

# Lecture 8: Semantic Web

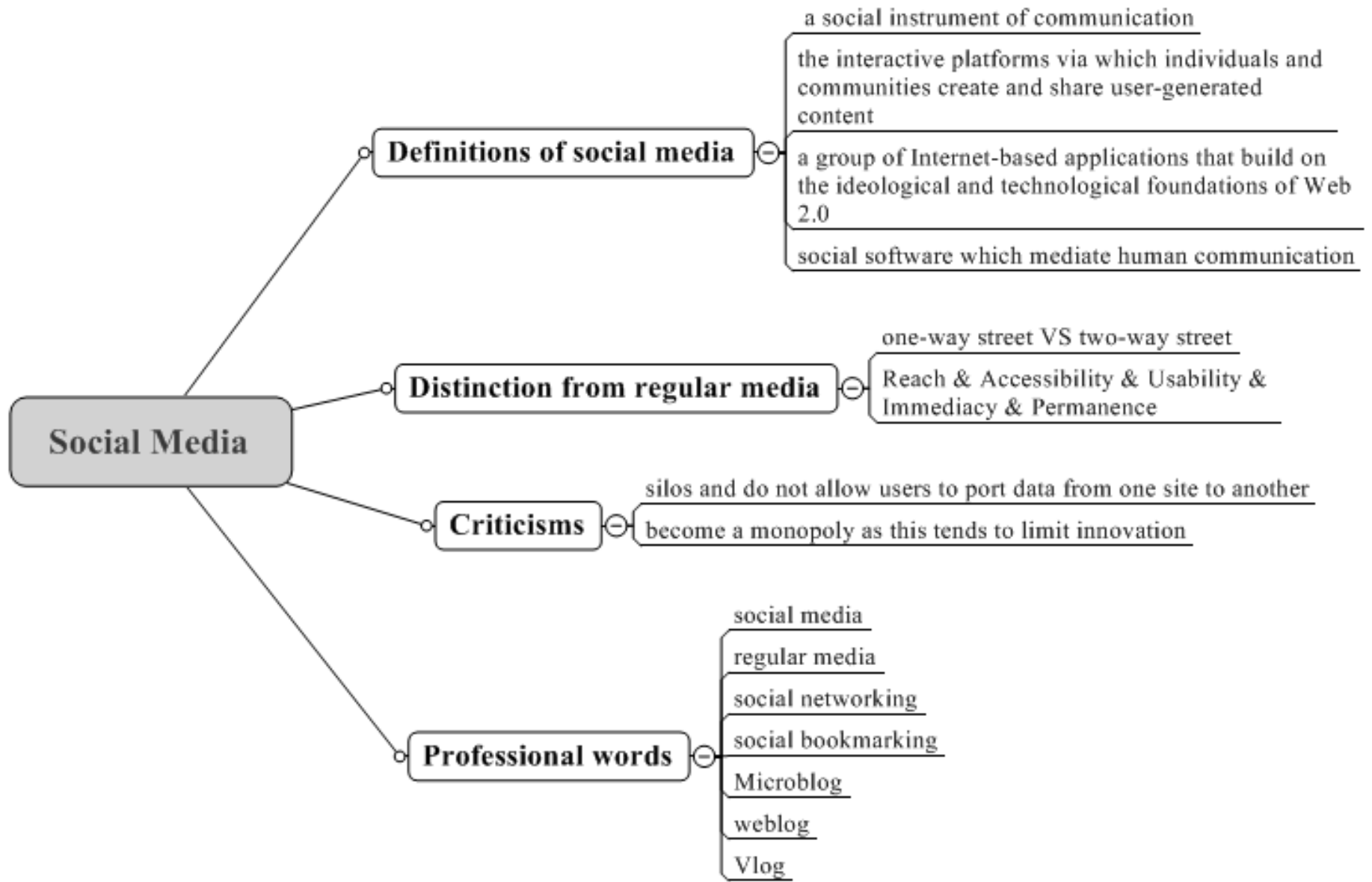
Dr. Xianmin Yang

Faculty of Education

Jiangsu Normal University



