

# **An introduction to Web Engineering**

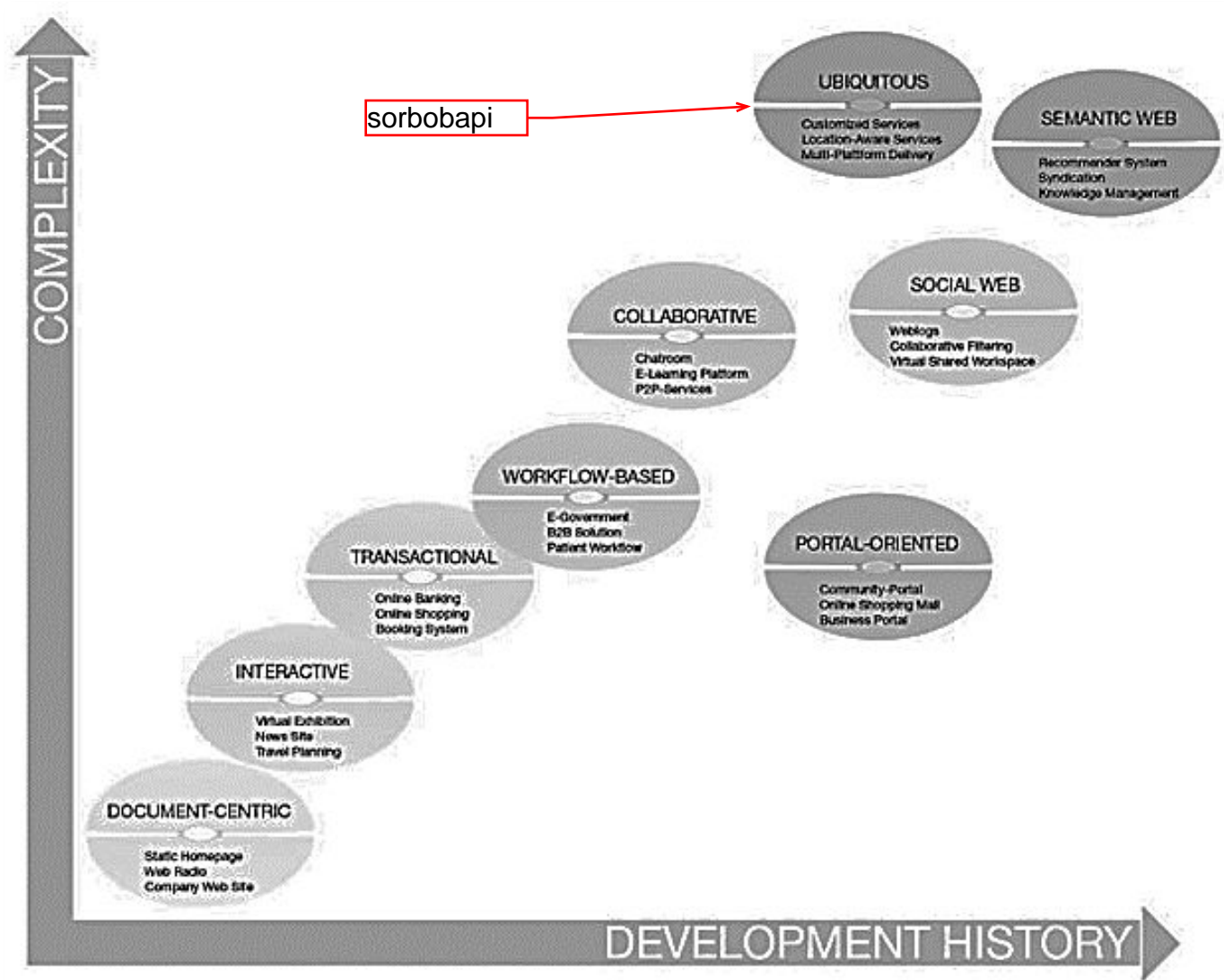
Chapter -1

# Why web engineering?

- From info medium to Application medium
- Web applications today are full-fledged, complex software systems
- Technologies and standards are used as a development platform and as a user platform at the same time

A Web application is a software system based on technologies and standards of the World Wide Web Consortium (W3C) that provides Web specific resources such as content and services through a user interface, the Web browser.

