Web Technologies and Services

CMSE 514

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Helpful Material:

Fundamentals of Web Development

Third Edition by Randy Connolly and Ricardo Hoar

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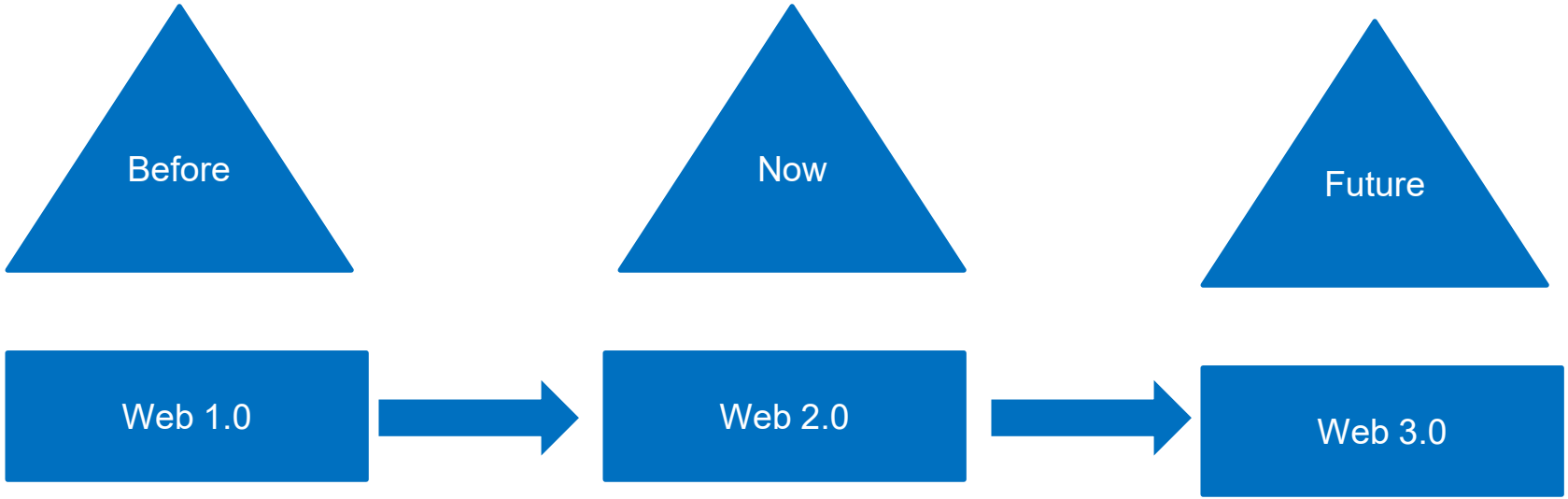
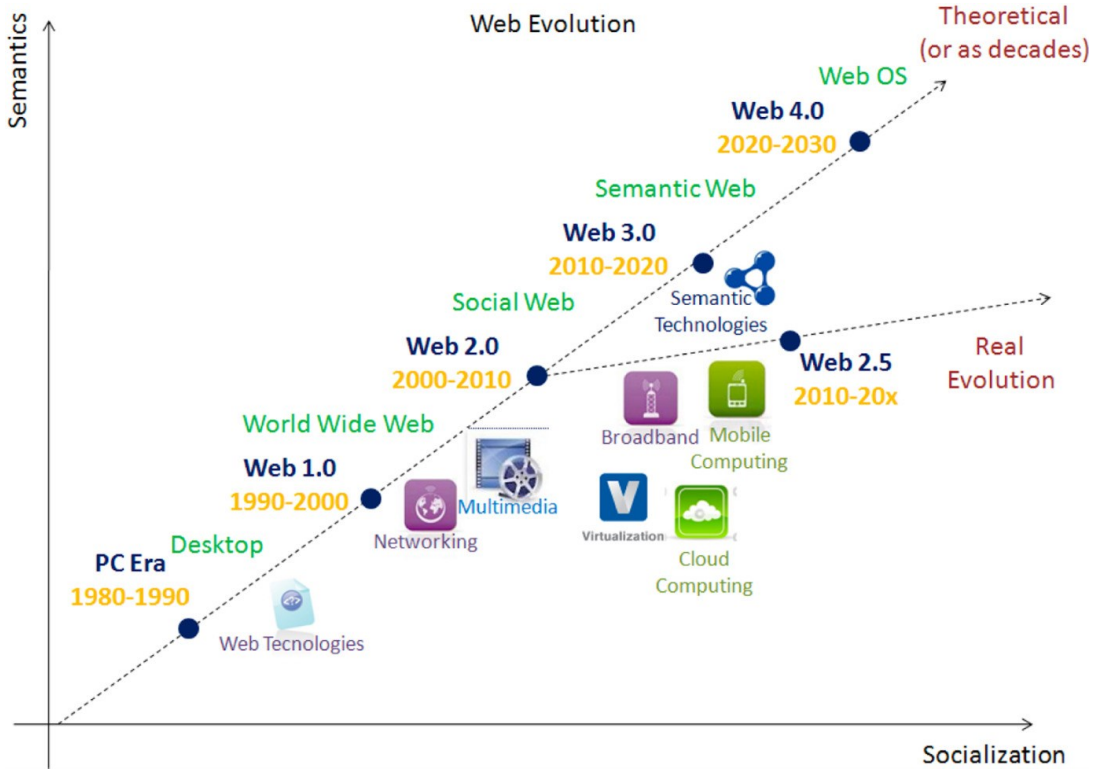
Chapter 10