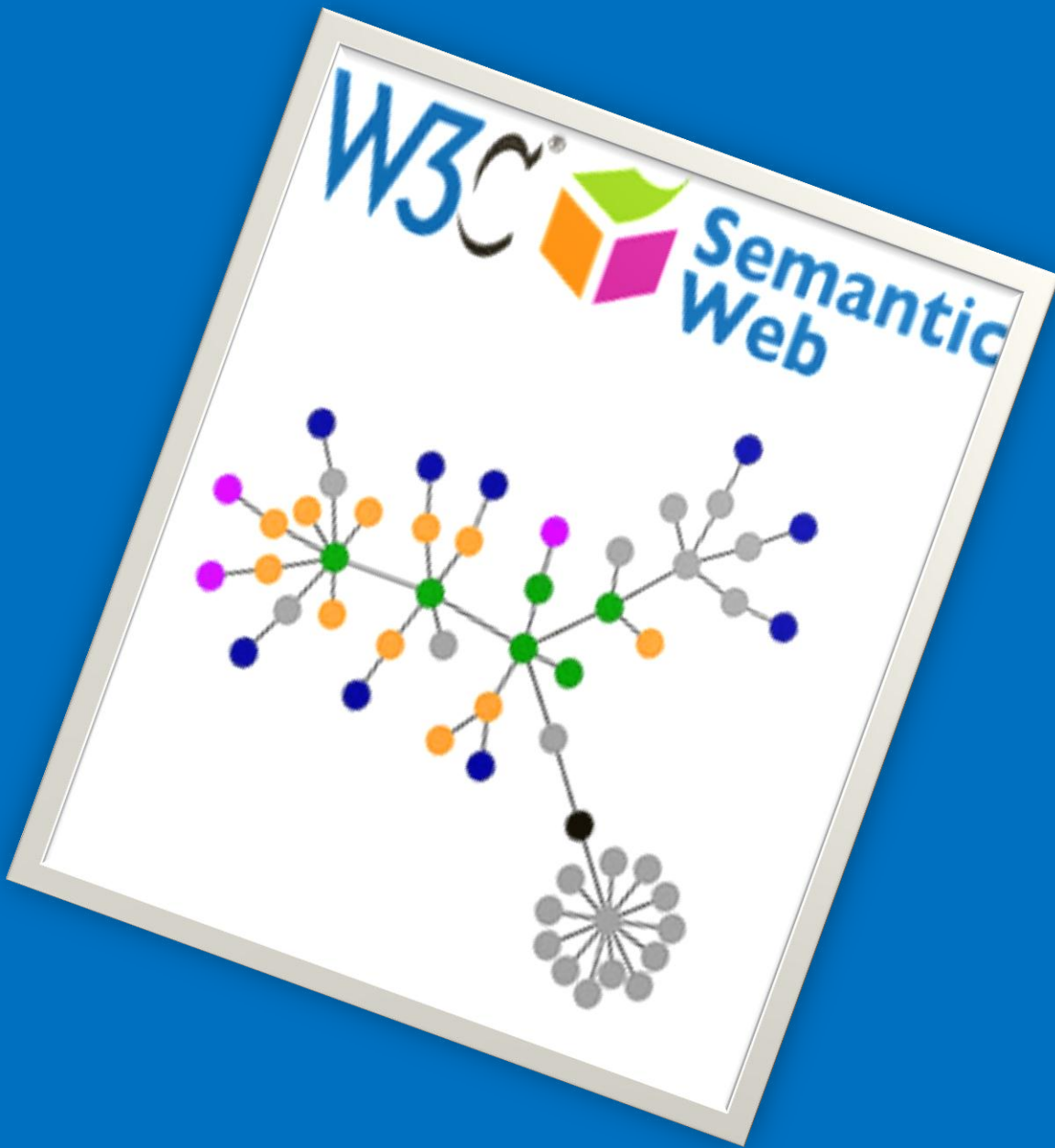
Last  
lesson  
review



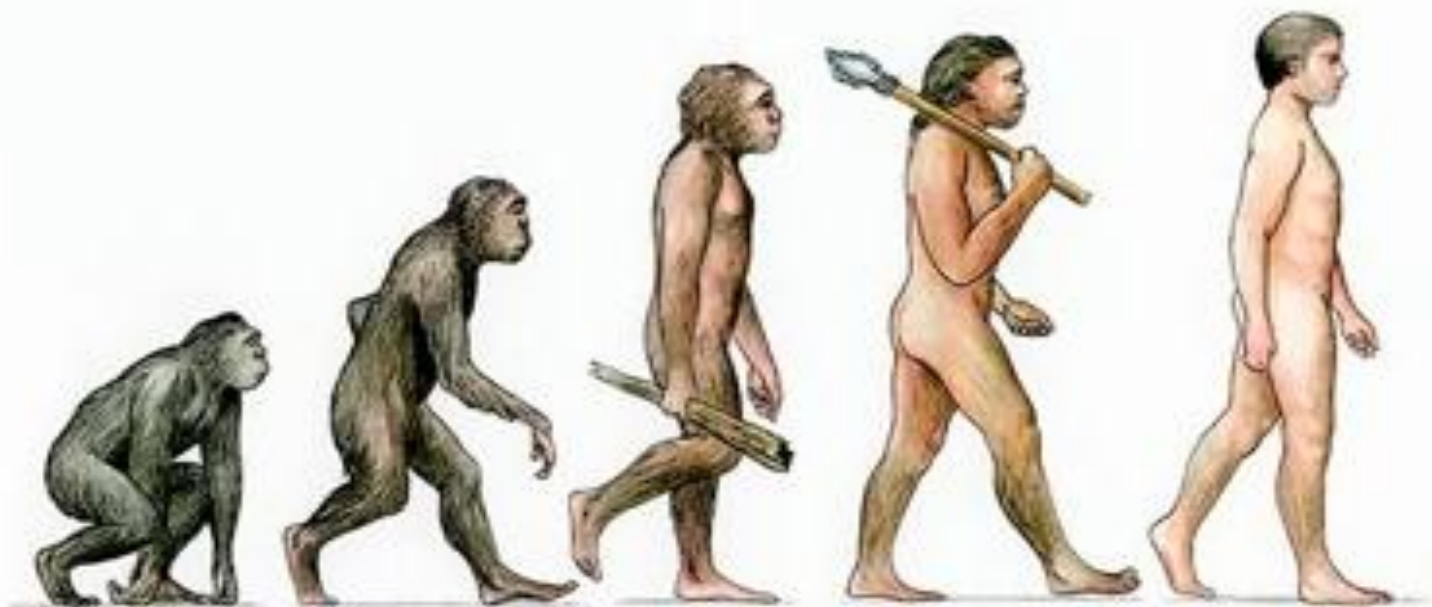
# Learning Objectives

- Know the evolution of web
- Know the definition of semantic web
- Know the drawbacks of www and the advantages of semantic web
- Master professional words about semantic web





