

# 第一讲:语义网基础

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教育技术前沿课程之语义网研究专题  
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**我们正在从电气时代走向信息时代!**





信息在以指数的速度增长，第三次浪潮是信息革命！近30年来，人类生产的信息已超过过去5000年信息生产的总和。

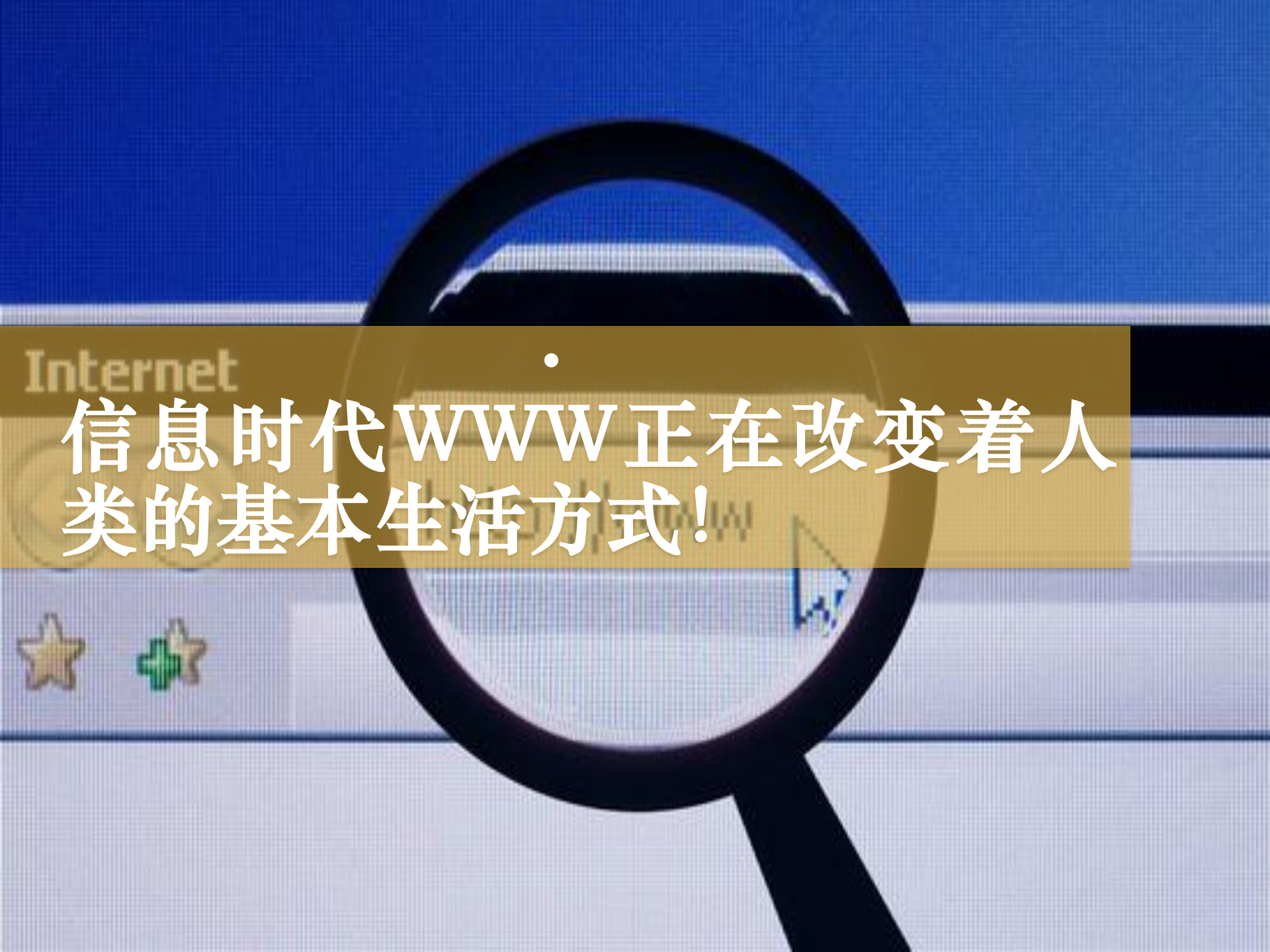


Wealth...

