

The Web @ 25

From 25 years of history ... into the future

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The web – a success story

- 25 years ago, the web was born.
 - The web: critical for society.
- Why did it succeed?
 - Important initial assumptions.
 - The evolutionary path in the first decades
- Where are we now?
 - What are the current hot topics being addressed?
- What future paths of technology evolution?
 - What remains to be done?
 - Present known needs?
 - Future “unknown” needs?

Contents

- A quick history
- The World Wide Web Consortium – web standards
- Current technology areas worked on
- Extensions to other business sectors
- The future of Internet and the Web
- Summary

A quick history

The birth of the web

- March 1989:
 - Tim Berners-Lee: “*Information Management: A Proposal*”
 - While at CERN (European Nuclear Research Center)
- Primary audience:
 - Researchers (high energy physics) sharing documents
- Precondition:
 - Internet technology fairly wide-spread
- 1989-1991: The baby years; prototyping (web server, web browser); internal deployment
- End 1991-1992: impressive external adoption.
- 1994: First WWW international conference.

Why did it succeed?

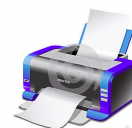
- Non-commercial launch
 - Prototype software: free download
 - No patents
- Simple technology:
 - HTML, HTTP, URL
- Build on existing wide-spread technology
 - SGML => HTML
 - FTP => HTTP
- Plenty of people with know-how and experience out there
 - Porting prototypes to new platforms – fairly simple.
- Focussing on simple support for basic needs
 - “80-20 rule”

Why did it get critical mass?

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Will it continue to be successful?

- Will it be replaced by something else?
- Will it become marginalised?
- Who determines the path of web technology evolution?
 - Some conspiracy behind the curtain?
 - Some committee at work?
 - Or it just happens ... no-one is in control?
- *Where* is web technology development happening?



The World Wide Web Consortium (W3C) Standards for technology

World Wide Web Consortium

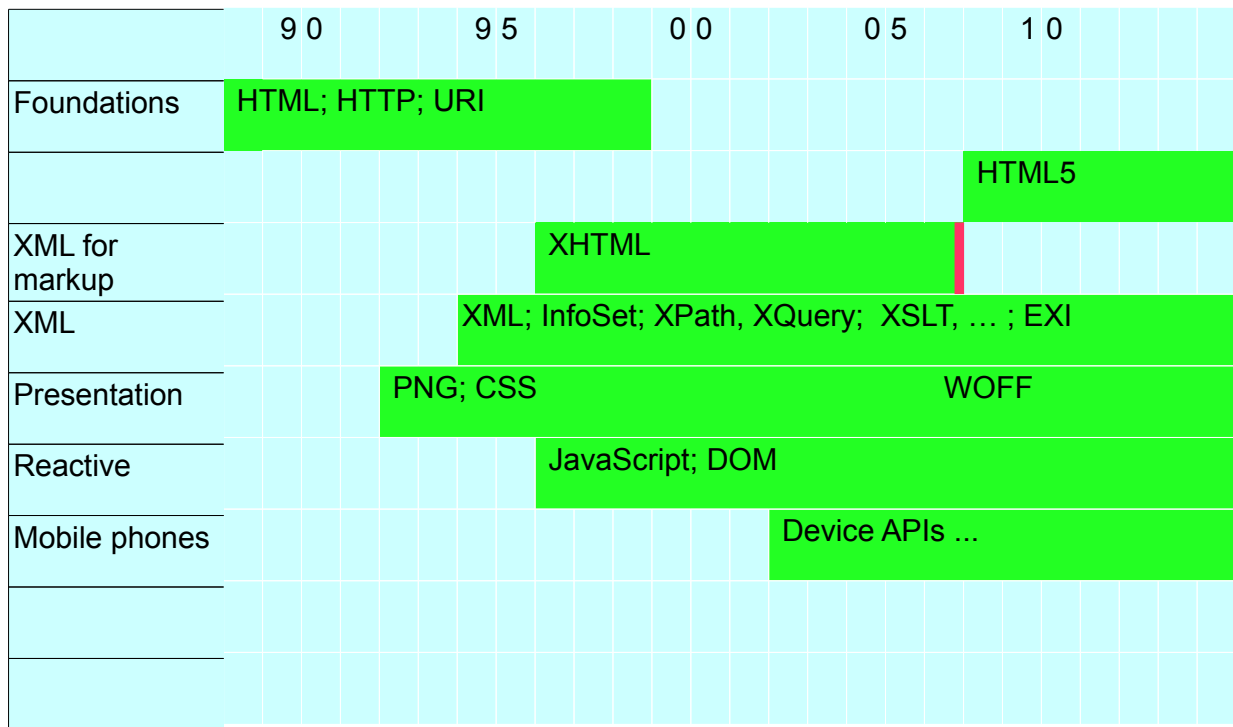
- Broad adoption of some technology
 - *Standardisation* critical precondition!
- The Web attracted business interest early
 - Industry required *predictability* in use of web technology
-  "World Wide Web Consortium"
 - Established October 1, 1994
 - 20 years old!
 - Slogan: "Lead the Web to Its Full Potential"
- Industry consortium – Members: industry and organizations:
 - technology providers; content providers; IT-using industry; public sector, NGOs, ...
- Objective:
 - Developing and standardising technology supporting the web.