**From  
WWW  
to  
Semantic  
Web**

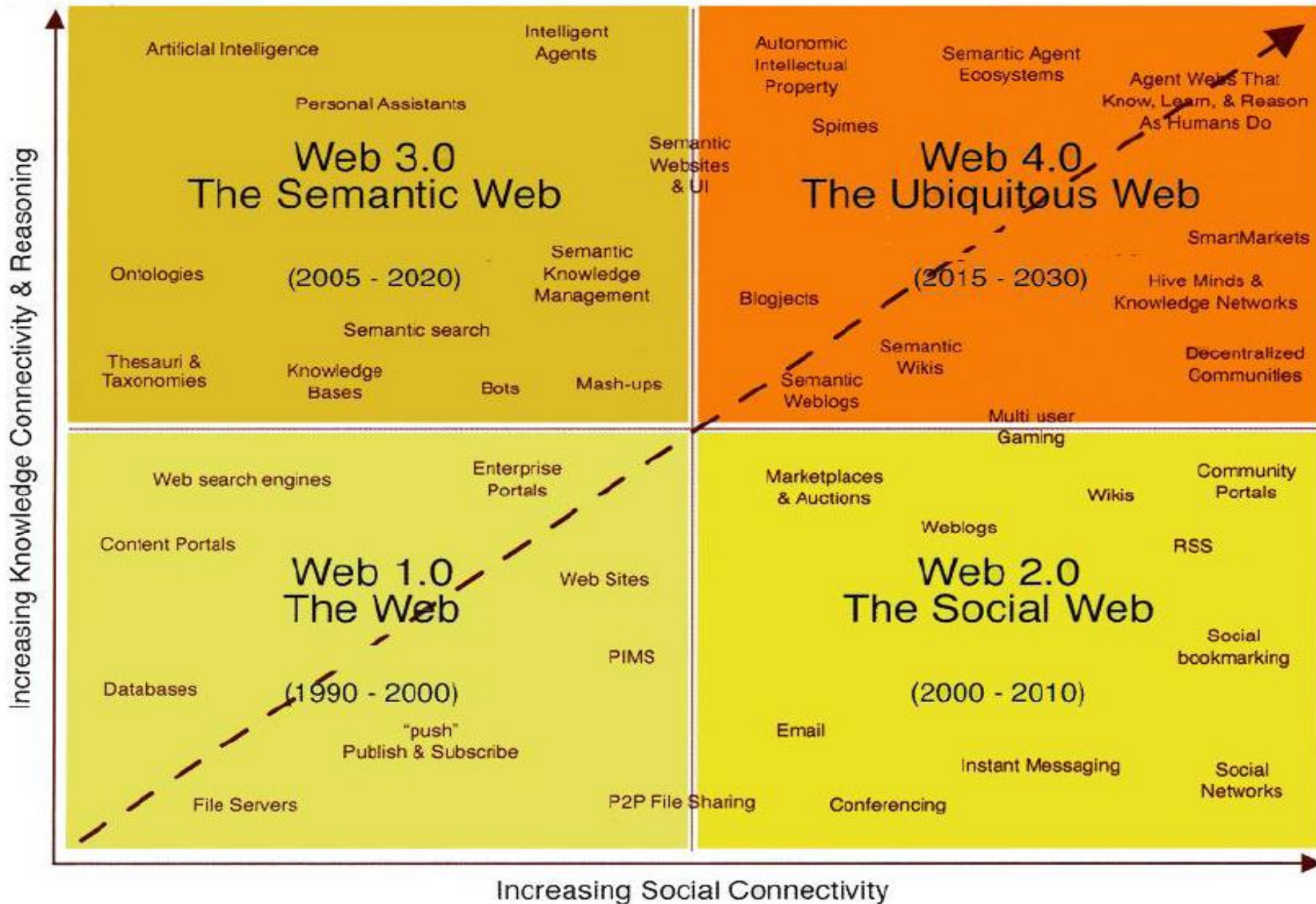


↓  
Web 1.0

↓  
Web 2.0

↓  
Web 3.0  
"semantic web"