vs

...Knowledge

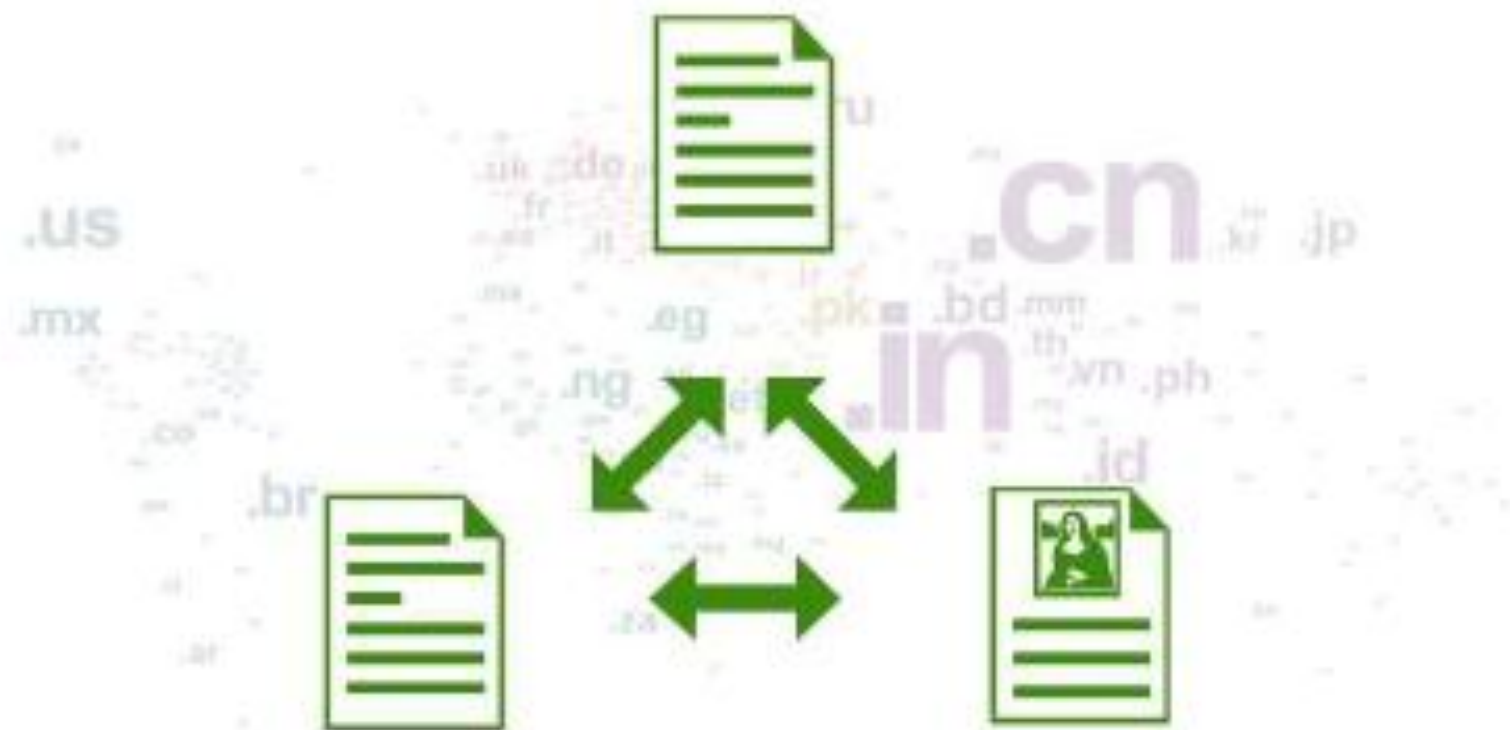


A magnifying glass with a black handle and frame is positioned over a computer screen. The screen shows a search bar with the word "Internet" in a light blue font. Below the search bar, there are two star icons: a gold one and a green one with a white outline. The background of the screen is a light blue grid pattern. The magnifying glass is centered over the search bar, and the text "信息时代 WWW 正在改变着人类的基本生活方式!" is overlaid on a semi-transparent yellow banner across the middle of the image.

Internet

信息时代 WWW 正在改变着人类的基本生活方式!

Current Web = internet + links + docs



# 万维网的缺陷

- 一个超级巨大的文档链接池
- 供机器阅读，但机器无法理解
- 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).
- 信息检索困难、耗时、耗力...



