

# Meta Modeling for Business Process

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**Abstract**— This paper intends to clear up the business model, its utilizations, and its roles. All businesses make some use of information technology and it is important that their systems are really built to support the businesses of which they are an integrated part. To get an understanding of a system, it is fundamental to make a model of the business. Ecore Modeling Framework (EMF) is an Eclipse-based displaying system and code era office for building devices and different applications taking into account an organized information model. This model is utilized to execute business demonstrating in an office administration framework. A model is a simplified view of a complex reality. It is a way of making reflection, permitting you to dispense with unimportant points of interest and concentrate on one or more essential viewpoints at once.

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## I. INTRODUCTION

When we began the examination procedure the hidden exploration inquiry was: Which are the applicable graphical business process displaying strategies to be utilized when demonstrating a hazardous and complex circumstance. The response to that question is that we had four applicants of procedure situated demonstrating strategies: flowcharts, BPMN, EPC, and UML-movement charts. This paper gives a begin focuses to the meaning of a procedure permitting the configuration of versatile and adaptable Business Process meta-models as per the current circumstance. We have presented the ideas of Business Process Modeling-piece and business technique and in addition case of lumps and meta-models so as to show our proposition. We advance the way that the last business process model must be made from the arrangement of proposed pieces keeping in mind the end goal to suit to a specific circumstance. [5]

## II. RELATIONSHIP MODELLING

A relational database, stores relations between whole numbers, strings and other straightforward sorts in a plain manner: it just specifies all qualities related.

This model is to a great degree adaptable, since different relations can be effortlessly taken from existing ones utilizing numerical formulae, and the relational database deals with that. In any case, database ought to mirror this present reality somehow to be truly of utilization. Since the social databases store relations between scientific deliberations and not genuine things, we ought to make some sort of a mapping of ones to the others.

This is the thing that entity-relationship model is for.

An entity-relationship model, as one can without much of a stretch supposition from its name, models connections between elements.

In any case, since we realize that databases do basically the same, how can it vary from the database model? [4]

An entity-relationship model states which information and relations between them ought to be put away.

As such, ER model is outline and database model is one of the approaches to actualize it. ER model is said to be over the database model in the waterfall development.

The model says nothing of information and relations between them that might or ought to exist, just of those that ought to be stored. Each person takes an interest in thousands if not millions connections, but rather an ER model ought to state which of them are to be stored and a relationship model ought to choose how to store them.[4]

## III. BUSINESS PROCESS MODELING

Business Process Modeling is a vital piece of comprehension and rebuilding the exercises and data a regular venture uses to accomplish its business objectives. With a demonstrating instrument like Enterprise Architect, you can model, archive and rebuild those procedures and data streams utilizing industry standard UML and the Business Process Modeling Notation (BPMN). Best of all, the procedure outlines and models can be utilized to drive process re-organizing and programming advancement." [1]

Business Process Modeling is the order of characterizing and laying out business hones, forms, data streams, information stores and frameworks. BPM regularly includes utilizing documentation, for example, UML to catch graphical representations of the significant procedures, streams and stores.

UML gives action, state, question and class charts to catch essential business procedures and ancient rarities. More definite BPM models can without much of a stretch be fabricated utilizing UML Profiles. Sparx Systems has

accessible for download a point by point UML Profile for Business Process Modeling in view of the augmentations characterized by Hans-Erik Eriksson and Magnus Penker in their book, "Business Modeling with UML". This profile is utilized to characterize an arrangement of generalizations for working with Business Activities, Processes, Objects and Information streams.[4][3]

BPM contrasts from programming framework displaying in various vital ways. The key distinction between framework displaying in UML and Business Process Modeling is that the accentuation on how the work is done inside of an association, as opposed to what work is finished. It is an essential device in comprehension the exercises a business embraces, and the sort of data it needs to effectively participate in those exercises. Venture Architect can offer you some assistance with identifying and report forms inside of a business, and recognize which business procedures can be overseen all the more successfully. Likewise, they serve the critical capacity of arranging new and existing programming frameworks inside of the business connection. [6][2]

Undertaking Architect is in a perfect world suited to catching and reporting your business process models. Best of every one of, the models you make in EA can then be utilized to drive the prerequisites, use cases, investigation and outline periods of new programming improvement extends, all with complete traceability back to your unique BPM. [2]