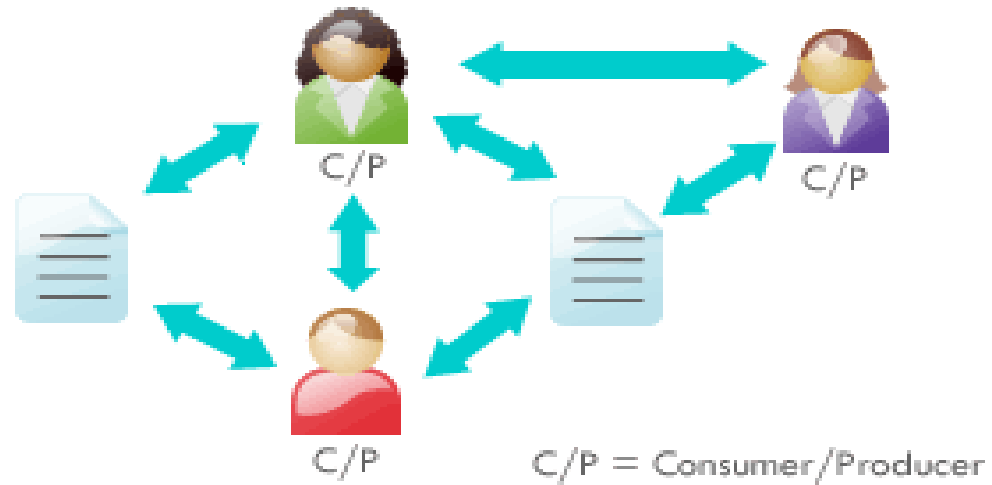
# Internet Evolution



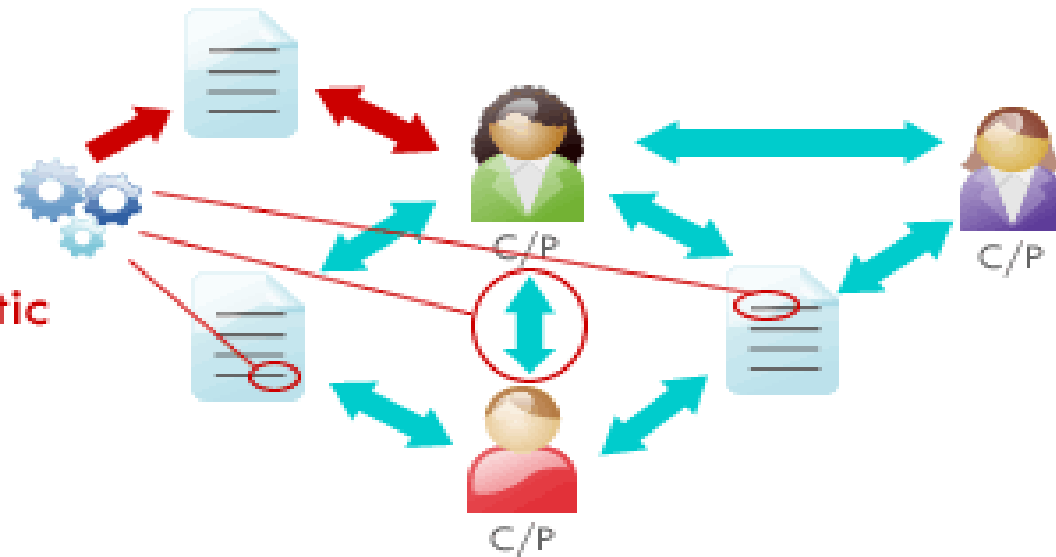
Web 1.0



Web 2.0



The Semantic Web







- Unfortunately, the Web was built for human consumption, not for machine consumption - although everything on the Web is machine-readable, **it is not machine-understandable** (Lassila, 1998).

- People aren't interested in documents
  - They are interested in things
- People can parse documents and extract meaning
  - Web pages are written in HTML.
  - HTML describes visualization of information.
  - **Computers can't!**

A photograph of Tim Berners-Lee sitting in a red upholstered lecture hall. He is wearing a dark blue suit jacket, a blue shirt, and a light blue patterned tie. He is looking towards the camera with a slight smile. In the background, other people are seated in the same red chairs, some looking towards the front of the room. The room has wooden paneling and a warm, indoor lighting.

Tim Berners-Lee!

The Father of Semantic Web  
1989 WWW  
1998 Semantic Web

# What is semantic web?

- *“The Semantic Web is an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation.”*
  - *Tim Berners-Lee, James Hendler, Ora Lassila, The Semantic Web, Scientific American, May 2001*

# What is semantic web?

- Semantic web is a highly interconnected network of data that could be easily accessed and understood by any desktop or handheld machine.
  - Feigenbaum, Lee, Ivan Herman, Tonya Hongsermeier, Eric Neumann, and Susie Stephens. “The Semantic Web in Action.” *Scientific American*, vol. 297, Dec. 2007, pp. 90-97.