Process ... and drivers

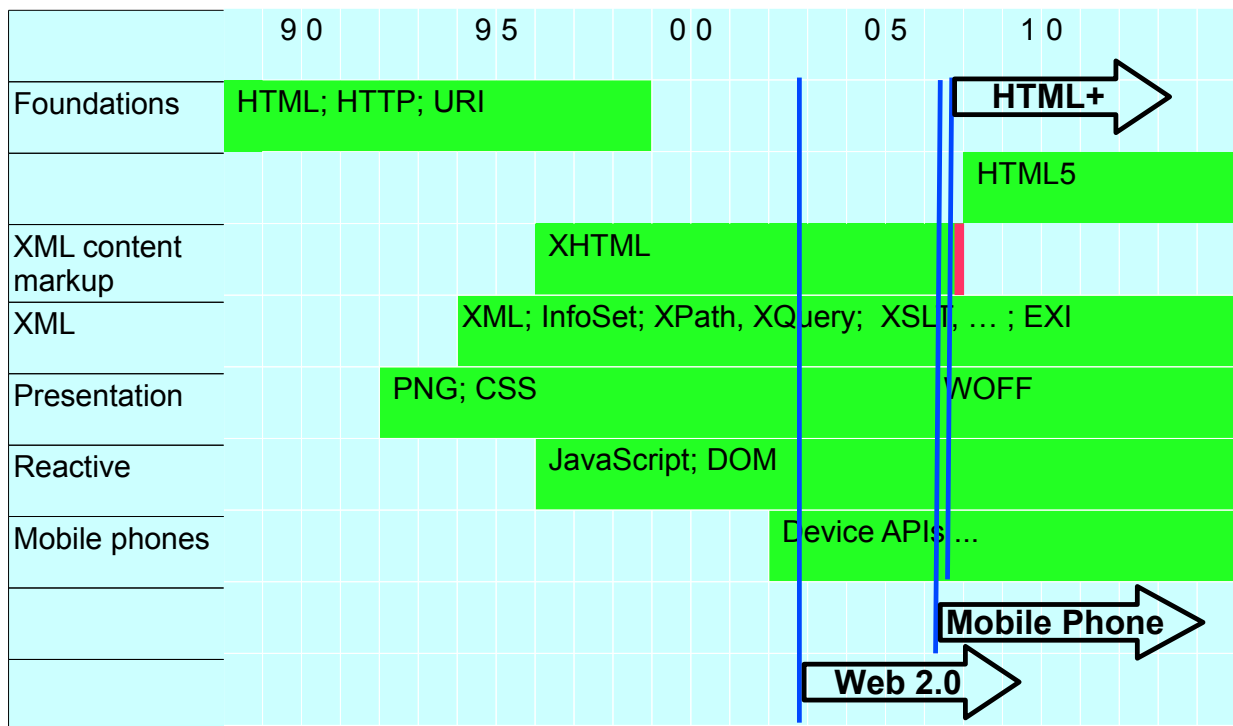
- Selection of areas for technology development
 - Proposed work: receives critical support by W3C Members?
- Technology specification done by knowledgeable persons
 - Employees provided by W3C Members
 - Specially invited external experts
- Proposed web standard (“W3C Recommendation”)
 - Voted on by W3C Members
- Industry interest:
 - Standardise common components/layers
 - ... Business rationale: sell specialized added-value components
 - Preferably accepted as *official* standards
 - **ISO**: HTML 4.01; SOAP 1.2; WS Addr; WS Policy; WCAG 2.0