**Much of our time is spent finding useful information rather than interacting with it and thinking about it!**



# 万维网的缺陷

- 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! SO WHAT?**



**We need to help machines to understand the web so machines can help us understand things.**

- They can learn what we are interested in
- They can help us better find what we want

# How can we do that?



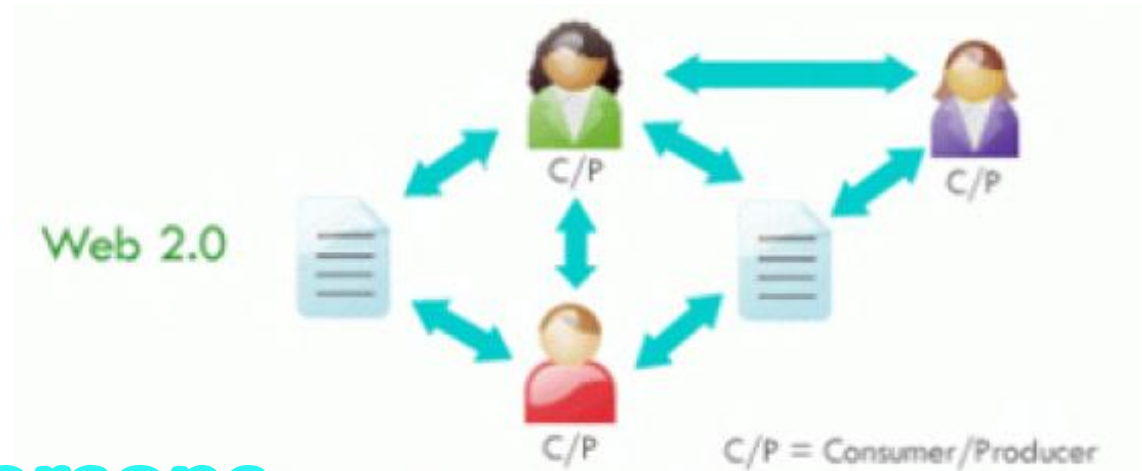
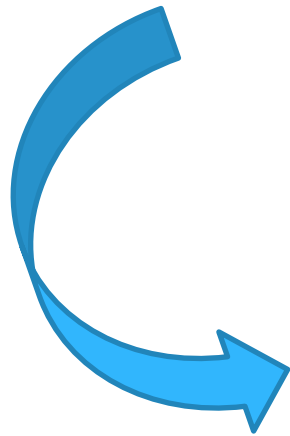
- Besides publishing documents on the web
  - Which computers can't understand easily
- Let's publish something that computers can understand



