# ENHANCEMENT OF METAMODEL

[1]*Preeti bala*, [2]*Dr.Harsh Dev*

[1,] *Singhania University Pacheri Bari, Jhunjhunu (Raj.), India*

*[2,] PSIT, Kanpur, India*

*Email: [1]preetitripathi38@gmail.com, [2]doctorharshdev@rediffmail.com*

*Abstract*. **This article presents a tool that has been developed for the creation of multi-views of system requirement specifications. The key component of developing the tool is a meta-model that represents different views and every view is based on a specific method and technique. I proposed two new symbols in the meta-model with their relevance and importance and how we can make a more effective model with the help of these two new symbols. The main objective of the symbol is to introduce a new way of information-collection. This paper presents a new approach to graphical representation of meta-model adding two new symbols for multi-perspective environment with the objective of refining the requirement and collecting more appropriate information during developing software in multi-perspective environment where we also handle different views according to their skills and knowledge ,this paper also describes all the significance of these two symbols with the help of case study .**

**Keywords:** *Meta-model, symbols, requirement specification, multiple views, effective.*

* Corresponding Author:
Preeti Bala,
Research Scholar Computer Science and Engineering,
Singhania University Pacheri Bari Jhujhunu, India,
Email: preetitripathi38@gmail.com     Tel:+91(9555062099)

## 1. Introduction

Multi-perspective software development engages multiple participants who invariably hold different views on a problem or solution domain [1]. The main advantages of using a multiple view approach are guaranteeing consistency among specifications prepared through different methods and techniques, simplifying migration from one method to another when the system is already being developed and being reengineered, reusing specifications, reducing maintenance cost etc. A view point is internally divided into five slots-(1) Style (2) Work plant (3) Domain (4) Specification (5) Work record [3]. We studied the meta-model work plan containing description or model of the development process; the key component for creating the environment was a meta-model that is common single representation which eliminates any redundancy between techniques while preserving those features that are unique. This representation is not a new requirement technique but an internal representation to which several different techniques may be mapped [5]. Meta-model includes a set of nine elements and asset of ten relations. Meta-model captures elements describing how people carry out work in the system being specified. The main objective of this research paper is to enhance the scope of Meta-model with the

help of new symbols. Many concepts in the Goal Meta-model, illustrated in this paper are based on the KAOS (Knowledge Acquisition in automated Specification) method [8]. KAOS was chosen over alternative goal-oriented notations for two reasons. First, unlike [9] derived approaches, KAOS dense goals as prescriptive description of system intent. Because goal and requirement analysis is already carried out in the context of persons and tasks, we use goals as a vehicle for refining requirements, rather than understanding the intent of actors. [10]

## 2. Research Methodology

As per my research I propose basically two new symbols which help make better graphical representation of the meta-model. The symbols which are the part of elements in meta-model are:
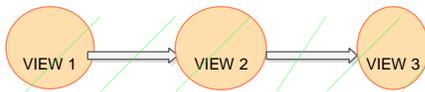


**Figure 1**   New symbol related to the different views in meta-model

According to my research this symbol will help to make more effective graphical representation because in my primary data and research I found that many types of users and their views can be different for the same questions in analysis phase. So we should know that different views of different types of users have been represented through circles  and the straight line represents connection (how the users answers are connected to each other), relation means how one user's view affected another user's view and how the answers are correlated and how they are different from one another. As we know the inconsistency (when multiple views are involved) provides important clues about missing information. Another symbol plays very important role for missing information which is named as information collection centre and another is for the source of information.
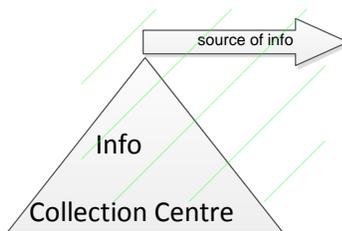


Figure 2 New symbol in meta-**model**

These are two symbols which can play very important role for missing information in multiple views. Now the meta-model becomes a set of 11 elements after introducing these two new elements

## 3. Justification of my symbols by a case study

The purpose of this paper is to introduce two new symbols. During the study of a company; Shearling Skins Pvt. Ltd. two new symbols have been added to the result and collected data.

