

# Intelligent User Interface in a Service Oriented Architecture Environment

## Work-in-Progress Paper

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**Abstract**— many enterprises seeking to “open” their legacy systems and share information are turning to service oriented architectures for their applications. The promise of flexibility, loose coupling of components and reusability are driving this change. User interfaces designed for use in SOA systems are lacking in their presentation of information to users in an efficient and effective manner. This paper proposes an approach that would allow interfaces to be composed as services as well as make use of intelligence providing services to infer how best to present their information to users in the user interface.

**Index Terms**—service oriented architecture, intelligent system, intelligent user interface, services.

## I. INTRODUCTION

Service Oriented Architecture (SOA) is not a new concept, it is an evolution of the old component style of distributed system development, where systems are designed and built in components which interact and exchange data [1].

The SOA concept suggests building heterogeneous units of computation that are autonomous and platform independent and can be programmed, described and published using standard internet protocols. These computational units are capable of collaborating and exchanging data in an agile network which can adapt itself depending on computation requirements. In terms of business processes, SOA allows business functions to be exposed as independent services [2]

It is estimated that 80% of mission critical applications as well as business processes will be based on service oriented architecture by the year 2010 [3]. The growing need for flexibility, loose coupling and component interchangeability is driving this growth.

Currently services used in SOA systems are not specifically designed to be used by end users; instead a user interface layer must be built overlaying the services layer [4]. This

approach, though meant to decouple the user interface from underlying layers, forces the design of user interfaces to be done manually. Furthermore, workflow based SOA system user interfaces are poorly designed in terms of intelligent information dispensation and do not take advantage of the SOA paradigm in information presentation to users.

This paper discusses intelligent user interfaces integrated with services as a solution to the above mentioned issues of user interface design as well as lack of intelligence in workflow based systems.

## II. INTELLIGENT USER INTERFACES (IUI)

Intelligent User Interfaces can be seen as the next step in the evolution of the user interface [5]. IUIs aim to increase the rate and quality of information flow between humans and computers [6].

A large multidisciplinary field, IUI encompasses topics such as adaptive interfaces and artificial intelligence. IUI provide a multitude of benefits to users such as adaptivity, personalisation, and assistance with task completion. They seek to make user interfaces more intuitive for users as well as provide assistance when a user feels unsure about how to proceed with completing a task [7]. Intelligent interfaces are capable of supporting different modes of interaction for users and are capable of making inferences about the information requirements of a user in order to complete a task. In this regard, intelligent user interfaces differ from traditional user interfaces [8].

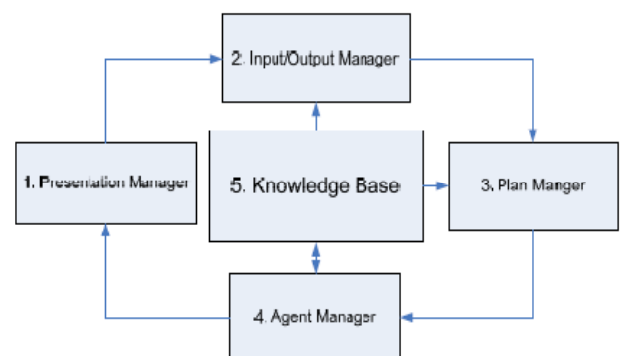


Figure 1: IUI Model for Contact Centre operations [9]

The benefits of intelligent user interfaces are applicable to SOA based workflow systems. Common complex and unintuitive user interfaces can be replaced with intelligent interfaces that provide relevant information at the right time to system operators. In addition, intelligence provided at the service level for the user interface allows this service to be reusable across many (composite) applications and systems.

### III. PROPOSED SOLUTION

Singh and Wesson's [9] IUI model in Figure 1 shows the required components of an intelligent user interface. In order for the interface to be effective, key components of IUI's must be present. In terms of the components of the model, the research focuses on elaborating on the plan manager, the adaptor agent, the knowledge base and the presentation manager within the constraints of intelligent user interface in a distributed environment.

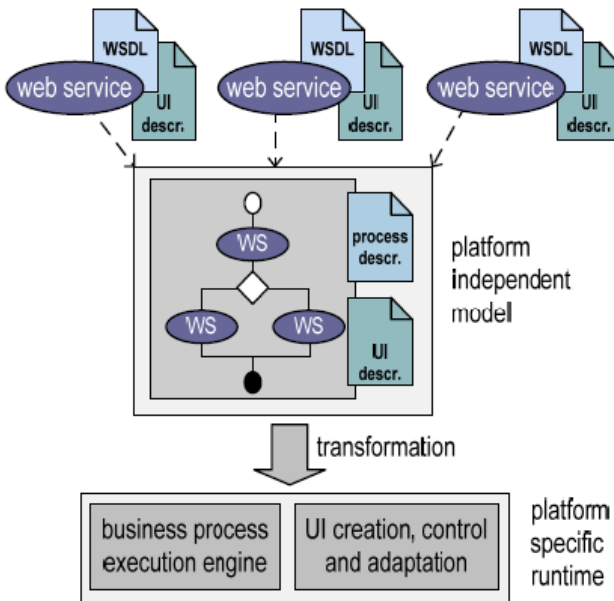


Figure 2: Service architecture [4].

On the service and user interface integration level, an approach such as [4] would be best suited. In this approach, user interfaces are designed in the same manner as functionality is developed for service-oriented systems. This approach integrates the user interface with services by providing user interface descriptions with the services for rendering and adaptation or execution is the business process engine (Figure 2). Building services in this manner will bring the benefits of service-oriented computing to the user interface. Furthermore, the inclusion of an intelligent interface as a service will allow for an efficient and effective user interface capable of assisting users in completing tasks as well as correcting errors while maintaining the flexibility and loose coupling characteristics of SOA systems.

Workflow based user interfaces could benefit from such integration of the user interface. Workflow management in IP Provisioning systems in general, lack intelligent breakdown of workflows and simply display all available input options for a particular workflow. The dissection of such a workflow with added intelligent features could make the user interface more efficient for users.

### IV. CONCLUSION AND FUTURE WORK

This paper has identified a possible approach to user interface delivery as a service. Intelligent user interface services could be integrated to manage information dispensation in workflows. The goal of this research is to deliver relevant information to IP Provisioning system operators by improving the flow of information between operators and the user interface.

The envisaged benefits from this research are an efficient interface in terms of information presentation and workflow management.

The next phase of this research is to develop a model integrating the components of an IUI in a service oriented architecture environment. A prototype based on this model will be developed to establish if the model supports the research goals. An Evaluation of this prototype would determine whether the requirements were met.

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