Analysis of Component-Based Information System Development

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Abstract

Different approaches of Component–Based Information System Development are being researched. The frameworks of Enterprise Architecture level components are analyzed: ISA Framework by J.Zachman [1], Work–Centered Analysis (WCA) Framework [2], Enterprise Integration Model [3]. The IS component architectures for application integration developed by CCA Working Group [4], CBDi Forum [5], Sterling Software [6], Computerware [7] are discussed. The implementation level components architecture - OMG’s CORBA [8] as prototype architecture for upper levels IS components is assumed. The analysis of component-based Information System development methods is focused on classification of component architectures.

Keywords: Information Systems, Component-Based Development, Application Integration.

1. Introduction

Component-Based Development (CBD) is a new approach to the design, construction, implementation and evolution of software applications. Software applications are assembled of components from a variety of sources; the components themselves can be written in several different programming languages and run on several different platforms.

In order to make effective use of implementation components (executable code, source code, interface specs, code templates), it is necessary to start with componentization of business models and requirements.

2. Component Based Development

2.1 The Frameworks of Enterprise Architecture Components

J. Zachman proposed Information System Architecture (ISA) Framework [1] which shows the aspects and levels of Information System Development Process. The levels of IS description represent the phases of IS Development Life Cycle. Each level is described from the different aspects: the data, functions and processes, locations, business events, the people and organizations involved, and the motivations and constraints.

Work Centered Analysis (WCA) Framework is developed by S. Alter [2]. WCA Framework consists of six linked elements: the internal or external Customers of the Work System; the Products (or services) produced by the Work System; the steps in the Business Process; the Participants in the Work System; the Information the Work System uses or creates; the Technology the Work System uses. The basic elements of WCA Framework can be assumed as components of Work System.

The Enterprise Integration (EI) Model [3] is described in the Universe of Discourse (UoD). Dimensions of the UoD for modelling of Enterprise activities and transactions are defined: the Levels of Description of Enterprise activities; the Domains of Enterprise activities; the Life Cycle phases of the activities. The dimension "The Levels of Description" of the UoD includes the levels as follows: General level, Conceptual level, Method level, Infrastructure level. The dimension "The Life Cycle phases of Enterprise activities" phases as follows: Identification phase, Concepts phase, Requirements phase, System design phase, Detailed design phase, Implementation phase, Managing (operation) phase, Reengineering (decommission) phase.
2.2 The IS component architectures for application integration

Common Component Architecture (CCA) Framework [4] is used to define a minimum set of standard features, in order to be able to use components developed within different frameworks. CCA model is used for Enterprise Activities modeling in Detail Design phase at Method and Infrastructure levels, described in EI Model [3].

Component-Based Development and Integration (CBDi) Forum [5] defines Application Integration as the requirement to integrate into new business processes the functional behavior or business rules of systems and their components as well as the data that supports them. CBDi Application Integration model is used for Detailed Design of Enterprise Activities at Conceptual, Method and Infrastructure levels.


Computerware Corporation presents following product to support component-based development [7]: UNIFACE Component-Based Application Assembly; ready-made reusable components; Technical Components; Life-Cycle support products; Methodology for CBD. Those products are used at Method and Infrastructure levels for modeling of Enterprise Activities in Detailed Design, Implementation, Managing and Reengineering phases.

Common Object Request Broker Architecture (CORBA) was designed by the Object Management Group (OMG) [8] to support open distributed communication between objects across different platforms and languages. CORBA can be employed in Detailed Design and Implementation phases of Enterprise Activities modeling at Method and Infrastructure levels.

Assembling the components of different Component-Based Information System Development Methods the Taxonomy of Information System Components is proposed. The results of analysis of approaches to Component-Based IS development are depicted in two-dimensional space, where the Levels of IS Description and IS development Life Cycle phases [3] are assumed as dimensions.

3. References