The justification for introducing two new symbols is that they help collectively to define the SRS in multiple views and play a very important role in collecting missing information in the process during handling of inconsistency and express more clearly the user requirements. The company is a furniture company and intends to automate its sales-purchase process involving different departments of the company without adding any new manpower and thus negating any escalation of cost. The purchase query is generated by different architects who run different projects in different organizations and these projects are pursued by the company sales persons by visiting their site at different locations to know the user requirements. There after price-quotations are generated by the sales persons manually and sent to the concerned architect. If the price-quotation is accepted and the order is finalized, the requirements of the user are sent to the production house. The process of production is manual and takes some time. The whole process is time-taking and many a time causes delays beyond the expectation and promise of sales department. After automating the system the company can put all relevant information regarding price, discount and a feedback system on its website. Any visitor to the website can put his requirements and queries as to the price, time and delivery-system on the website. The company can send a price quotation according to the requirements of the visitor and if the deal is finalized, it can send the same directly to the production house indicating the time of delivery. The company can provide a user-id to facilitate update information about a particular order. The user-id will also help the user to make changes either by addition or deletion of any new/old feature. One replica of the whole process will be made available to the sales department and the accounts department for processing the order for online payment system through debit/credit card.

## 3. Explanation of meta-model

This meta-model initially proposed by [6] was tested through several system examples, and was demonstrated to be very helpful [7]. It is only for internal use, that is, it is not intended that end-users or even requirement analysts utilize it as a new specification technique. Meta-model for representing SRS by these two new symbols can make more effective meta-model with adding two new features which has been proved by a case study at the company to make two meta-model for representing SRS. One is generic meta-model and other is using two new symbols. I found that two new symbols made more effective meta-model by enhancing its effectiveness in multiple views (multiple users) where we are able to define more effectively SRS according to the user skills as compared to basic meta model and in the basic meta-model there is no information collection centre whereas by adding these two new symbols we create this centre where we got any missing information which is very important in handling consistency of multiple views. As a meta-model is a graphical representation of any system, the study in consideration shows that these two new symbols make more effective meta-model with different advantages.

1. Multiple views are more effective and specified according to their skills and knowledge which make a more effective graphical representation of Meta-model.
2. It also helps to collect the information for effective SRS during the handling of inconsistency of multiple views.

**Remark – this is first view to see the furniture company and its working**

| Furniture company F projects | Production House |
|---|---|
| | Order status |
| F follow by manager | Final order status |
| Final order | F update status |
| F gets order | Request to fast delivery |
| F generate reports | |
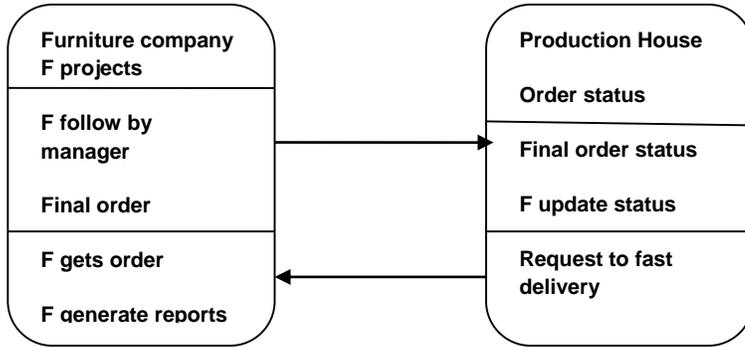
Figure 3 Class and object diagram for Furniture Company