# Categories of Web Applications



- Document centric
- Interactive
- Transactional
- Workflow-based
- Collaborative
- Social Web
- Portal-oriented
- Ubiquitous
- Semantic Web

# Document centric Web application

ogroduct

- precursor to Web applications
- stored on a Web server as static HTML docs and sent to the Web client in response to a request
- updated manually
- often results in outdated information
- Danger of inconsistencies as manually update different pages
- simplicity and stability
- Short response time

## Example:

Static homepages, simple web presences for small businesses belong in this category.

# Interactive Web application

- CGI (Common Gateway Interface) and HTML forms based
- Dynamically generated Web pages and links

## Example:

- virtual exhibitions,
- news sites,
- timetable information.

Feedback and survey systems

# Transactional Web application

- more interactivity
- Data Driven
- Allow info. update by user
- efficient and consistent handling of the increasing amount of content

## Example:

- Online banking,
- online shopping
- booking systems
- Hotel website+room booking system

# Workflow-based Web application

- **handling of workflows** within or between different entities
- **Interoperability** Ensures smooth data exchange and coordinated processes across different technical and organizational environments.
- **require a certain structuring** of the automated processes and operations
- **Challenges:**
  - complexity of the services
  - the autonomy of the participating companies
  - robust and flexible workflow

## Example:

- **B2B** solutions in e-commerce
- **e-government** applications in the area of public administration
- Web-based support of patient workflows in the health sector.

# Collaborative Web application

- Groupware
- High degree of communication between the co-operating entities
  - Chat or video conferencing
  - Comments and discussions
  - Notifications and updates
- support shared information and workspaces

## Example:

- Wiki
- Google meet
- E-learning platforms (google classroom)
- Scheduling systems



# Social Web application

- Find Related objects of interest
- Find people with similar interests
- people provide their identity to a community of others with similar interests

## Example:

- blogs
- Friendster
- Facebook
- Quora

# Portal-oriented Web application



- Central hubs to access web
- Provides single point of access to separate, potentially heterogeneous sources of information
- specialized portals
  - business portals
  - marketplace portals
  - community portals

Users log in once and gain access to a variety of resources, such as email, calendars, forums, documents, and external links.

# Yahoo!

[Home](#) [Mail](#) [News](#) [Finance](#) [Sports](#) [Entertainment](#) [Search](#) [Mobile](#) [More](#)

**yahoo!**

[Sign in](#)  

[Terms \(Updated\)](#) [Privacy \(Updated\)](#) [Advertise](#)  
[About Our Ads](#) [Careers](#) [Help](#) [Feedback](#)  
[Suggestions](#)

## Products and Services

<b>A</b>		<b>T</b>
Accounts	Mobile Apps	Tech
Ad.com	My Channel	Technical Support
Advertising		
Autos	<b>N</b>	<b>W</b>
	News	Weather
	Norton Security Online	Women Empowerment Content
<b>C</b>		
Computer Optimization	<b>O</b>	<b>Y</b>
Currency Converter	OneSearch	Yahoo BOLD
		Yahoo elevAsian
<b>D</b>	<b>P</b>	Yahoo Fantasy Plus
Developer Network	Password Secure Manager	Yahoo Finance Plus
Downloads	Personal Finance Articles	Yahoo Homepage
	Personal Finance News	Yahoo Mail Plus
<b>E</b>	Premium Offers	Yahoo Mail Plus
Entertainment	Protection Products	Yahoo Native
		Yahoo Plus Protect Home
<b>F</b>	<b>S</b>	Yahoo Plus Protect Mobile
Fantasy Sports	Search	Yahoo Plus Secure
Finance	Security Center	Yahoo Plus Support
	Shopping	Yahoo Prism
<b>H</b>	Small Business	Yahoo SOMOS
Help	Smart TV	
	Sports	
<b>L</b>	Support Services	
LastPass Premium		
LastPass Families		

