

# Exhibit 21

[Contents](#)[Index](#)[Previous](#)[Next](#)

Journal reference: *Computer Networks and ISDN Systems*, Volume 28, issues 7–11, p. 1493.

# Ubiquitous Advertising on the WWW: Merging Advertisement on the Browser

[Youji Kohda](#) and [Susumu Endo](#)

**Fujitsu Laboratories Ltd.**

**1-9-3 Nakase, Mihama-ku, Chiba-shi, Chiba 261, Japan**

**E-mail: {kohda, susumu}@iias.flab.fujitsu.co.jp**

**Tel: +81(43)299-3100**

**Fax: +81(43)299-3075**

## Keywords

World Wide Web, advertisement, advertising agent, 1:1 future, Web server, Web browser, Web page, Web site

## Abstract

We propose a new advertising framework on the WWW. Some popular WWW sites now provide advertising space in their Web pages. However the actual effectiveness of the advertising is questionable. In our advertising framework, an advertising agent is placed between advertisers and users. The agent's business is to deliver advertisements to users who wish to see advertisements on their Web browser. Users will see a variety of advertisements at the sites they visit, even if the sites have no advertisements on the Web servers. This will make the advertising business on the WWW really ubiquitous.

## 1. Introduction

To sell goods or services, advertisement is the first step to making them available to the public. TV and newspapers are representative media that have advertising spaces for commercial purposes. The operational cost of commercial TV stations and newspaper publishing companies is covered by the advertising revenue. This makes it possible for people to receive TV programs at no charge and to subscribe to newspapers very cheaply.

The World Wide Web is a new way of presenting information to the public via the Internet. Advertising on the World Wide Web has increased rapidly over the last few years. However, the mode of advertising has so far been similar to that used in TV and newspapers in essence.

Service providers on the WWW such as Yahoo![1], a popular Internet directory service, prepare advertising space in their Web pages and sell this space to advertisers by the hour. The anchors (links to advertiser's Web servers) are placed on the sold small spaces, and are displayed to users as small clickable images. When they click one of the anchors, they are then connected to that advertiser's own commercial Web server.

WWW advertising in its current state is better than nothing, but the cost benefit is questionable for the