Web 3.0

Generations of WWW



The Web Evolution



Web 1.0 (Read only)

- The first generation of the World Wide Web (WWW), characterized by separate static websites.
- It is one-way broadcasting.
- It is invented 1989 by Tim Berners- Lee.
- It was widely used between 1998 and 2001, and it is still used beside Web 2.0 in almost all web sites.

Web 1.0: Features

- Easy to connect static pages with the system via hyperlinks
- Supports elements like frames and tables with HTML 3.2
- Also has graphics and a GIF button
- Less interaction between the user and the server
- You can send HTML forms via mail
- Provides only a one-way publishing medium

Web 2.0 (Participative Web)

- Web 2.0 describes the current state of the internet, which has more user-generated content and usability for end-users compared to its earlier incarnation, Web 1.0.
- It does not refer to any specific technical upgrades to the internet; it refers to a shift in how the internet is used.
- It was first coined by Darcy DiNucci in 1999 and popularised by Tim O'Reilly and Dale Dougherty in 2004.

Web 2.0: Features

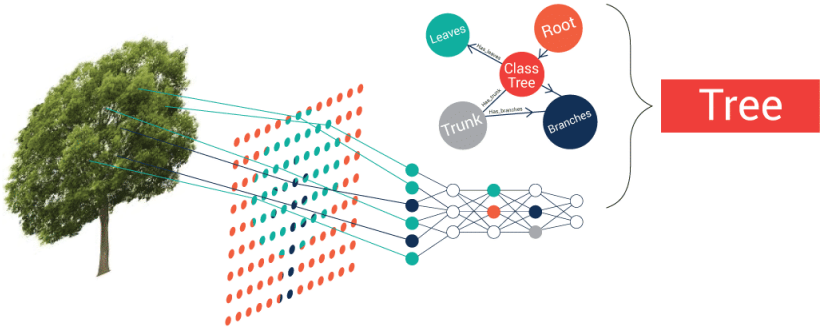
- Free sorting of information, permits users to retrieve and classify the information collectively.
- Dynamic content that is responsive to user input.
- Information flows between the site owner and site users using evaluation & online commenting.
- Developed APIs to allow self-usage, such as by a software application.
- Web access leads to concerns different, from the traditional Internet user base to a wider variety of users.

Web 2.0: Usage

- Web 2.0 applications tend to interact much more with the end user.
- As such, the end-user is not only a user of the application but also a participant in tools mentioned below:
  - Podcasting
  - Blogging
  - Tagging
  - Curating with RSS
  - Social bookmarking
  - Social networking
  - Social media
  - Web content voting

Web 3.0 (Read-Write-Execute)

- **Web 3.0** is the executable web or read-write-execute version of the web.
- It is also known as **Semantic Web** and is an extension of the World Wide Web that uses standards set by the World Wide Web Consortium (W3C).
- Tim Berners-Lee coined the term Semantic Web, which refers to a version of the web that can connect everything at the data level.
- With the Semantic Web, programs will be able to organize a wider range of data sets to perform tasks.