# MSN



Sign in




 Outlook.com

 Facebook

 Sports

 Office

 Twitter

 Skype

 Microsoft Store

 OneDrive

CORONAVIRUS

 RAJSHAHI / 23°C 

[Try MSN in Microsoft Edge](#)

AFRICA

ASIA

AUSTRALASIA

EUROPE

LATIN AMERICA

MIDDLE EAST

NORTH AMERICA

LIFE

SPORT

ES >

# Ubiquitous Web application

- Customized services anytime anywhere and for any device
- personalization (dynamic adjustments according to the users' situation )
- location-aware services

- Limitations:

- Limitations Of Mobile devices


Small screens, limited processing power, and short battery life make it hard to run complex apps, unable to manage complex UI

- The context

Detecting user location, device, or intent can be difficult and may lead to wrong or irrelevant responses.

# Example of Ubiquitous Web App (Google Now)


Lunch with Brad @ 12pm  
2368 3rd Street, San Jose, CA 94107



[Get directions / 33min](#) [via 101](#)





[Alternate route / 45min](#) [via 280](#)

San Francisco




SUNNY  
3MPH


80°

TUE	WED	THU	FRI
 72° 62°	 82° 72°	 60° 42°	 84° 78°

55 minutes to work  
Light traffic on 101



Pacifica Airlines  
flight 2340



Status: Delayed / Wed, June 27, 2012


Depart San Francisco  
SFO 7:09pm (sched. 5:20pm)  
Terminal 4, Gate A3

Arrive Taipei  
TPE 10:32pm  
Terminal 2, Gate 50

[Navigate to SFO / 34 min](#)

The Connaught Hotel  
Carlos Place, Mayfair, London  
W1K 2AL, United Kingdom


Check-out in 1 hour



[Get directions](#)

La Gavroche  
43 Upper Brook Street, London, W1K 7QR

Reservation in 1 hour  
Journey time walking 45 minutes



[Get directions](#)

[View email](#)