#### IV. META-MODELING

A metamodel is at a higher level of abstraction than a model. It is often called "a model of a model". It provides the rules/grammar for the modeling language (ML) itself. The ML consists of instances of concepts in the metamodel. "Is-instance-of" is key relationship i.e.  
instance -> class  
element -> set

A metamodel describes the rules and constraints of metatypes and meta relationships. Concrete metatypes are instantiated for use in regular modelling work. (Abstract metatypes do not appear as classes in a UML analysis/design model)[6]

A. Important principles of metamodeling

When defining a meta-model it is very easy to fall into the trap of over-elaboration. To avoid this, this article obeys the following principles, with the goal of creating a minimal, coherent metamodel that can be extended if needed.

- principle of parsimony: Be parsimonious, start small and add
- principle of divide and conquer: Divide and conquer, avoid mega-models

These principles and many more great ideas on modeling can be found in Tools for Thinking – Modelling in Management Science by Michael Pidd. Please also read our pages on Models and Metamodels and the Unified Modeling Language (UML). When prototyping an enterprise, we find it useful to distinguish between three layers: the business model layer, the organization layer, and the technology layer.[6],[1]

#### V. ECORE

The Eclipse Modeling Framework (EMF) is an arrangement of modules which can be utilized to demonstrate an information model and to create code or other yield in light of this model. EMF has a qualification between the meta-model and the genuine model. The meta-model portrays the structure of the model. A model is a solid occurrence of this meta-model.

Ecore is the center (meta-) model at the heart of EMF. It permits leveraging so as to communicate different models its develops. Ecore is likewise its own metamodel (i.e.: Ecore is characterized as far as itself).[5]

According to Ed Merck, EMF project lead, "Ecore is the defacto reference implementation of OMG's EMOF" (Essential Meta-Object Facility). Still according to Merck, EMOF was actually defined by OMG as a simplified version of the more comprehensive 'C'MOF by drawing on the experience of the successful simplification of Ecore's original implementation.

Utilizing Ecore as a foundational meta-model permits a modeler to exploit the whole EMF ecosystem and tooling -in as much as it's then reasonably easy to map application-level models back to Ecore. This isn't to say that it's best practice for applications to directly leverage Ecore as their metamodel; rather they should seriously mull over characterizing their own particular metamodels taking into account Ecore.[5]

EMF permits the designer to make the meta-model by means of various means, e.g., XMI, Java comments, UML or a XML plan. It additionally permits to continue the model information; the default usage utilizes an information position called XML Metadata Interchange.

##### A. Exploring in the Diagram

Once your graph gets populated it may get harder to locate a particular EClass. Much the same as in a large portion of the other Eclipse editors, CTRL-O will summon a little popup which is extremely advantageous to discover a component. You can choose the component in the rundown and when accepting with ENTER the outline editorial manager will choose and uncover this component.

### B. Demonstrating Classifiers

You can use the tools defined in the palette to create new EClasses or EDatatypes:

- Class will create an EClass instance
- Abstract Class will create an EClass instance with abstract=true
- Interface will create an EClass instance with interface=true and abstract=true
- Datatype will create an EDatatype instance
- Enumeration will create an EEnum instance

Every one of the Class related tool may likewise be utilized to change some properties:

Clicking so as to use the device Abstract Class on a current EClass will set abstract=true, Using the instrument Interface by tapping on a current EClass will set interface=true and abstract=true

This is particularly advantageous when utilizing the graphical modeler as a part of full-screen with no other view and tapping on the logical alternate route which shows up a couple of milliseconds after you select an EClass.

### C. Displaying References

Alternate ways are accessible in the palette to make distinctive sort of EReferences:

- Reference will make a non contained EReference with a 0..\* cardinality.
- Bi-directional Reference will make two EReference examples every one being
- Containment will create a containment EReference with a 0..\* cardinality.

You can adapt the EReference properties at any time and the diagram will reflect your changes. If a non-contained reference is changed into a containment reference then the decorator at the source of the EReference will be adapted.

### D. Displaying Attributes

Shortcuts are accessible in the palette to make distinction sort of EStructuralFeatures, quite:

- Attribute will make an EAttribute with a default name when utilized on an EClass.
- Literal will make an EEnumLiteral with a default name and valud when utilized on an EEnum.On account of EAttribute occurrences, some writing alternate ways are accessible. See the «Editing Shortcuts» area.