Current technology areas

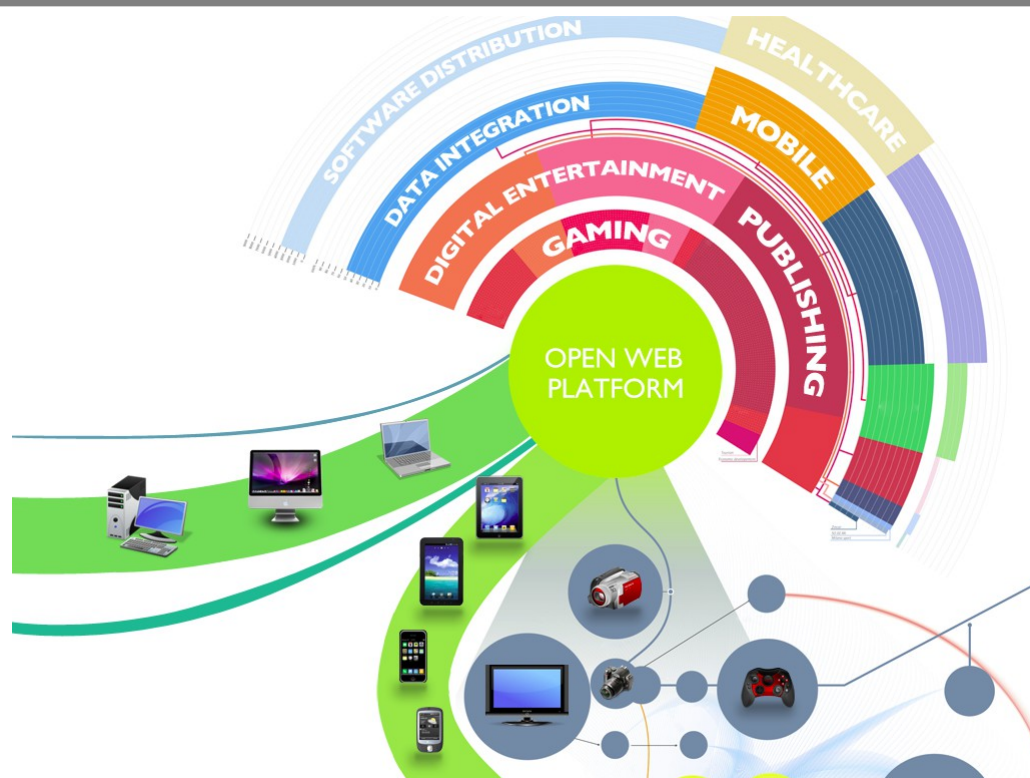
Before today: the big picture – timeline



Before today: the big picture – timeline



Now: The Open Web Platform



What is the Web ? What is it *not* ?

- Was:
 - Set of standardised technology (components)
 - ... compose to a presentation / interaction
 - ... for information
 - Defined for common generic use cases.
- Now:
 - Platform of standardised functionality
 - ... used by programs/scripts
 - ... to create desired behaviour
 - With growing support for special domain-specific needs.
- *Basic assumption:*
 - Distributed decentralised access & communication.

The death of the competition

- Marketed alternatives for web standards:
 - Example: Flash, Silverlight, JavaFX...
 - Focussed on animation, dynamic behaviour, ...
- Functionality available on HTML5
 - Vendor-independent, standardised
 - Highly device-independent
- No longer strong a business case for alternatives

- But what about phone Apps?

Mobile Phones ...

- App stores created a new way to interact on the net.
 - Exponential growth – users / apps
- Apps interface to the net; web interface to the net
 - Different beasts?
 - Basically the same?
- Apps implemented in vendor-specific ways.
 - Web technologies device-independent
 - Advantage for information/service providers
- Chicken race:
 - Device suppliers ... new functionality via app dev toolkits
 - Web standardisation of API to such functionality
- What's the value of a device-specific App?