# What can SW do?

- Help you finding the right data and the way to access it!
- Allows data to be shared and reused across application, enterprise, and community boundaries!
- Allows data to be processed automatically by tools as well as manually!
- Revealing possible new relationships among pieces of data!
  - [From W3C Semantic Web FAQ](#)

# Can the dream become true?

- Remember, 15 years ago the web was science fiction to most. Today it is taken for granted. Eventually, we will take the Semantic Web for granted as well. Our thirst to make sense of the information available to us and to broaden and deepen our relationships with the world and each other will most certainly urge us on through whatever complex and challenging development period awaits us.
  - [By Jason Ohler, \*EDUCAUSE Quarterly\*, vol. 31, no. 4, 2008](#)



# Links between WWW and SW

- The Semantic Web is *an extension of the current Web* and not its replacement. Islands of RDF and possibly related ontologies can be developed incrementally. Major application areas (like Health Care and Life Sciences) may choose to “locally” adopt Semantic Web technologies, and this can then spread over the Web in general. In other words, *one should not think in terms of “rebuilding” the Web.*
  - [From W3C Semantic Web FAQ](#)



Can computer really understand these information?



**SIR TIM BERNERS-LEE**  
**INVENTOR OF THE WORLD WIDE WEB**

- Of course not!
- Just to operate data in a more useful and meaningful way for human!
  - What is Semantic Web(T. Berners-Lee et al.)



# Reading Materials

- Reading 1: **Semantic web (必读)**
  - <http://lcell.bnu.edu.cn/do/cmUploadres?action=down&cmId=405&resId=650>
  - 10 minutes to finish the reading !

- The term was coined by Tim Berners-Lee, the inventor of the World Wide Web and director of the World Wide Web Consortium ("W3C"), which oversees the development of proposed Semantic Web standards.

- He defines the Semantic Web as “a web of data that can be processed directly and indirectly by machines.”

- The Semantic Web provides **a common framework that** allows data to be shared and reused across application, enterprise, and community boundaries.



- The concept of the **Semantic Network Model** was coined **in the early sixties** by the cognitive scientist Allan M. Collins, linguist M. Ross Quillian and psychologist Elizabeth F. Loftus in various publications, as a form to represent semantically structured knowledge.

- The main purpose of the Semantic Web is driving the evolution of the current Web by enabling users to find, share, and combine information more easily.

- The semantic web is a vision of information that can be readily interpreted by machines, so machines can perform more of the **tedious** work involved in finding, combining, and acting upon information on the web.

- Currently, the World Wide Web is based mainly on documents written in Hypertext Markup Language (HTML), a markup convention that is used for coding a body of text **interspersed** with multimedia objects such as images and interactive forms.

- HTML describes documents and the links between them. RDF, OWL, and XML, by contrast, can describe arbitrary things such as people, meetings, or airplane parts.

- "Semantic Web" is sometimes used as a synonym for "Web 3.0", though each term's definition varies.

- Some of the challenges for the Semantic Web include vastness, vagueness, uncertainty, inconsistency, and deceit. **Automated reasoning systems** will have to deal with all of these issues in order to deliver **on the promise of** the Semantic Web.

- Reading 2: **Semantic web and web 2.0**(选读)
  - <http://lcell.bnu.edu.cn/do/cmUploadres?action=down&cmId=405&resId=648>





# *Video Resources*

# An intro to semantic web

暴风影音 an intro to semanti web.flv

# The Web

icanhascheezburger.com

00:02:32

00:02:14/00:06:07

# Web 3.0 : Semantic Web Era





- Semantic web: 语义网
- RDF(Resource Description Framework): 资源描述框架
- web of data: 数据网络
- Microformat: 微格式
- Semantic Network Model: 语义网络模型
- Intelligent agent: 智能代理
- Web Ontology Language (OWL): 网络本体语言
- Extensible Markup Language (XML): 可扩展标记语言
- Automated reasoning system: 自动推理系统
- Fuzzy logic: 模糊逻辑
- Probabilistic reasoning techniques: 概率推理技术
- Cryptography techniques: 密码学技术

# Any more?

- Please pick up other professional words by yourself, and post them on the comment area.

内容准确性 选择 ▾ 内容客观性 选择 ▾ 内容完整性 选择 ▾ 标注规范性 选择 ▾ 更新及时性 选择 ▾

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请输入您对学习元的评论

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# Summary



# Can you recall what we learn today?

- The evolution of web
- The definition of semantic web
- The history of semantic web
- The purpose of semantic web
- The challenges of semantic web



*Any question, please contact me:*

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\* Actions speak louder than words \*