The Ubiquitous Web

Dave Raggett, W3C Technical Plenary, March 2005

Ubiquitous. [adj]
1. (seemingly) present
   everywhere simultaneously.
2. often encountered
   [Latin *ubique* everywhere]

Oxford English Dictionary

Ubiquitous Computing

Ubiquitous computing represents a powerful shift in computation, where people live, work, and play in a seamlessly interweaving computing environment. Ubiquitous computing postulates a world where people are surrounded by computing devices and a computing infrastructure that supports us in everything we do.

Mark Weiser, The Computer of the 21st Century, Scientific American, Sept 1991.

Ambient Intelligence

Ambient Intelligence implies a seamless environment of computing, advanced networking technology and specific interfaces. It is aware of the specific characteristics of human presence and personalities, takes care of needs and is capable of responding intelligently to spoken or gestured indications of desire, and even can engage in intelligent dialogue. Ambient Intelligence should also be unobtrusive, often invisible: everywhere and yet in our consciousness – nowhere unless we need it. Interaction should be relaxing and enjoyable for the citizen, and not involve a steep learning curve.

EC Information Society Technologies Advisory Group, 2001.

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The Web browser has become an appliance for accessing all manner of information and services. It shrinks into the background in that you don't need to learn from scratch each time time you visit a new web site. The browser is an application platform and avoids the need to install and manage new software each time you want to use a new application – you just point the browser at the website and you are off and running.

Trends

- Increasing variety of devices being connected to networks, not just desktops and cell phones

- First in offices, and now in homes

  – Ubiquitous Open Platform Forum

    Tokyo, February 2004: 14 electric appliance companies working collectively to promote Internet accessible electrical appliances

- The Web needs to encompass a much wider range of devices

  – Cameras, copiers, scanners, printers, home appliances of all kinds, environmental sensors and effectors, specialized engines for speech, handwriting, etc.

Glass Walls

- Things don't have to be the way they are
  - Instant messaging and presence are handled through different software clients and protocols
  - Voice calls versus data services

- A more powerful framework for Web applications would enable the removal of these walls

Ubiquitous Web

The Ubiquitous Web seeks to broaden the capabilities of browsers to enable new kinds of web applications, particularly those involving coordination with other devices. Some examples include connecting a camera phone to a nearby printer, using a cell phone to give a business presentation with a wireless projector, and viewing your mailbox while listening to your messages.

Ubiquitous Web

These applications involve identifying resources and managing them within the context of an application session. The resources can be remote as in a network printer and projector, or local, as in the estimated battery life, network signal strength, and audio volume level. The Ubiquitous Web will provide a framework for exposing device coordination capabilities to Web applications.

Device Coordination

- Registering what services a device provides

  - How to describe services

- Discovering what services are available

  - Could be local or remote

- Binding to a service

- Relinquishing a service

- How to expose existing device coordination frameworks to Web applications?

  - UPnP, Jini, Salutation, WSD, …

Requirements

- Dynamically adapt to user preferences, device capabilities and environmental conditions

- Extend device capabilities through access to resources available via the network

- Respond to events over the network from servers and other devices

- Enable applications involving multiple devices

- Use events to coordinate voice and data to augment human to human conversations

- Manage resources in terms of temporary and persistent sessions

Enabling Technologies

- IDL for describing interfaces for distributed systems and as used for the W3C DOM

    - See next slide

- URIs for naming resources, sessions and interfaces

- Semantic Web for ontologies describing device capabilities

- Web Services for passing commands and events

- Existing device coordination mechanisms

The DOM and Distributed Services

- Web application identifies need for a service

  e.g. speech synthesis and recognition

- It discovers and binds the service

- This exposes the service to the local DOM but hides the details of how it is implemented

  - Local interface can be described in IDL and exploited via markup or scripting

- For a remote speech engine, the local interface acts as a proxy for the speech engine

- The implementation could make use of Web Services, based upon WSDL and SOAP

Next Steps

- Plan to hold a W3C Workshop on the Ubiquitous Web in October 2005

    - Date and location to be determined

- An opportunity to share use cases, research results, and implementation experience

- Consider possibility of launching a new W3C Working Group