Web Technologies on mobile phones

- Highly decomposed specifications. Examples:
 - “*The Screen Orientation API*”
 - “*Media Queries*”
 - “*Touch Events*”
- Growing implementation support on mobile (Safari@iOS; Android; Opera; Chrome@Android; Blackberry; Explorer@Phone; Firefox)
 - Status: from Full conformance to Partial support.
- WG members from:
 - phone manufacturers, telcos, web browser vendors, ...
- Selection of work to do:
 - low-hanging fruit; critical needs;...

Extensions to other business sectors

Non-traditional sectors: Increased interest

- **Business sectors and used technology**
 - Traditionally: define own technology from ground up.
 - Now: better to re-use proven technology ... web technology
- **Automotive industry**
 - Networked within the car
 - The car networked to the environment (cars, roads, ...)
 - Critical requirements to use the Open Web Platform in cars?
- **Publishing industry**
 - Printed material: development process up to printing supported by web technologies
 - eBooks: content representation; content distribution

Non-traditional sectors: Increased interest/2

- **Game industry**
 - Games on the web.
 - Required extensions and additions to web standards
- **Sensor networks industry**
 - Internet of Things – dynamic networks of heterogeneous small devices
 - Use of web protocols and formats to interconnect and control "web of things", and connect to the web.
- **Payment industry**
 - No good platform for easy payment on the web
 - Need for "a set of open, patent and royalty-free specifications that allow people on the Web to send each other money as easily as they exchange instant messages and e-mail today".

Tearing down the walls

- Business eco-systems change
 - Unfamiliar actors appear in your sector
 - You can appear in other sectors
- Technology as unifying force
 - Not: technology as protective walls
- Shared technology platform/toolbox
 - Easier to reach/touch novel phenomena
 - Create new kinds of business added-value.



Future Internet and Future Web
... and standards development

The Future Internet

- Evolutionary work on-going.
- Driven by needs in well-known weak areas:
 - Security, authentication, identification,...
- And by observed non-optimal behaviour
 - Media transport for the web.
- Trend: from *host-centric* to *content-centric*
 - URI as resource name, not as host network address



The Future Web

- An integrating platform
 - Basic set of common protocols and formats
 - Growing library of technologies
 - Combinable like "LEGO blocks"
- Drivers ... examples:
 - Client: new devices
 - Embedded devices; wearables; ...
 - Network: new/improved functionality
 - Security; authentication; real-time communication; ...
 - Server:
 - Data on the web; Cloud; ...



The Future Web

- The most important types of drivers
 - Triggers from use of web technology
 - Example: Web 2.0
 - Triggers from related industry sectors
 - Example: mobile phones
- Other important drivers:
 - Critical sector needs:
 - Financial industry, payments: security, authentication;...
 - Game industry: efficiency; real-time
 - Example: WHATWG => HTML5
- And who speaks for your needs?



Future Web Standards development

- Challenge:
 - rapid evolution of user needs
 - Standards development "slow"
 - How to anticipate practical *adequacy* and *uptake* of standards
- A proposed complementary route:
 - "Extend the web forward"
 - JavaScript implementations of new functionality
 - Provide libraries to the world
 - If popular, then standardise
 - And then web browsers can implement this functionality
- JavaScript (& libraries) is now in wide use
 - In the field: no change. In standardisation: "big" change.

The Extensible Web Manifesto

#extendthewebforward

Summary

What can we expect in the future

- More diversity in web technologies
 - Specialized to specific application domains
- Smaller standards
 - Standardised composable components (not "systems")
- Convergence in use of web technologies
 - Increased use of common technologies across business sectors
- Web applications on diverse devices
 - Private & public devices; stand-alone & embedded
- Web technologies integrating previously separate areas
 - Example: logistics



---end---
... of my prepared slide set ...

... but let's hear from you!

What do you expect from the future web?

- What technologies are you missing?
- What technologies should be improved?
- How well are technologies used/exploited by tools you use?
- What is better:
 - Slow down new technology development and let us work with what we have now?
 - Give us new technology, we can quickly learn how to use it.
- Is there competence around, about how to use current technology?
 - How fast is competence on new technology established?
- How well does your development process fit the way the web evolves?