# 从Web1.0到Web2.0

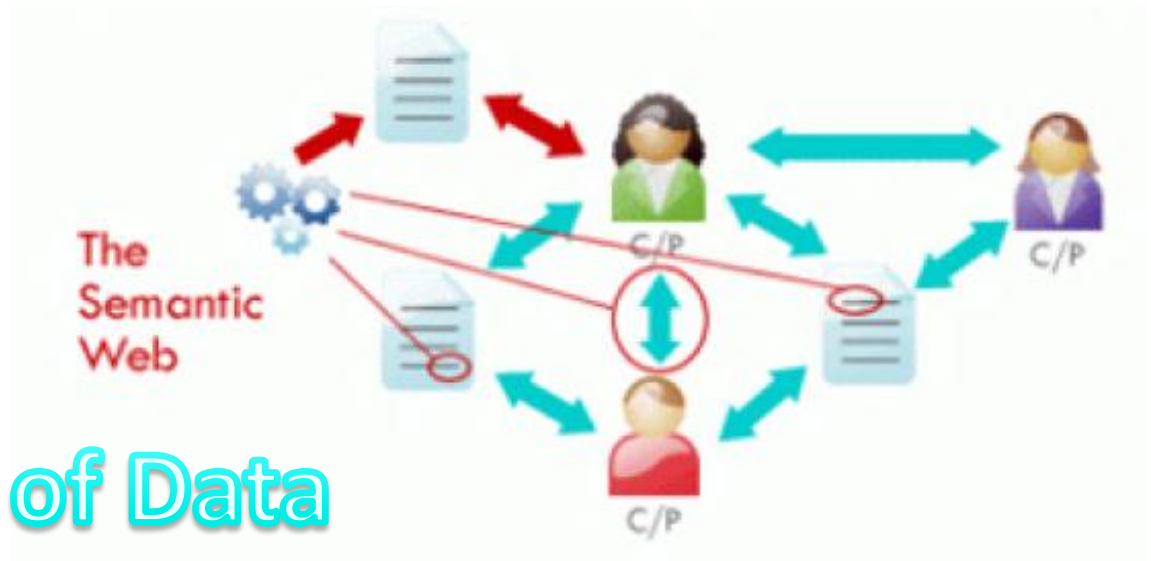
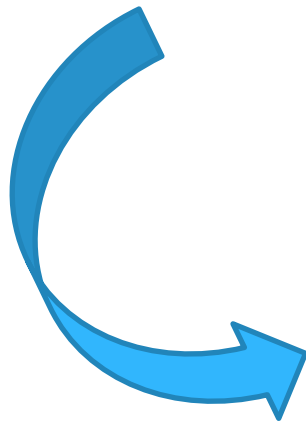
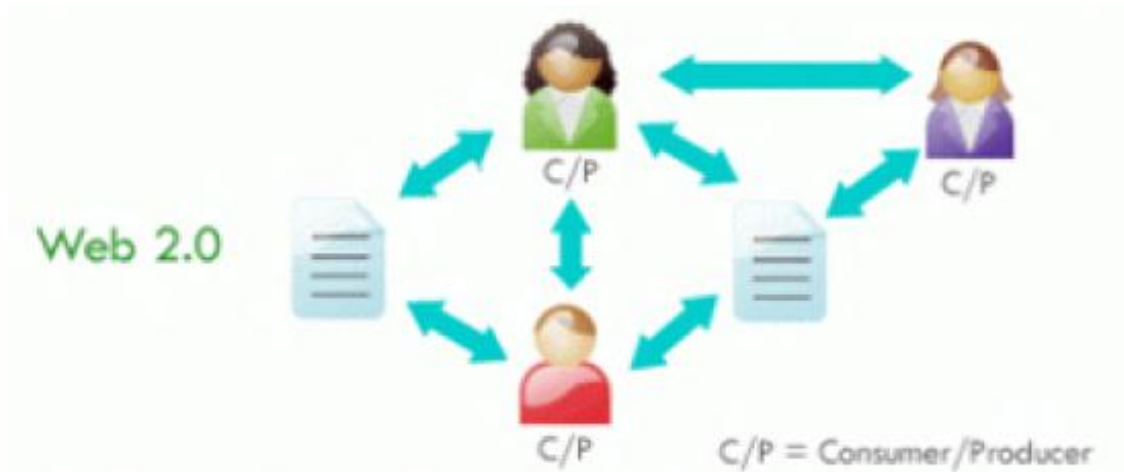


