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Subtask C
Plugin –technologies for daylight design tool applications

A Working Document
of IEA SHC TASK 31 DAYLIGHTING BUILDINGS IN THE 21ST CENTURY
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1. Introduction

Software development in IEA Task 31 Subtask C focuses among other things on a Complex Fenestration System (CFS) database, algorithms to include CFS in simulation tools and an extension and modification of the ADELINE program system. This software development shall follow a component based approach allowing reuseable, more flexible and homogenous program structures itself and allowing to make the software components available to third party software projects.

Traditionally software programs are developed as one unit. The Code is compiled and linked together as the finished program. After linking its parts together, no additional parts can be added. With the more advanced concept of component based technology it is possible to load parts of the program as plugins during runtime of the program. Component based software models are therefore also intended for the development of reuseable software pieces. Another important intention of this concept is the ability to use this software components in more than one programming language and on more than one platform. The common understanding of a component is a unit that offers its functionality only by defined interfaces while its internal part is hidden and cannot be manipulated directly. Up to now there are three different and approved technologies available to build up component based software: COM, CORBA, JavaBeans.

This working document briefly describes and compares three different approaches and selects one approach for usage for the CFS database, algorithms and the Adeline program system.

2. COM

The Component Object Model (COM) was developed and introduced by Microsoft. It is on the one hand a component based software model and on the other hand the base for linking and embedding functionality in other programs.

Like the common definition of a software component, COM Objects exist of ‘black-box’ implementations and interfaces. There can be various interfaces for each component. Each interface is given a Global Unique Identifier (GUID)

to address it. The interfaces are described in a separate language. This language, Microsoft Interface Definition Language (MIDL), describes the interfaces in a way, that they can be addressed and used by different programming languages.

COM is also the basis for the Object Linking and Embedding (OLE) protocol. Since the internet got more important, Microsoft continuously developed the COM-idea such that COM-Objects can also be integrated in web-pages. With ActiveX- Controls the amount of necessary COM functionalities and methods was reduced. Another difference to common COM- Objects is the ability for ActiveX- Controls to enable bi- directional communication.

3. CORBA

The Common Object Request Broker (CORBA) definition was developed by the Object Management Group (OMG). As the world’s largest association of software- manufactures and –users, its main interest is to create a standard for software components that is programming language-, implementation- and platform independent.

The specification describes, how distributed objects can communicate with each other via an Object Request Broker (ORB). A client can use a server object by sending a request to the ORB, which delegates the request, executes it and returns the result.

Like in the COM technology the interfaces are described in an independent language called Interface Definition Language (IDL). To use these components platform and language independent, the interface definitions are mapped by an IDL-compiler into definitions in the various languages.

4. JavaBeans

Java itself is a programming language that is platform independent. This concept is one of the reasons for the popularity of Java especially related with internet technology. JavaBeans are the component technology of Java and developed to create reusable components.

Visual JavaBeans components are able to allow the manipulation of their appearance by creating controlling attributes.

5. Technologies in comparison

Despite the structural similarities of the different component technologies, they have some essential differences. CORBA is used mostly for company-wide backend- systems with a request for high efficiency COM is used mostly for desktop solutions. It can be accessed by several programming languages but it is restricted to only one platform as it is an integral component of the Windows technology. Java- Beans are completely platform independent but they are restricted to one programming language. The COM technology is maybe the most-developed and accepted component technology with a high distribution level as it is part of the Windows platform.

The decision for a component technology cannot only be made by looking at the technical aspect. The other aspect is, how established a technology is and if it is accepted and introduced on the market. The COM technology is on the way to be the ‘leading’ technology for small and middle solution for the desktop market. Also the support by different development tools is crucial. The disadvantage of a strong binding to the provided platform is not that crucial since the restriction of the limitation to the Windows technology is already adapted by most of the users. Especially for the Windows based applications to be developed in the framework of Subtask C of IEA Task 31 the COM approach is therefore well suited.

6. Conclusion

The Component technology offers a good solution for a program that should be extended by various plugins. Especially for a desktop program on a windows-platform, the COM technology offers a commonly accepted and approved technology. COM will be therefore taken as approach to realise the CFS database, algorithms and also the extension and modification of the ADELINE program system.

7. WWW Addresses

COM: **http://www.microsoft.com/com/resources/comdocs.asp**

CORBA: **http://www.corba.org/**

JavaBeans: **http://java.sun.com/products/javabeans/**