Advances in Web Technologies

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Outline

- History
- Web 2.0
- Rich Internet Applications (RIA)
- The Semantic Web
- Other Advances in Web Technologies

History (Origins)

1945: Vannevar Bush proposes the Memex (Memory Extender) in his article entitled “As We May Think.”

1965: Ted Nelson coins the term “hypertext” and later on “hypermedia.”

1969: ARPANET becomes operational.

1991: Tim Berners-Lee’s research leads to the birth of the World Wide Web

History (Recent)

1998: Google is founded by Larry Page and Sergey Brin.

2000: The burst of the dot-com bubble.

2001: Tim Berners-Lee introduces the concept of the Semantic Web.

2002: Macromedia white paper introduces the term "Rich Internet Application."

2004: The term "Web 2.0" becomes popular following the O'Reilly Media Web 2.0 conference.

Web 2.0 (Introduction)

- Refers to a perceived second-generation of web-based services based on user collaboration, user content-generation and the emergence of web-based communities.
- Includes:
  - Social-networking sites
  - Wikis
  - Blogs

Web 2.0 (Examples)

Web 2.0 (Characteristics)

- User-owned data
- Social-networking aspects
- Collaboration within communities
- Network as a platform
- Data as the driving force
- *Interactive user-interface based on RIA*
- *Lightweight business models*

Web 2.0 (Criticism)

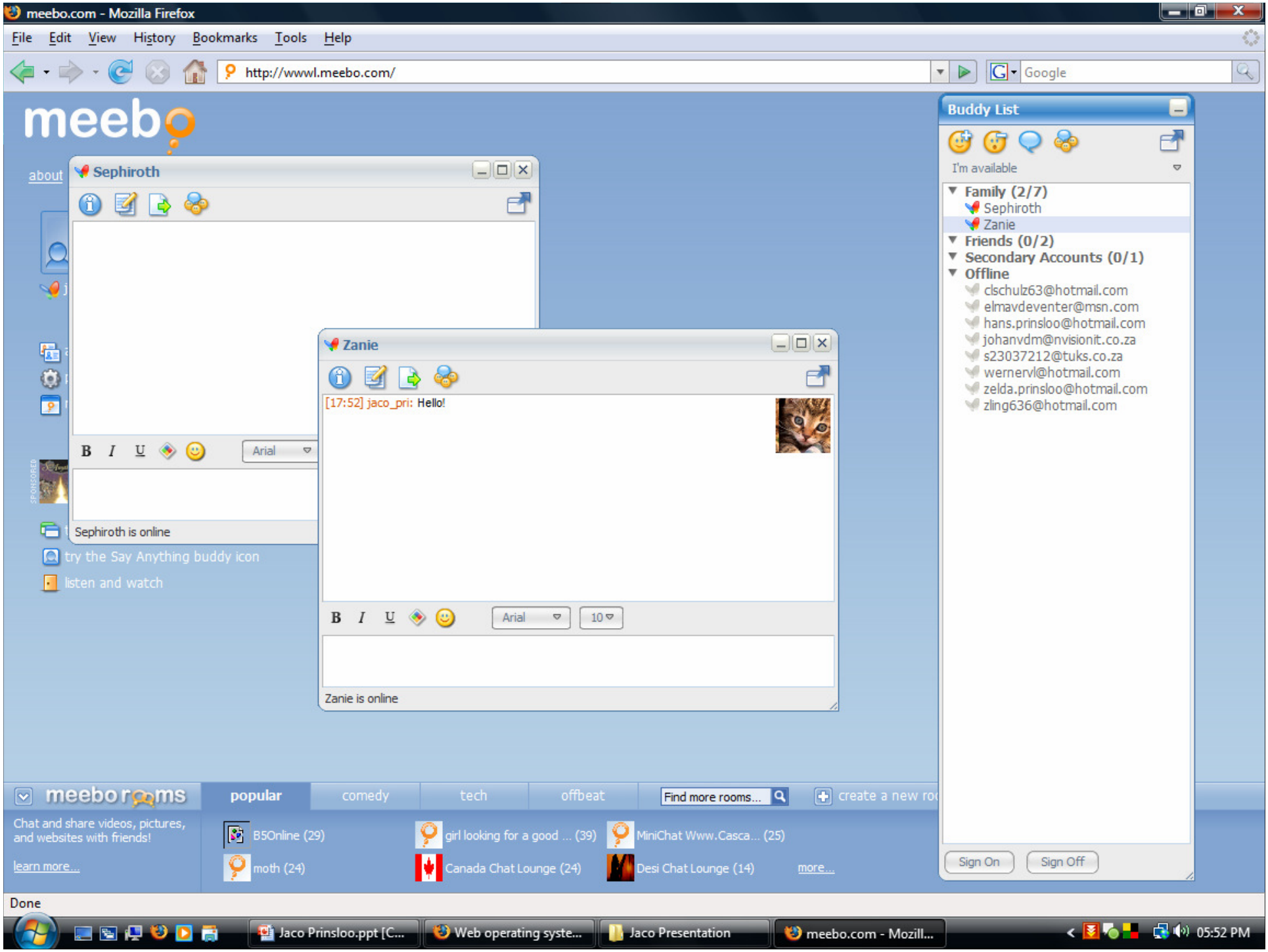
- More a buzzword than an actual progression of the technology.
- Many of the ideas and concepts have been in use well before the emergence of the term “Web 2.0.”
- Difficult to see its applicability to “traditional” websites.
- Talks of a “Bubble 2.0.”

