Web Application Development

Seminar OHJ-1820
Tampere University of Technology

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http://www.cs.tut.fi/~taivalsa/kurssit/WADS2007

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Background and Motivation

- The widespread adoption of the World Wide Web has dramatically altered the landscape of software development.
- Today, most new software applications will have to be designed with the Web in mind ...
  - … either to be used via a web browser or some other client device, such as a mobile phone.
- Numerous changes in the field and technology since our seminar in Spring 2006.

Paradigm Shift!

- The software industry is currently in the middle of a paradigm shift.
- Applications are moving to the Web.
  - Applications are no longer written for a specific type of computer, operating system or device.
  - Rather, they will be written for the Web, to be used via a web browser from anywhere, anytime.
- The browser is increasingly taking the role that the operating system used to have.

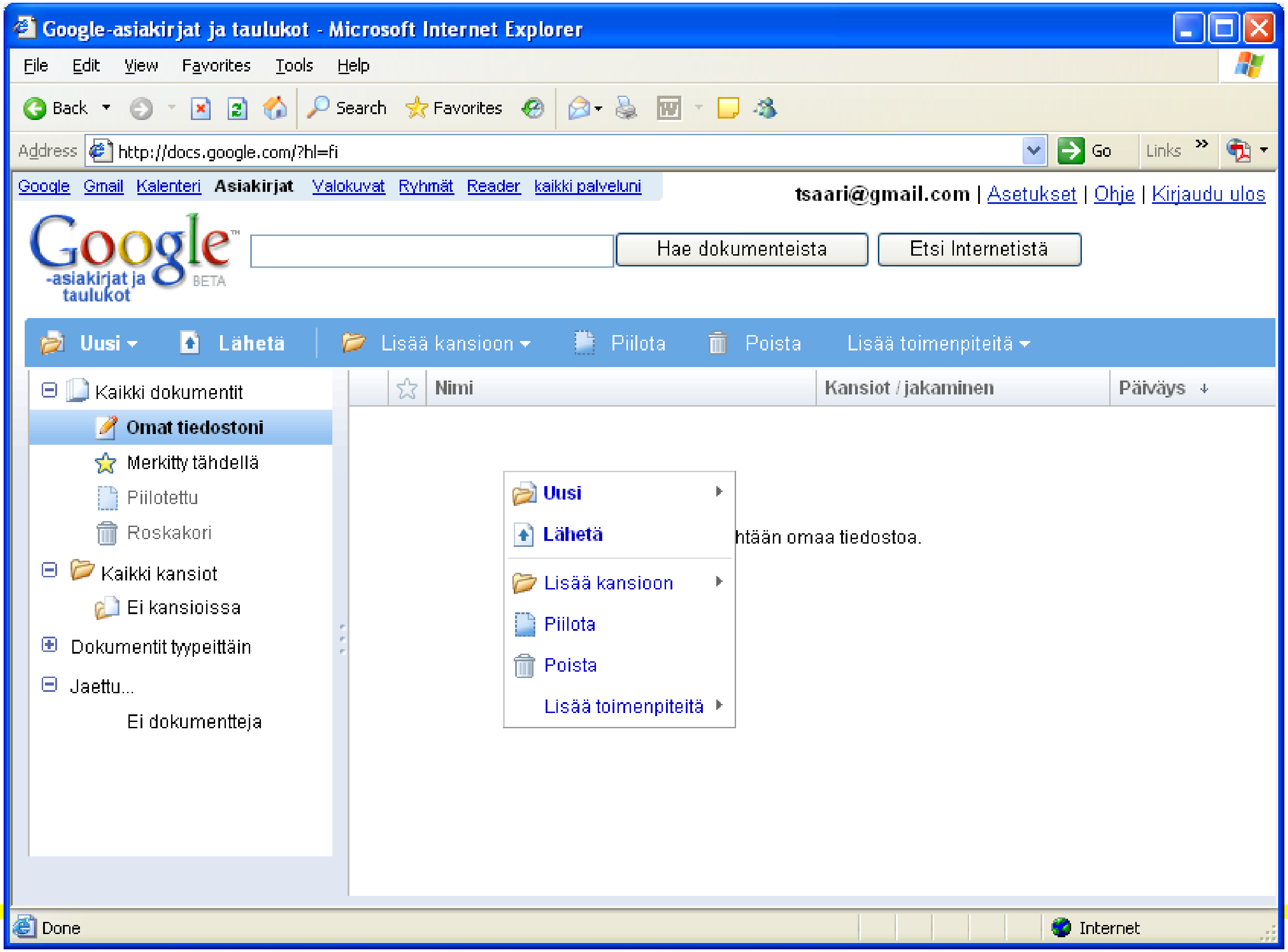
How Things Have Changed?