Web of Documents



Web of Persons

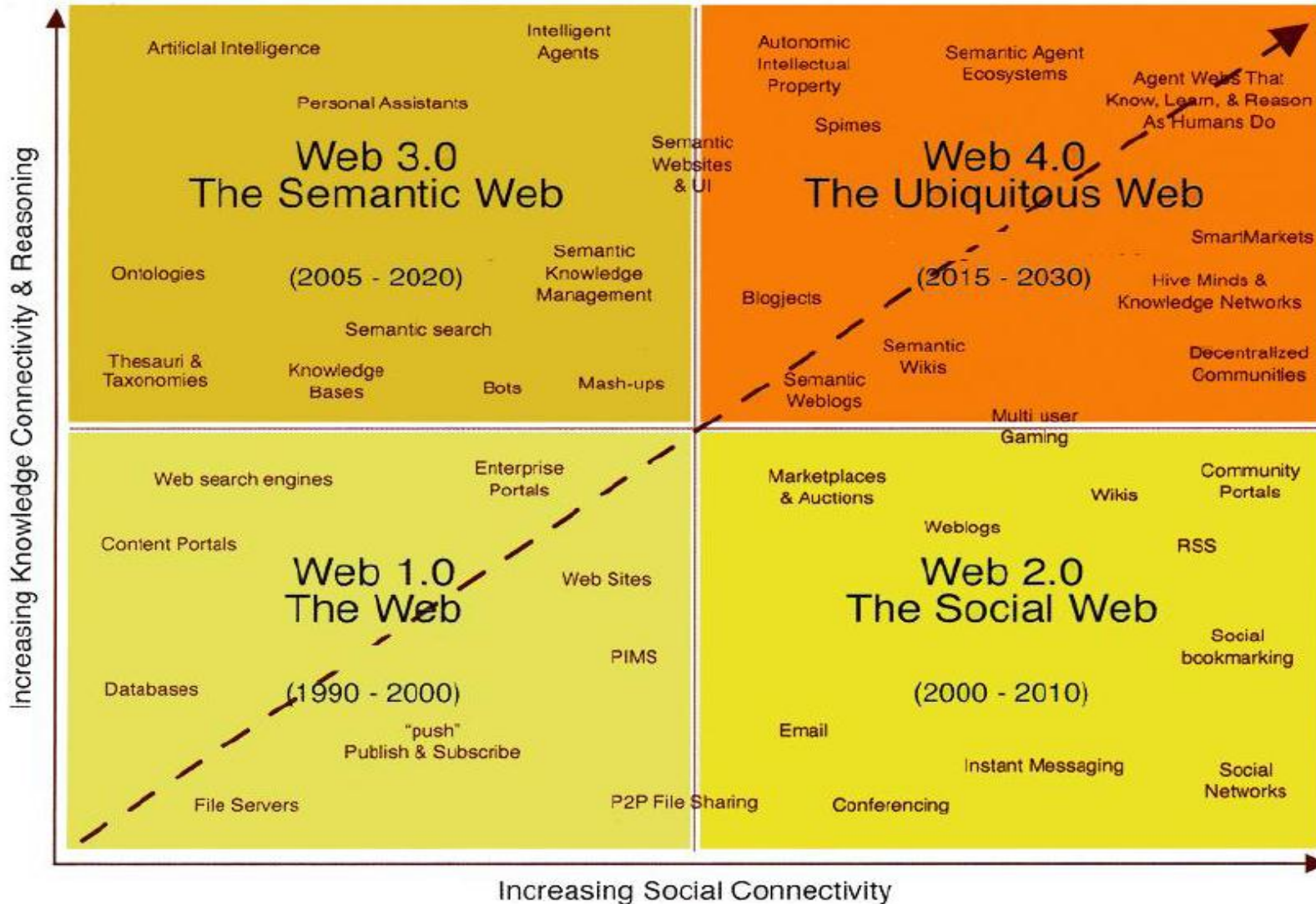
# 从Web2.0到Web3.0



Web of Data

# Web进化历程

## Internet Evolution





# Web进化历程

- Web1.0: 网络资源从信息生产者到信息消费者。
- Web2.0: 所有人既是网络资源的生产者又是消费者。
- Web3.0: 智能语义程序介入网络资源生产流程，更有针对性的发送和获取信息。



- "By **2012**, **70%** of public Web pages will have some level of semantic markup, **20%** will use more extensive Semantic Web-based ontologies"

**Then, What is  
Semantic Web?**



优酷



A photograph of Tim Berners-Lee sitting in a lecture hall. He is wearing a dark suit jacket, a blue shirt, and a patterned tie. He is looking towards the camera with a slight smile. The background shows rows of red seats and other people in the hall, some of whom are blurred. The lighting is warm and indoor.

Tim Berners-Lee!

万维网之父

1989 WWW

1998 Semantic Web

# 语义网的定义

- *“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*

# 语义网的定义

- 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.



# 语义网能干什么

- 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](#)

# 梦想会成真吗？

- 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](#)

# SW和WWW的联系

- 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.)



语义网环境下的生活会是什么样子？

# 场景1:搜索专家的Email地址

- **WWW环境**

- Currently, go to the webpage->root around the page->find it
- Just for displaying information
- Locating mailing address is difficult, clumsy, inefficient, inaccurate

- **语义网环境**

- Common representation of mailing address
- Tell your agent some basic information
- Locate target address quickly and accurately

# 场景2：到海南旅游

- **WWW环境**
  - Currently, go to airline ticket office for tickets
  - Go through hotel and tourist routes information
  - Dealing with travel scheduler
  - ...
- **语义网环境**
  - Preparation Done by Your Agent
  - Confirm Flights, Book hotel, Tourist Routes
  - Weather Reminding ,Friends
  - ...



# 场景3：学术信息检索

- **WWW环境**
  - Searching “[A Dream of Red Mansions](#)”
  - Go to Wikipedia, then Google or Baidu
  - Returns a gazillion hits, lots of work(filtering, synthesizing, evaluating ) done by human
- **语义网环境**
  - Return a multimedia report
  - Aggregating Various sources
  - Mainly Scholarship knowledge

# AGENT

COMING SOON

**Agent will be everywhere!**

**Help your do everything you want them to do.**

***Any question, please contact me:***

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\* Actions speak louder than words \*