

An introduction to Web Engineering

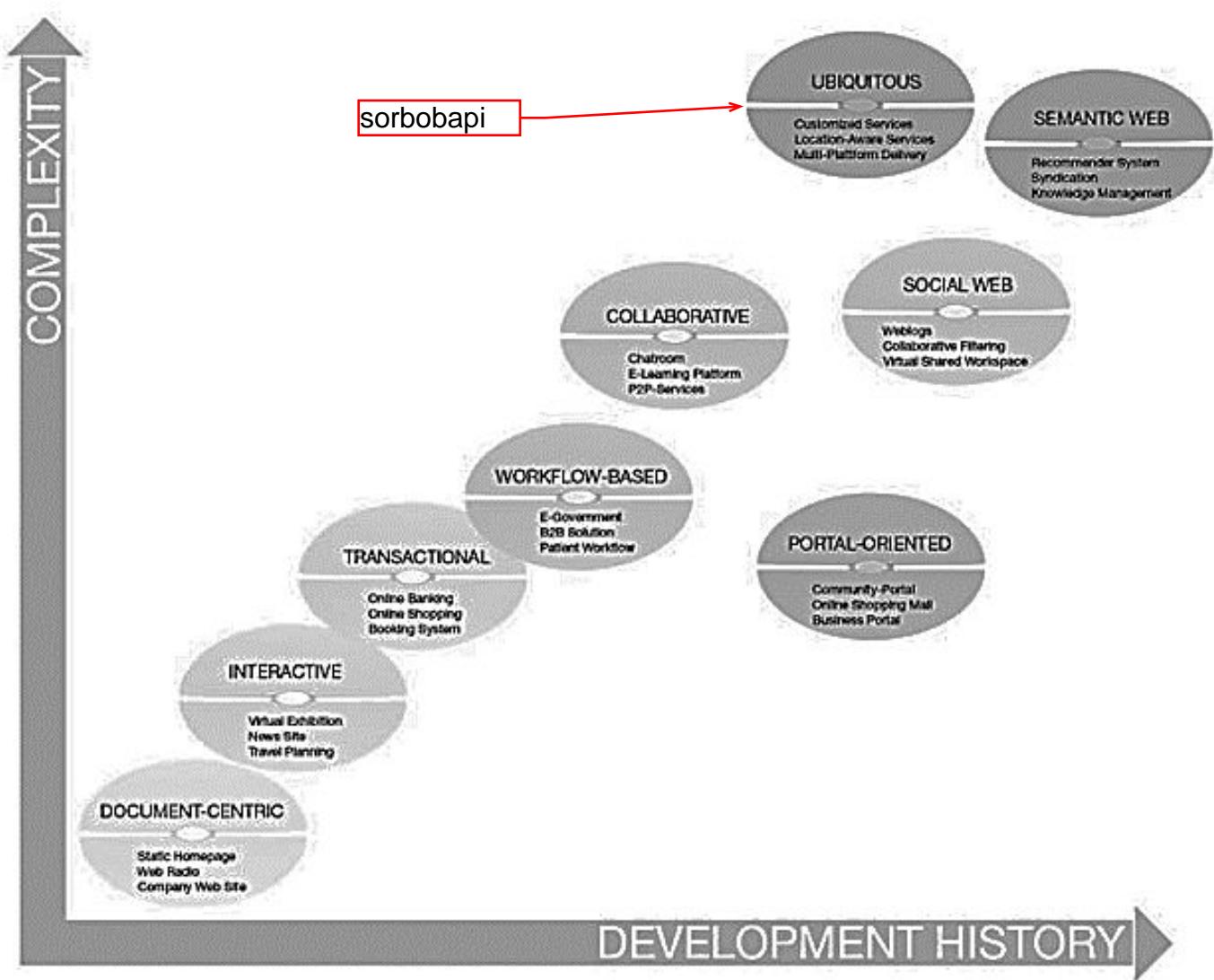
Chapter -1

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

ogrodut

- 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- often results in outdated information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!

