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# Frameworks for Adaptive Human Management Systems using UML and CBD

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**Abstract.** Mobile and Web resources become encapsulated as components, with well-defined interfaces through which all interactions occur. Builders of components can inherit the interfaces and their implementations, and methods (operations) can be redefined to better suit the component. New characteristics, such as concurrency control and persistence, can be obtained by inheriting from suitable base classes, without necessarily requiring any changes to users of these resources. In this paper, we describe the AHMS frameworks and component model, which we have developed, based upon these ideas, and show, through a prototype implementation, how we have used the model to address the problems of referential integrity and transparent component (resource) migration. We also give indications of future work.

**Keywords.** Mobile applications, Frameworks, Component-Based Development, Referential integrity, Mobility, Distributed systems

## 1 Introduction

It is widely accepted that building in safety early in the development process is more cost-effective and results in more robust design [1, 2]. Safety requirements result from safety analysis – a range of techniques devoted to identifying *hazards* associated with a system and techniques to eliminate or mitigate them [3,4]. Safety analysis is conducted throughout the whole development process from the requirements conception phase to decommissioning. However, currently the approaches for incorporating safety analysis into use case modeling are scarce. The Unifying Modeling Language (UML) [1] is gaining increasing popularity and has become de facto industry standard for modeling various systems many of which are safety-critical. UML promotes use case driven development process [1] meaning that use cases are the primary artifacts for establishing the desired behavior of the system, verifying and validating it. Elicitation and integration of safety requirements play a paramount role in development of safety-critical systems. Hence there is a high demand on methods for addressing safety in use case modeling.

This paper entitled AHMS Components describes the AHMS Component design, its aims, component model, and system architecture. We also describe how making the change to an component-Based Development system can yield an extensible infrastructure for AHMS that is capable of supporting existing functionality and

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allows the seamless integration of mobile AHMS complex resources and services. We aim to use proven technical solutions from the distributed component-Based Development community to show how many of the current problems with the Web can be addressed within the proposed AHMS model.

## 2 Related Works

### 2.1 Component Based Mobile Applications Development

Mobile applications modeling expertise requires both domain knowledge and software knowledge. Mobile Applications modeling disciplines are rapidly accumulating in terms of languages, codified expertise, reference models, and automated tools.The areas where such technologies are extensively practiced, the quality features re neither of main concern nor adequately tackled. It is a well-known truth that CBD is important for large and complex systems but why it is important for mobile device applications. It tackles vital concerns such as productivity, high level of abstraction, partitioning of the system development process from the component development process and reusability [5].

AHMS(Adaptive Human Management Systems) development model in this paper is based on component based software development. One of the principles of computer science field to solve a problem is divide and conquer i.e., divide the bigger problem into smaller chunks. This principle fits into component based development. The aim is to build large computer systems from small pieces called a component that has already been built instead of building complete system from scratch. Software companies have used the same concept to develop software in standardized parts/components. Software components are shipped with the libraries available with software.

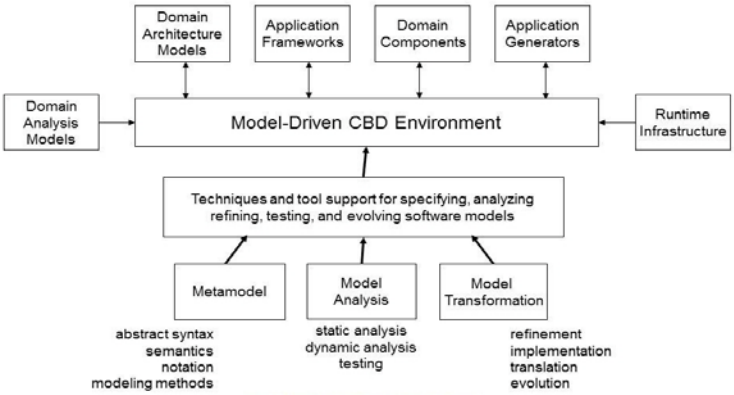


**Fig 1.** CBD Driven Mobile Applications Development

# 3 Design of AHMS Components

## 3.1 AHMS Component Architecture

In common with the current Web, the proposed AHMS Component architecture as in figure 2 consists of three basic entity types, namely, clients, servers, and published components.

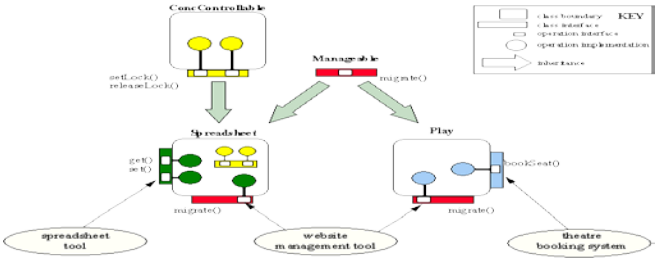


**Fig.2.** Illustration of using the AHMS component model

## 3.3 AHMS Inter-Component Interactions

In addition to AHMS Components, servers may contain AHMS Component stubs, or aliases, which are named components that simply forward operation invocations to another component, transparently to clients. One particular use of aliases is in implementation of name-servers, since a name-server may be viewed simply as a collection of named components which alias other components with alternative names as in figure 3.

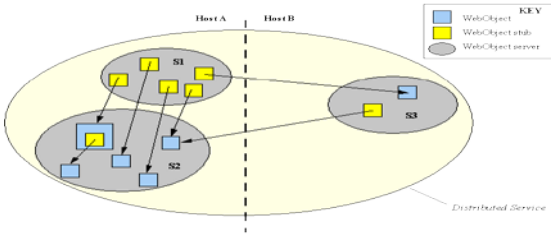


**Fig.3.** Inter-component interactions

We have classified these properties into three categories: core properties, common properties, and class-specific properties. In this section we shall present what we believe to be the core properties required by all AHMS Components and give examples of some common properties.

## 4 Conclusions

The AHMS Component model, presented in this paper, is intended to provide a flexible and extensible way of building Web and mobile applications, where Web resources are encapsulated as components with well-defined interfaces. Components inherit desirable characteristics, redefining operations as is appropriate; users interact with these components in a uniform manner. We have identified three categories of component properties: core, common, and specific, and have described an implementation using the core properties which addresses what we believe to be one of the most significant problems facing the current Web--that of referential integrity. A key feature of our design is support for interoperability; for example, in addition to sophisticated clients which may use the rich component inter faces that our model provides, our implementation will also allow AHMS Components to continue to be accessed using existing Web browsers.

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