### E. Demonstrating Operations

Utilizing the Operation tool from the palette and tapping on an EClass in the graph you can make another EOperation occasion.

To alter the EOperation signature you have a few options, you can specifically sort it in the graph, EcoreTools expects a configuration like :

```
name ( param1 : TypeOfParam1, param2 TypeOfParam2 ) :  
return Type
```

You can likewise straightforwardly set the qualities and make new EParameter cases through the Properties View.

### F. Erasing components

Hitting DEL on the console will erase the chose model component and reset all the cross references to it. On the off chance that you need to expel a component from a given chart without really erasing the component, you can either utilize the Remove tool which is accessible in the palette or the Delete from Diagram relevant activity accessible with a right snap.

## VI. INSTALLATION

Install EMF via the Eclipse Update manager from Help → Install New Software.

Select Modeling and install EMF - Eclipse Modeling Framework SDK and the Diagram Editor for Ecore (SDK). The second entry allows you to create models based on diagrams.

Project and initial model creation create a new project called abcmodel via File → New → Project→ Ecore Modeling Project.Ecore description file

The Ecore file allows to define the following elements.

**EClass:** represents a class, with zero or more attributes and zero or more references.

**EAttribute:** represents an attribute which has a name and a type.

**EReference:** represents one end of an association between two classes. It has flags to indicate if it represents a containment and a reference class to which it points.

**EDataType :** represents the type of an attribute, e.g., int, float or java.util.Date

The Ecore model shows a root object representing the whole model. This model has children which represent the packages, whose children represent the classes, while the children of the classes represent the attributes of these classes.

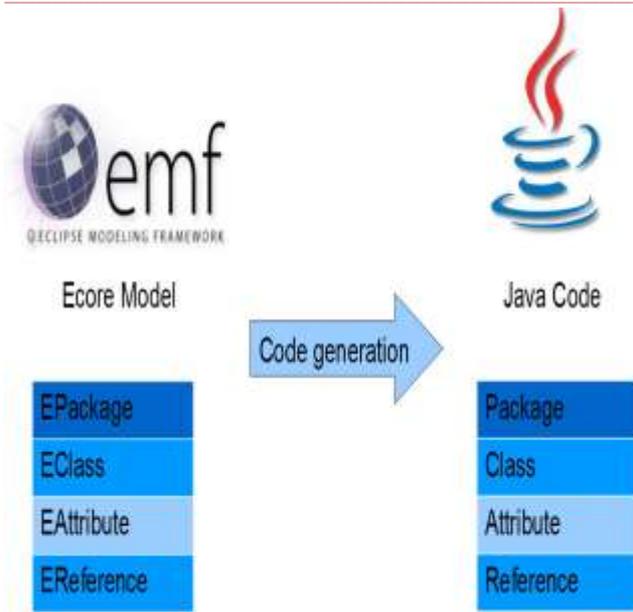


Fig. 1 A sample graphical representation of relationship between Ecore and Java code.

**VII. UNDERSTANDING**

- The EMF tooling permits you to make UML graphs.
- The Unified Modeling Language (UML) is a visual dialect for catching programming outlines and designs.
- The fundamental building obstruct for UML is a chart. UML partitions graphs into basic outlines and behavioral charts
- The most recent variant UML 2 has the objective to add the capacity for modelers to catch more framework conduct.
- UML 2 has the objective to bolster model driving designs (MDA).
- MDA has the objective to make consequently a product program from several models.

**VII. Case STUDY**

**Office Management System**

The system makes reports of all clients, employees, manager and project so that there can be no sort of confusion and reports will be generated based on different criteria's. Office administration is a set of day-to- day activities related to financial planning, personnel, and physical distribution and logistics within an organization. The product could be implemented in an average sized organization and also in large organization, which will not be very keen on spending loads of money on ledgers. Whereas our product will greatly reduce the running by using common and cheap office items like database and desktop application. And also there is no requirement to store books or accounts. The data is directly stored in the database in the hard disk of the PC. People that hold office management positions conduct special studies and based on the results of these special studies, they develop reports. Apart from developing reports, they also

provide input to management on the development of policies and procedures. Office management may also provide paralegal support, and may draft correspondence for management, schedule appointments, etc. Office management is the administrative handling, controlling, and maintaining a balanced process of work inside the office of an organization whether big or small company/business, which is necessary to achieve the administrative goal.