Rich Internet Applications (Introduction)

- Web Applications that seek to replicate the features and functionality of traditional Desktop Applications.
- Became popular with the rise of AJAX (**A**synchronous **J**avascript **A**nd **X**ML).
- Other RIA technologies:
  - Adobe Flash & Flex
  - Microsoft Silverlight
  - JavaFX

Rich Internet Applications (Comparison)

Rich Internet Applications	Standard Web Applications
Dynamic	Static
Asynchronous	Synchronous
UI Processed at Client	UI Processed at Server
Regular communication	Infrequent communication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The Semantic Web (Introduction)

- The information contained on the web is intended for human use and as such cannot be analyzed and processed in a meaningful way by computers.
- This in turn makes searching for and retrieval of information difficult for humans.
- The Semantic Web seeks to alleviate this problem by tagging data with metadata which the computer is able to understand and reason about.

The Semantic Web (Components)

World Wide Web Consortium (W3C) recommendations:

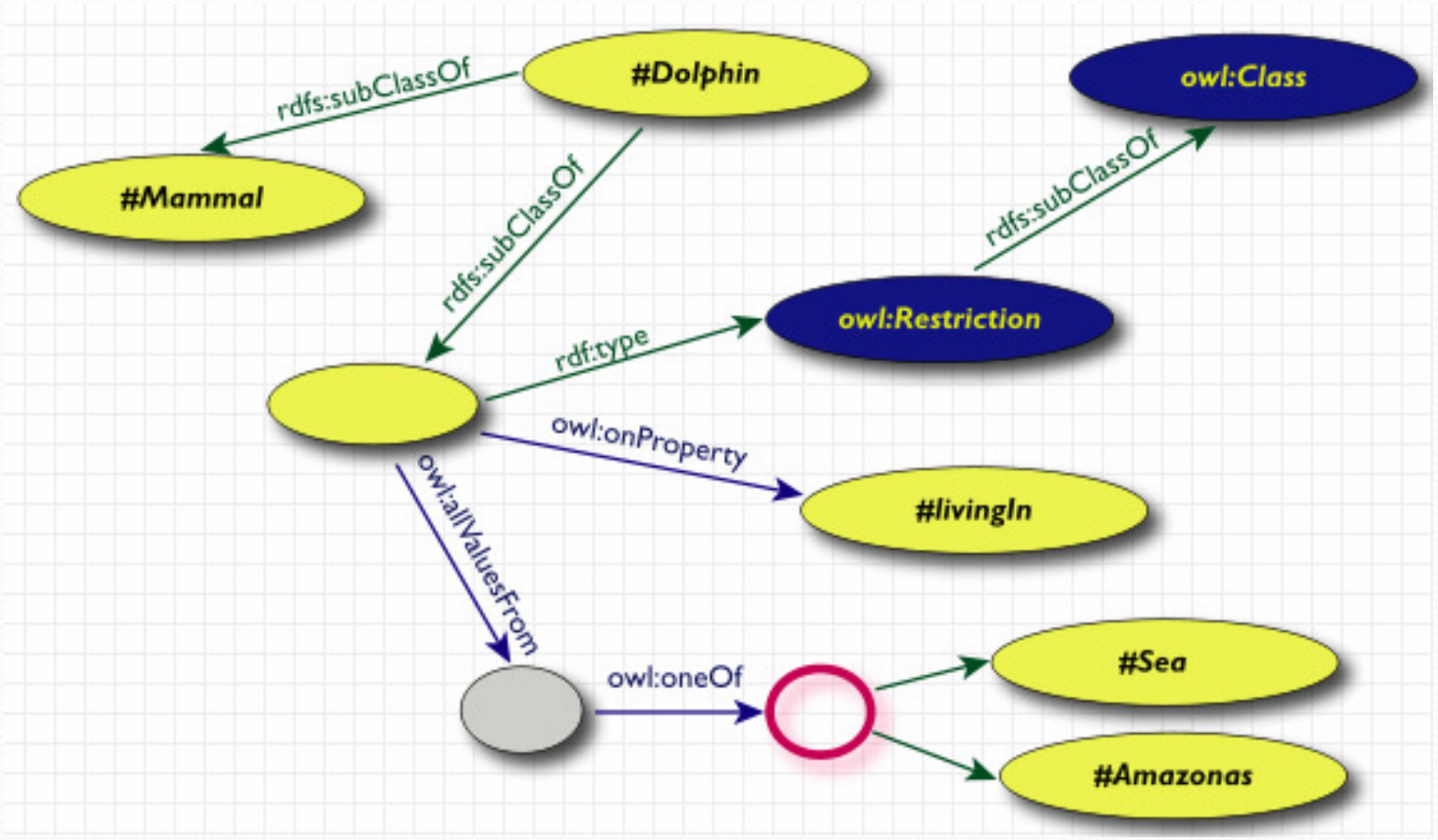
- Resource Description Framework (RDF)
- Defines “vocabularies” through a collection of triplets consisting of two concepts that are connected through a relationship.
- Documents based on XML and make use of URIs for resource identification
- Simple Protocol and RDF Query Language (SPARQL)
- Programming language-independent query language used to retrieve data from RDFs

The Semantic Web (Components)

- Web Ontology Language (OWL)
  - RDFs are inadequate for complex applications.
  - OWL allows for the specification and instantiation of web ontologies.
  - Allows for computers to reason about the domain: add additional meaning and properties to concepts not present in RDFs.

The Semantic Web (Example)

- A dolphin is a mammal living in the sea or in the Amazonas



The Semantic Web (Problems)

- Original article published in 2001, yet today the idea of the Semantic Web remains largely unrealized.
- Reasons might include:
  - RDF and OWL are very complicated
  - Converting from Natural Language to RDF/OWL is difficult
  - Large amount of existing information
  - The need for standardization
  - The business challenge

Other Advances in Web Technologies

- Integrating web applications with the desktop (Pyro Desktop)
- 3D Virtual worlds (Second Life)
- The internet of things (Appliances form part of the web)