- The World Wide Web enables effortless mass distribution of software, as well as the development of truly *collaborative* software.

- There is now enough computing power to run software in pure source code form.
  - No more binaries?

- There is now enough bandwidth to download applications each time they start.
  - No more installation or upgrades?

Example: docs.google.com

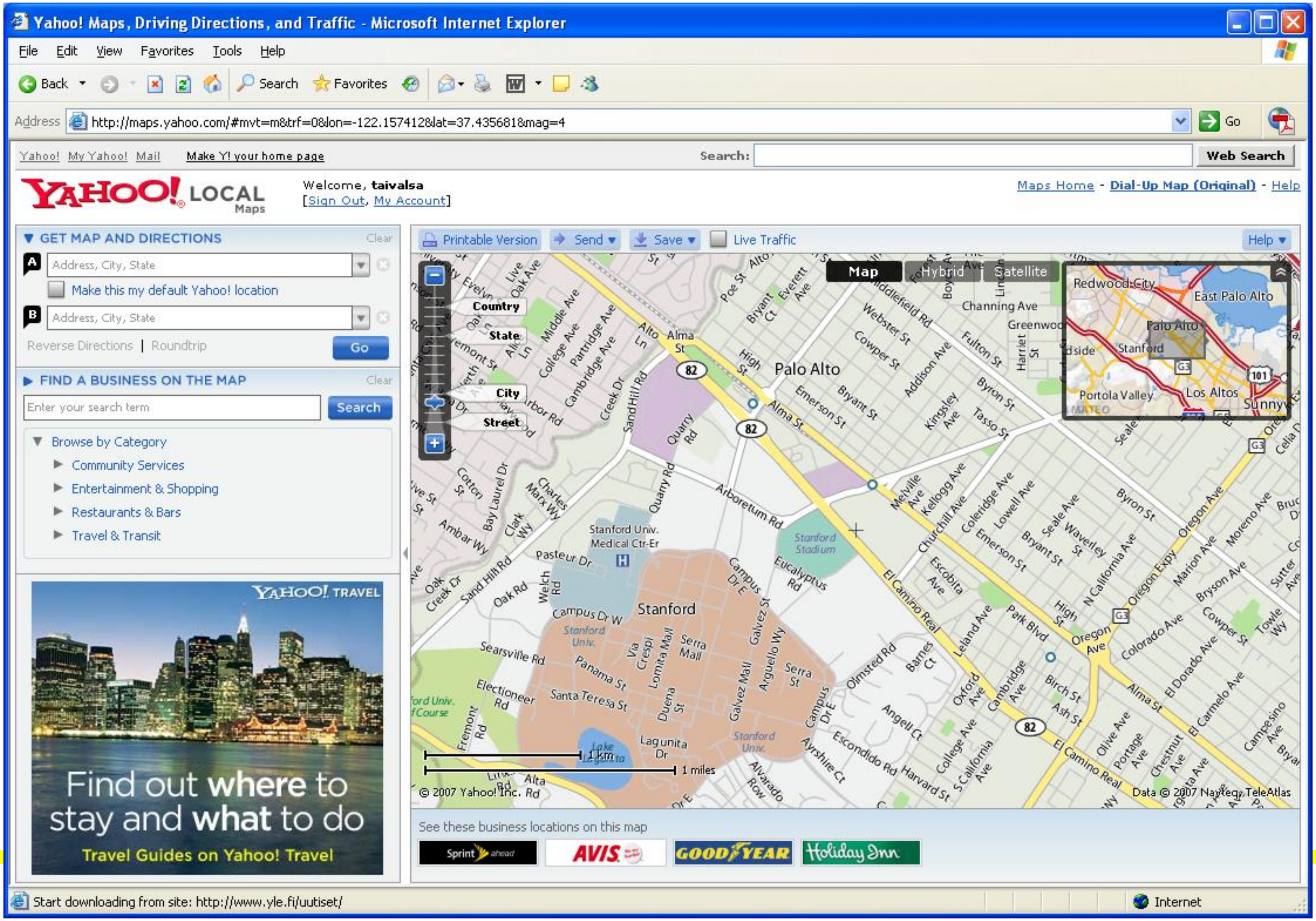


Address: http://docs.google.com/?hl=fi

tsaari@gmail.com

htään omaa tiedostoa.

Example: Yahoo's “Web 2.0” Maps



Yahoo! Maps, Driving Directions, and Traffic - Microsoft Internet Explorer

Address: http://maps.yahoo.com/#mvt=m&trf=0&lon=-122.157412&lat=37.435681&mag=4

Welcome, taivalsa
[Sign Out, My Account]

Find out where to stay and what to do

Travel Guides on Yahoo! Travel

See these business locations on this map

Start downloading from site: http://www.yle.fi/uutiset/

What is Web 2.0, Really?