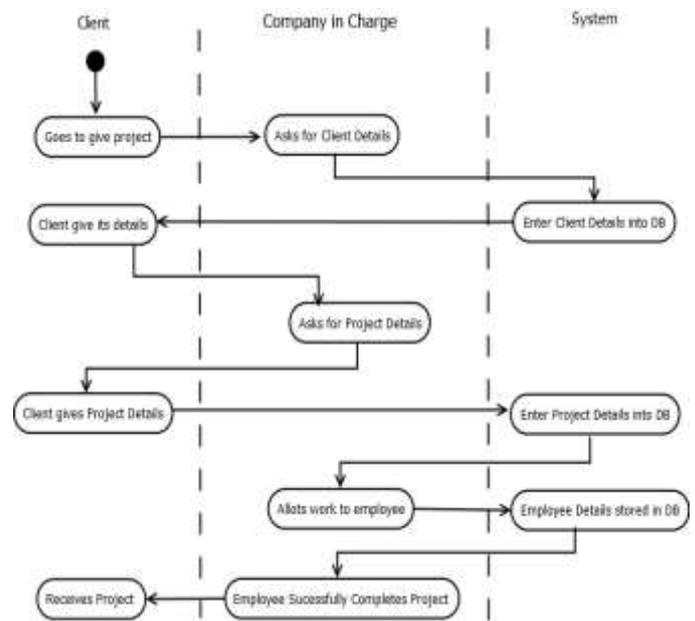


Fig. 2 The flow of the processes in the office management system.

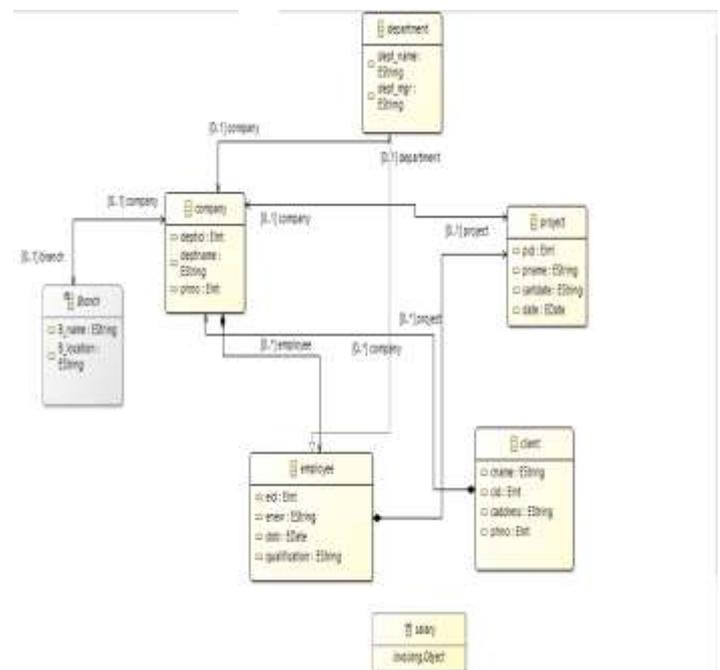


Fig. 3 The meta-model generated using Ecore tool in eclipse IDE

## VII CONCLUSION

The ecore meta-models presented in related work focus different perspectives concerning with business process. The review of these meta-models allowed identifying the advantages and limits of this approach. It create orchestrations of business processes internal to a specific organizations and interconnecting different processes. This study showed that although exist several business process meta-models, little effort has been devoted to the development of meta-models supporting the alignment between daily actions and business process descriptions as they are really executed in organizations.

It gives you a decent, abnormal state approach to both impart the configuration and to impart information to different applications. You can conceivably create a few, if not all, of the usage code. Today's applications are turning out to be progressively not so much solid but rather more coordinated with different applications. The way to supporting fine-grain information combination between applications is a typical comprehension of the information—that is, a model—and preferably a typical execution system. Having the capacity to create a percentage of the usage code is likewise the way to expanded efficiency and high caliber and dependability of these inexorably complex incorporated applications.

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