

TransSquid: Transcoding and Caching Proxy for Heterogenous E-Commerce Environments

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Abstract

With the advent of the Wireless Internet, the client space has become heterogeneous in terms of device capabilities. To cater to the needs of these devices in E-Commerce applications, smart intermediaries have been developed to increase the user satisfaction by hiding the inherent weakness of some of the small although handy devices like the PDAs and Web-tops. Transcoding has been a popular technique to render data for small devices that have smaller displays, and lesser colour capabilities. But transcoding comes at the cost of caching at the Intermediary.

In this paper, we describe a transcoding and caching proxy that caches objects for heterogeneous client spaces by maintaining separate caches for different categories of clients (PC, PDAs, Mobiles, etc.) and transcoding the lower fidelity versions from the high fidelity variants at the proxies as opposed to fetching the transcoded variants from the server. To achieve this, the proxy keeps the server-directed transcoding information (if provided by the host server) as part of meta data attached to the cached objects and uses this information to convert its fidelity and modes or uses heuristics. Through such an intermediary architecture that serves a heterogeneous client base, we exploit the availability of cached high-fidelity variants of web resources (brought in to serve the requirements of high-end devices like PC's) to serve low end devices, and thereby decrease latency and bandwidth.

1. Introduction

With the everyday computer user adopting the Internet, the opportunity to communicate and interact for business and personal use has exploded to phenomenal levels. As

traditional business takes its steps into the electronic environment, the rate of growth of the e-commerce and m-commerce space has been rapid. The development has gone a step further with the advent of pervasive devices, such as cell phones and personal digital assistants (PDAs). All this has led to a greater potential to do business and to share ideas.

As the figures state, the current mobile subscriptions stand at 170 million. They are forecast to exceed one billion by 2005. According to a study published by Strategy Analytics [1] within its strategic advisory service, Wireless Internet Applications, more than 1.5 billion PDAs, handsets and Internet appliances are to be equipped with the wireless capabilities the end of 2004. In money terms, the global mobile commerce market will be worth 200 billion dollars by then and 130 million customers will be generating almost 14 billion transactions per annum. Taking a look at the mobile devices we can expect 70 percent of the new cellular phones and 80 percent of all the new PDAs to have some form of access to the web and further expect 63 percent of the transactions to be generated by mobile devices [2].

All the above is based on the hypothesis that mobile phones and small handheld devices would be able to provide the quality of service and features desired by a common user to carry-out day-to-day business activities. An enabling and essential feature for the same is the ease to access the Internet at a reasonable user satisfaction¹ level. But then one needs to understand that there are several challenges in making mobility a widespread reality. Many problems like lower bandwidth, higher error rates, frequent disconnections, smaller displays are common across mobile phones and PDAs. Another important issue here is that of *heterogeneous client space*.

¹User satisfaction is the perceived experience of a typical user during Internet surfing.

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Table of Contents Research Issues In Data Engineering Ride 2ec 2002 Proceedings

1. Understanding the eBook Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - The Rise of Digital Reading Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Advantages of eBooks Over Traditional Books
2. Identifying Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - User-Friendly Interface
4. Exploring eBook Recommendations from Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Personalized Recommendations
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings User Reviews and Ratings
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings and Bestseller Lists
5. Accessing Research Issues In Data Engineering Ride 2ec 2002 Proceedings Free and Paid eBooks
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings Public Domain eBooks
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings eBook Subscription Services
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings Budget-Friendly Options

6. Navigating Research Issues In Data Engineering Ride 2ec 2002 Proceedings eBook Formats
 - ePub, PDF, MOBI, and More
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings Compatibility with Devices
 - Research Issues In Data Engineering Ride 2ec 2002 Proceedings Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Highlighting and Note-Taking Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Interactive Elements Research Issues In Data Engineering Ride 2ec 2002 Proceedings
8. Staying Engaged with Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Research Issues In Data Engineering Ride 2ec 2002 Proceedings
9. Balancing eBooks and Physical Books Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Research Issues In Data Engineering Ride 2ec 2002 Proceedings
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Setting Reading Goals Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Fact-Checking eBook Content of Research Issues In Data Engineering Ride 2ec 2002 Proceedings
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements

- Interactive and Gamified eBooks

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shadows of the empire 27s and 3 cassettes

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