- Real applications on the Internet.
  - Not just “pages” or “documents”.
- Compelling user interaction capabilities.
  - Support for direct manipulation.
  - No more full page refresh (à la IBM 3270 of the 1970s) when something changes.
  - No more back button, reload button, stop button, ...
- Support for worldwide collaboration.
  - The same applications (and data) can be shared by numerous users worldwide.

Disruptive Period in Software Development

- Many new web development technologies have been introduced in recent years.
  - AJAX, Ruby on Rails, Google Web Toolkit, Apollo...
- Most web development systems are simply hybrid combinations of existing technologies.
  - HTML, DOM, CSS, JavaScript, PHP, XML, ...

- Very little coherence or elegance.
- These seem like “transitional” technologies.
- The real disruption is yet to occur.

Problems and Observations

- Today, software developers writing applications for the Web often find themselves in working *around* the tools and language features, rather than being helped by them.
- Applications are composed of HTML, CSS, JavaScript, etc. in a fashion that violates well-established principles of software engineering.
- In the absence of web-oriented programming mechanisms and idioms, software developers are often repeating the same tasks over and over again.

Best Known Web Application Development Systems

- There are numerous web application development systems.
- The following systems are best established at this point:
  - Ajax
  - Ruby on Rails
  - Google Web Toolkit
  - Adobe AIR (Apollo)
  - Microsoft Silverlight

Ajax

- Shorthand for “Asynchronous JavaScript and XML”
- Not a technology in itself – rather a group of technologies:
  - DHTML (HTML + DOM + CSS + JavaScript)
  - Asynchronous HTTP support + XML protocols
- Ajax allows the creation of web pages that feel more responsive by exchanging smaller amounts of data asynchronously with the web server.
- *http://en.wikipedia.org/wiki/AJAX*

Ruby on Rails (RoR)

- Ruby on Rails is a web application framework built around the Ruby programming language.
- RoR leverages the Model-View-Controller (MVC) paradigm to connect a web UI to a database easily.
- RoR is a highly “tool-assisted” system; it utilizes, e.g., automatic naming conventions to simplify development.
- *http://en.wikipedia.org/wiki/Ruby_on_Rails*

Google Web Toolkit (GWT)

- GWT is an open source toolkit to develop Ajax-style applications using the Java programming language.
- GWT uses Java as the development language, and JavaScript as the “binary language” (!)
- GWT compiler translates Java code into equivalent JavaScript that can be executed in any browser.
- Includes a widget library written in the Java language.
- *http://en.wikipedia.org/wiki/Google_Web_Toolkit*

Adobe AIR (formerly Apollo)

- Cross-operating system runtime that allows web developers to create rich internet applications.
- Combines a number of Adobe technologies:
  - Flash, ActionScript, Flex
- Unlike Flash, Apollo focuses specifically on the development of general-purpose web applications.
- *http://en.wikipedia.org/wiki/Adobe_Apollo*

Microsoft Silverlight

- Microsoft’s response to Adobe Apollo.
- Web-based subset of WPF (Window Presentation Foundation).
- Based on XAML and JScript (Microsoft’s variant of JavaScript).
- Enables Flash-like web applications with the exact same code as Windows .NET applications.
- Still in development; final release expected in late 2007.

Why This Seminar?

- We think that a new era in software development has begun.
- We are moving beyond conventional OS-specific applications and POOOP (Plain Old OOP).
- Examine web application development by evaluating the technologies and building real applications using the technologies.
- Drill deeper into those technologies that seem most likely to succeed.

Practical Arrangements

- The seminar will be arranged in TB 110 on Wednesdays, 12-14 o’clock.
- Seminar dates:
  - 12.9., 19.9, (3.10.), 10.10., 24.10., 31.10., 7.11., 14.11., 21.11., 28.11., 5.12., 12.12., (19.12.)
- Reports to be completed by December 31.

How to Get Credits?

- Maximum number of credits: 4-6 op
- Attendance: 1 op
- Seminar presentations: 1+2 op
  - One presentation for introducing a technology;
  - Another presentation after writing a demo application and summarizing the experiences in building it.
- Written report: 2 op (optional)

Choosing Topics and Apps

- Please choose your presentation and implementation topic and the preferred presentation date as soon as possible.
  - tjm@cs.tut.fi, updated list at http://www.cs.tut.fi/~taivalsa/kurssit/WADS2007
- Topics allocated on a “first-come-first-serve” basis.

Discussion