get order

Data of priceswith discount

Description

follow the project by architect

Generate report fororder

productionhouse ← Result for processing order
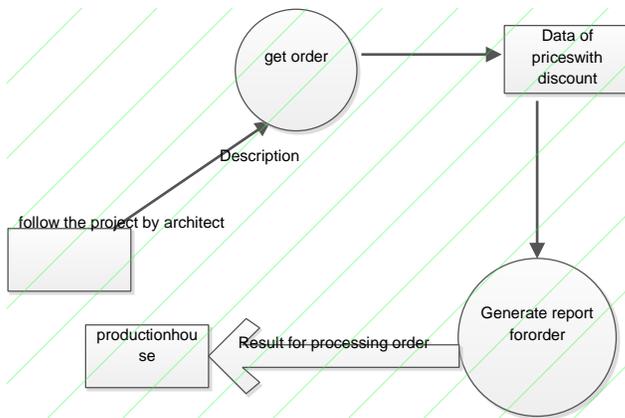
Figure 4 DFD (data flow diagram) of Furniture Company

View1 — view 2 — Sends/rec — get order
sends<msg>
Description
furniture
has value <ext>
Description

report
Descriptio
report
Productionhouse
generate report of order
View 1 — view 2
source of information
Information collection
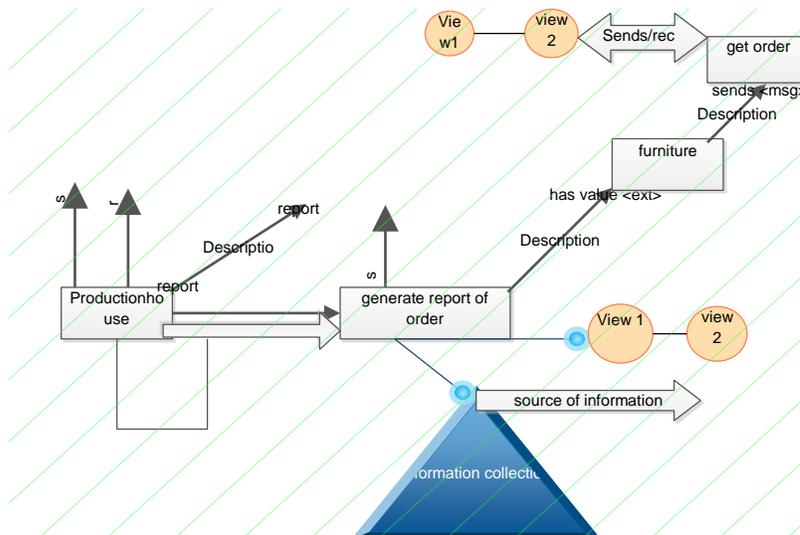
Figure 5 Proposed model **of the furniture company system in data flow diagram (4), and its corresponding metamodel (5)**

This is another view to represent the furniture company working. There are different views to see the company working. We represent these views in Meta-model.

Here may be some missing information which we could not analyze about the company so we will introduce this missing information by a new symbol which is introduced in my paper figure2.

These symbols will help to make better SRS during developing software. These are basically some tools which enhance the Meta-model representation.

## Advantage of meta-model after introducing these two new symbols

Graphical representation is always better than general representation. Here these two new symbols will also collect the missing information which is very important for the requirement and specification. Secondly, this symbol will also manage the inconsistency of multiple views.
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## Conclusion

After analysis of a Meta-model through various factors, it has been found that a Meta-model is used to specify the working of an organization. The main objective of introducing these two symbols is to go a step ahead to better understanding of working elements in an organization or to refining a requirement by Meta-model during developing a software in multi-perspective environment. Additionally these symbols handle two aspects; multiple views and inconsistency during multiple views. We can also further research in this multi-view-oriented process modeling, which acknowledges the relevance of a multitude of issues in a process model and how the Meta-model helps but there are also some limitations with this research. This is only a presentation of a system refining the requirement. We cannot change the system. It only defines what the system can achieve.

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