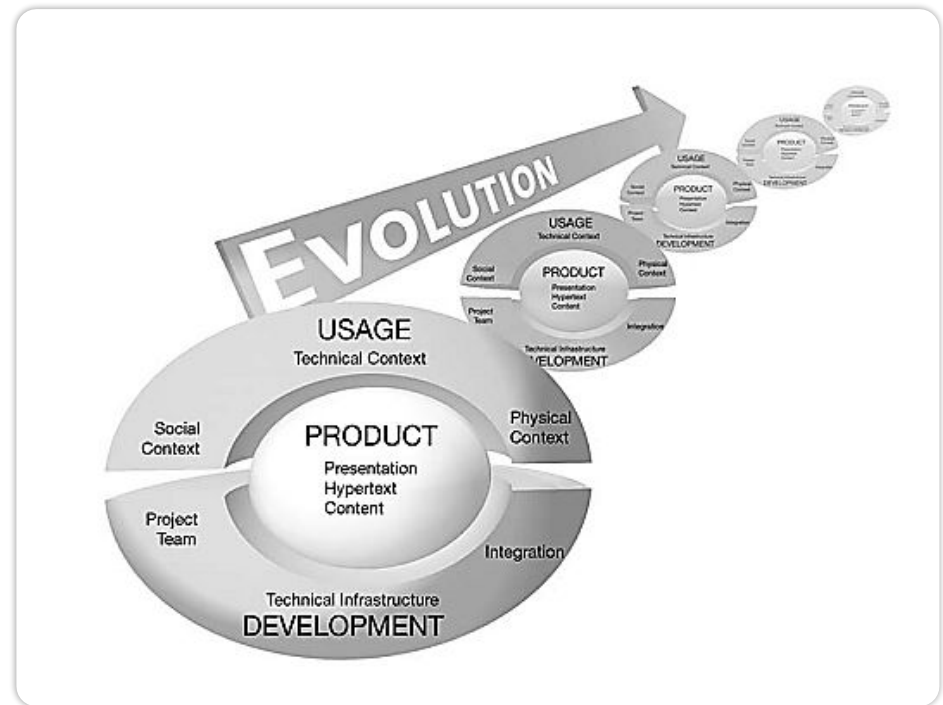
# Semantic Web application

- Presenting information on the Web not only for humans, but also in a machine-readable form
- Facilitate knowledge management on the Web
- Content syndication Allows sharing and reusing structured content (like news feeds or product info) across different platforms automatically.
- Locating new relevant knowledge, e.g. by means of recommender systems
- Supports more ubiquitous

```
SELECT
    price, spec, photo
FROM
    Internet
WHERE
    product_name LIKE 'iphone'
```

# Characteristics of Web Applications

- Web applications differ from traditional, non-Web-based applications in a variety of features worth looking into
- Characteristics and arranged along 4 dimensions
  - Product 3
  - Usage 3
  - Development 3
  - Evolution 4





# Characteristics of Web Applications

## • Product-related Characteristics

- Content
- hypertextual structure (navigational structure)
- presentation (the user interface)

# Product-related Characteristics

- Content

- Content is equally important as the Web application
- Web application developers : programmers and authors
- provided as tables, text, graphics, animations, audio, or video
- Targeted to certain user groups
- Content Quality
  - Update frequency
  - exact, consistent and reliable

# Product-related Characteristics

- **Hyper-text**

- a basis for the structuring and presentation of information
- Non linear
- Basic elements
  - **Nodes** : uniquely identifiable info unit
  - **Links** : path form one node to another
  - Anchor :
- Problem:
  - Disorientation: lose ones focus while browsing
  - cognitive overload : overwhelmed by the amount of info

# Product-related Characteristics

- **Presentation**

Two special features of Web applications at the presentation level

- **Aesthetics**

- Look-and-feel
    - Visual presentation of web pages
    - often determines success or failure

- **self-explanation**

- should be possible to use without documentation.
    - interaction behavior must be consistent

# User-related Characteristics

- Heterogeneous usages
- Users vary in numbers and cultural background
- devices have differing hardware and software characteristics
- The usage of Web applications is characterized by the necessity to continuously adapt to specific usage situations, so-called contexts

# User-related Characteristics

- Social Context: Users
- Technical Context: Network and Devices
- Natural Context: Location and Time

# Social Context: Users

- Spontaneity:
  - user cannot be expected to be loyal
  - users will only use if it appears to bring them immediate advantage.
  - Unpredictable user load
  - Scalability is extremely important
- Multiculturality
  - developed for different user groups
  - large and hardly foreseeable heterogeneities in terms of abilities, knowledge and preferences
  - Personalization is difficult
  - User context must be made a development stage

# Technical Context: Network and Devices

- Quality of Service:
  - bandwidth, reliability, and varying stability of the connection are independent factors that must be considered to guarantee appropriate quality of service
- Multi platform delivery
  - offer services to devices with very different specifications (e.g. monitor size, memory capacity, installed software)
  - different browser
  - difficulties in creating a consistent user interface and in testing Web applications



# Natural Context: Location and Time

- Globality:
  - internationalization
  - location-aware services
  - security of Web applications (content restriction)
- Availability
  - Immediately available
  - Permanent availability demand stability

# Development-related Characteristics

- The Development Team
- Technical Infrastructure
- Process
- Integration

# The Development Team

- Multidisciplinary

# Case Study

- SafeHomeAssured.com

Pressman (page-4)

# **Are WebApps Really Computer Software?**

**How they are different from  
conventional Software?**

# Attributes that distinguishes them

- Network intensiveness
- Concurrency
- Unpredictable load
- Performance
- Availability
- Data driven
- Content sensitive.
- Continuous evolution
- Immediacy.
- Security
- Aesthetics