Web 3.0 (Read-Write-Execute)

- The semantic web improves web technologies in demand to create, share and connect content through search and analysis based on the capability to comprehend the meaning of words, rather than on keywords or numbers.
- Artificial intelligence will be a crucial tool for building the web of tomorrow.
- The Semantic Web makes it easier for artificial intelligence to execute natural language processing, allowing for faster and more accurate search results, among other benefits.
- Web 3.0 and Web3 are terms often used interchangeably, but they refer to two different concepts.

Web 3.0: How it works?

The original vision of the Semantic Web and its implementation gave rise to two data types:

- **Linked Open Data (LOD):** Linked Open Data is Linked Data which is released under an open license, which does not impede its reuse for free and combines 2 concepts:
  - **Open Data (OD)** is data that can be freely used, modified, and shared by anyone for any purpose. Data in this context is any structured web-based information.
  - **Linked Data (LD)** refers to structured data which is interlinked with other data, so it becomes more useful through semantic queries.
- **Semantic Metadata:** Semantic metadata is additional data that provide meaning about the data itself. In the context of the web, semantic metadata, also known as semantic tags, provide additional data about the web page content to describe its meaning to machines.

Web 3.0: A Look Under the Hood

From a technical point of view, the Semantic Web consists primarily of three technical standards:

- **Resource Description Framework (RDF):** The data modelling language for the Semantic Web. All Semantic Web information is stored and represented in the RDF.
- **SPARQL Protocol and RDF Query Language (SPARQL):** The query language of the Semantic Web. It is specifically designed to query data across various systems.
- **Web Ontology Language (OWL):** The schema language, or knowledge representation (KR) language, of the Semantic Web. OWL enables you to define concepts carefully so that these concepts can be reused as much and as often as possible.
- **Uniform Resource Identifier (URI):** a string of characters designed for clear identification of resources and extensibility via the URI scheme.

Web 3.0: Features

- **Artificial Intelligence (AI):** Combining this capability with natural language processing, in Web 3.0, computers can distinguish information like humans to provide faster and more relevant results.
- **3D Graphics:** The three-dimensional design is being used widely in websites and services in Web 3.0. Museum guides, computer games, e-commerce, geospatial contexts, etc. are all examples that use 3D graphics.
- **Connectivity:** With Web 3.0, information is more connected thanks to semantic metadata. As a result, the user experience evolves to another level of connectivity that leverages all the available information.
- **Ubiquity:** Content is accessible by multiple applications, every device is connected to the web, and the services can be used everywhere.

Differences Between the Web 1.0, Web 2.0, and Web 3.0

	Web 1.0	Web 2.0	Web 3.0
Know as	Read-only web	Read-write or social web	Read-write-own
Timeline	From 1989 to 2005	From 2005 to present	Upcoming
Content	Content is owned by the creator only	Content is shared by creators and users	Content is consolidated by creators and users
Focus	More focus on companies	More focus on community	More focus on individuals
Earnings	Earning is through page views	Earning is through cost per click	Earnings are obtained through user engagement
Advertise	Advertising is banner based	Advertising is interactive	Advertising is behavioral
User Data	User data was not focused	User data is controlled by central authorities	User data is personalized and decentralized without the use of central authority
Usage	Mostly visual, static web with no user-to-server communication	Mostly programmable web with improved user interaction	Linked data web with intelligent, web-based functionalities and applications
Examples	Examples are home pages and WebForms	Examples are blogs, wikis, and web applications	Examples are live streams, waves, and smart applications

Image Courtesy by creative-tim.com

Differences Between the Web 1.0, Web 2.0, and Web 3.0

	Web 1.0	Web 2.0	Web 3.0
Technologies	HTML/ HTTP/ URL/ Portals	XML/ RSS	RDF/ RDFS/ OWL
Services	Web servers, search engines, P2P file sharing	Instant messaging, Ajax, JavaScript frameworks, Adobe Flex	Personal data assistants, ontological data mining
Applications	Netscape Navigator, Slashdot, Craiglist	Google Maps. Google Docs, Flickr, YouTube, MediaWiki, WordPress, Facebook, Twitter	Alexa, Siri, Bixby, Decentraland, DTube, Filecoin, Steemit, Wolfram Alpha

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