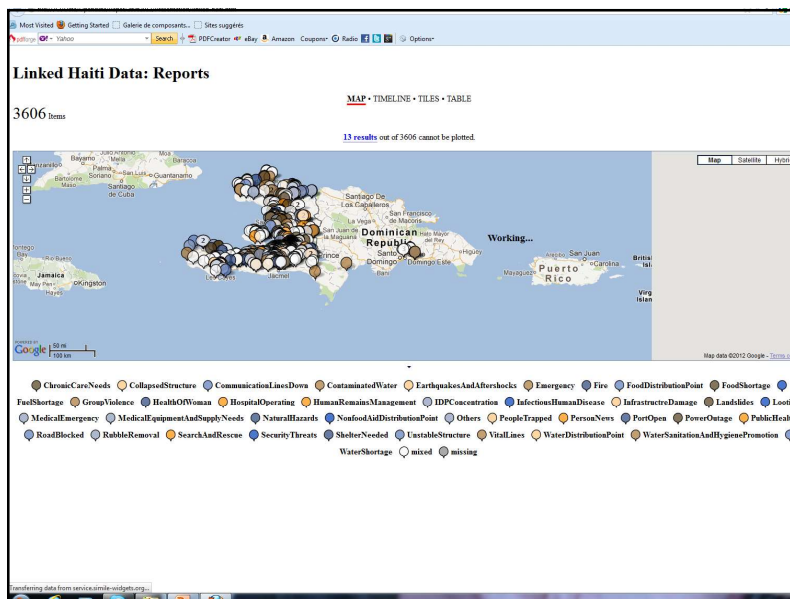
The data content published by individuals on web, specifically in a collaborative environment like social forum, blog, games etc. Data can be analysed/created by thousands of users (crowd-sourcing initiatives).

- Right after the earthquake in Haiti in 2009, the company holding the license to use geo-imagery opened up the map data of Haiti to general public. The web users all over the world examined the imagery and within a couple of days populated the map with information like refugee camps, hospitals, damaged buildings. The relief workers in the area used the map to organise the relief work

<http://observedchange.com/demos/linked-haiti/>

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E-Science

The 2012 Intel International Science and Engineering Fair

First Prize : A 15 year old freshman devised a new method to detect pancreatic cancer. He created a simple dip-stick sensor to test blood or urine to determine whether or not a patient has early-stage pancreatic cancer, based on diabetic test paper. His study resulted in over 90 percent accuracy and showed his patent-pending sensor is 168 times faster, 26,667 times less expensive, and 400 times more sensitive. And he credits his achievement to the free available scientific data and literature on Internet.

<http://www.forbes.com/sites/bruceupbin/2012/06/18/wait-did-this-15-year-old-from-maryland-just-change-cancer-treatment/>

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E-Science

- **Astronomy**
 - Sloan Digital Sky Survey (SDSS) (2000 – 2014)
 - Large Synoptic Survey Telescope (LSST) to be completed by 2024
 - Square Kilometre Array (SKA) to be completed in 2024 – 20 nation
- **Genomics**
 - ENSEMBL - genome databases for vertebrates and other complex species.
Up till now 354 species/subspecies genomes data had been made available
 - 1000 Genomes – human genome database
- **Particle Physics**
 - CERN (European Organization for Nuclear Research) – 34 nation
- **Geoscience**
 - <http://www.bgs.ac.uk/opengeoscience/> , <http://www.geo-seas.eu/>
 - <http://www.onegeology.org/misc/downloads.html>

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E-Science

Data statistics

- CERN 15 Petabytes/year
- SDSS 1 Petabyte till to date
- LSST 20 Terabytes/day (over 10 years 60 PB of raw and 15 PB of catalogue data)
- SKA 1 Exabyte/day
- Ensembl 1 Terabyte of raw data till to date
- 1000 Genome 260 Terabytes till to date (250000 files)

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E-Enterprise

- Enterprise management system - emails, spread sheets, word documents, databases, presentations, corporate web sites, in-house instant message communication, contact lists etc
- Online business transactional system : Millions of transactions over internet, e.g. online game servers, business transaction portals or other business to business oriented services
- New York Stock Exchange produces about one terabyte of data per day

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Web Application is not just a static Website!

WEB is a living, Expanding, Evolving,
Exploding thing

Big Data :

Volume, Velocity, Value, Variety, Veracity

Web Applications – Web based applications are developed and deployed to harness the Es and Vs!

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- Browsing different sites
- Low Fidelity Mockup Wire Framing
- Apps like <https://marvelapp.com/>