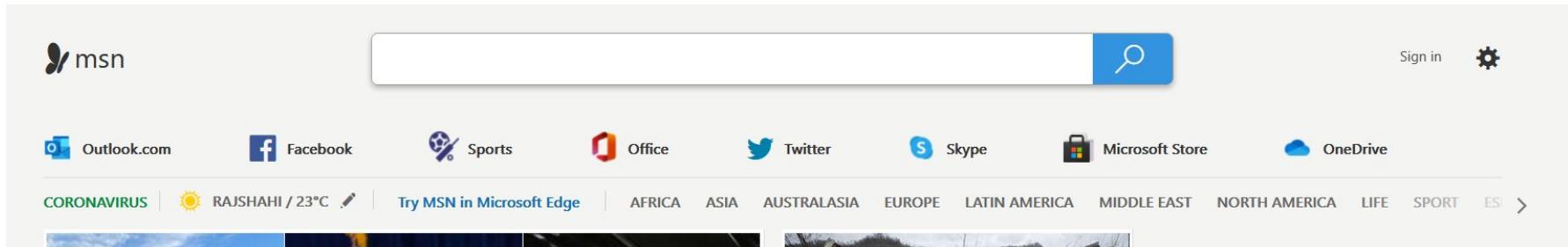
Products and Services

Terms (Updated) Privacy (Updated) Advertise
About Our Ads Careers Help Feedback
Suggestions



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

MSN



The screenshot shows the MSN homepage with a clean, modern design. At the top left is the 'msn' logo. To its right is a large search bar with a blue search icon. On the far right of the header are 'Sign in' and a gear-shaped settings icon. Below the header is a navigation bar with links for 'Outlook.com', 'Facebook', 'Sports', 'Office', 'Twitter', 'Skype', 'Microsoft Store', and 'OneDrive'. A weather forecast for 'RAJSHAHI / 23°C' is displayed next to a sun icon. Below the navigation bar is a horizontal menu with categories: 'CORONAVIRUS', 'AFRICA', 'ASIA', 'AUSTRALASIA', 'EUROPE', 'LATIN AMERICA', 'MIDDLE EAST', 'NORTH AMERICA', 'LIFE', 'SPORT', and 'ESI >'. The main content area features a large, partially visible image at the bottom.

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



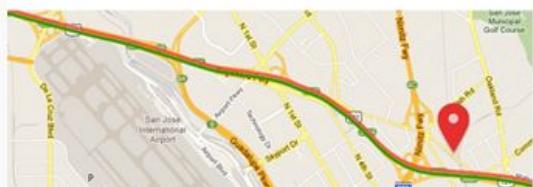
80°

SUNNY
3MPH

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

Get directions 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

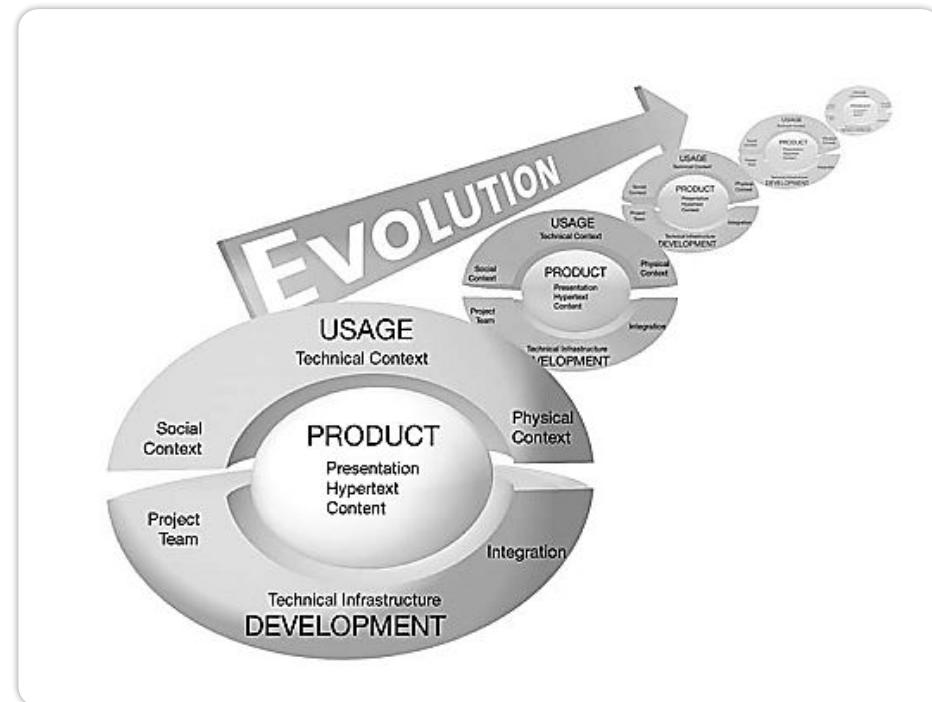
Semantic Web application

- 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 are 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