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Master's Thesis

MEXARC : Smart Client Software Architectures for Presentation Applications

Miyuru Dayarathna

Graduate School of Media Design
Keio University

Academic Year 2010

Dedication

To

My Mother, Father, Nirmal and Chamika

For their love and understanding

A Master's Thesis
submitted to the Graduate School of Media Design,
Keio University
on August 31st, 2010, in partial fulfillment of
the requirements for the degree of
Master of Media Design

Miyuru Dayarathna

Thesis Committee:

Professor Kazunori Sugiura	(Supervisor)
Professor Akira Kato	(Co-supervisor)
Professor Keiko Okawa	(Co-supervisor)

Abstract of Masters Thesis Academic Year 2010

MEXARC : Smart Client Software Architectures for Presentation Applications

Summary

Information presentation desktop applications such as media players, digital signage players are heavily encountered by us in our daily life. However current presentation oriented desktop application architectures are not flexible to present a variety of rich information efficiently. Desktop applications rely on tied format files and contents they present are bound to their layout. These factors restrict the content presentation ability of these desktop applications.

As a solution, this thesis introduces the use of Smart Client technologies for presentation applications to enable content and layout separation. The presentation application is developed as a Smart Client with ability of constructing its user interface based on presentation template and contents sent from a central server. This unique architecture is termed as "Media Content Expression Architecture (MEXARC)".

Two software prototypes (Infoshare and TelescopeVisualizer) were developed based on MEXARC using Microsoft Windows Presentation Foundation and Extensible Application Markup Language (XAML) technologies to evaluate applicability of the above mentioned architecture in two different application domains. Evaluations of MEXARC applications were done considering the aspects of scalability, maintainability and flexibility. It was observed that Infoshare web service and the TelescopeServer are scalable in terms of hardware resources.

Thesis made three contributions to the area of presentational desktop application architectures. First it introduced a novel, scalable generic Smart Client software architecture that can be applied in different presentational scenarios. Second it introduced use of Loose XAML style contents for digital signage networks and introduced a scalable, Smart Client based digital signage application architecture. Third it created a scalable network information visualization application architecture based on Smart Clients that uses loose XAML and Custom WPF Control Libraries as presentational contents.

Thesis identified four future application areas for MEXARC in E-Learning, Massively Multiplayer Online Games, Matrix Signage and Television. Thesis describes the potential of improving the TelescopeVisualizer query language as a generic query language to bridge the gap between real world and Internet activities.

Thesis describes anatomy of MEXARC providing its architectural description. In addition, system analysis and design, implementation and evaluation of the two MEXARC based software prototypes are described. Thesis outlines the findings made by applying Smart Client approach for the aforementioned application domains under its conclusion.

Key Words
Smart Clients, Software Architecture, Distributed Systems, User Interfaces

Keio University, Graduate School of Media Design

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