

# A to Z of Model based Software Engineering

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**Abstract**—Software engineering is a deep study of any software to design it in a proper manner. It mainly point to the low quality software which lacks in designing and development criteria. Whereas model based software engineering is a software development process which focus on software quality and testing as well.

Model based software engineering is a benefiting tool for many group of individuals namely software developers, software engineers and business analysts. The basic purpose of MBSE (model based software engineering) is maximizing the positive results through programs at different abstract levels. The key idea of MBSE is to control of process of software development and this lead to a quality software. Most of the software code generation process follows standard tools and techniques but still it need to code some program manually so the overall aim of MBSE is to produce all code automatically.

In this paper, we will give brief of the introduction, concepts, issues, tools and technologies in MBSE. We also figure out difference between Process aware information system (PAIS) and Model based software engineering (MBSE).

**Keywords**—Model based software engineering (MBSE), Model driven Architecture (MDA), model driven software engineering, Process aware information system (PAIS).

## I. INTRODUCTION

Model based software engineering is a discipline that focuses on software intensive applications. It is often used to modify the domains to address a specific purpose. The principle objective of model driven software engineering is to optimize the productivity through fine tuning the linked systems and simplifying the process of information exchange between systems by engineers and programmers. Model based Software engineering must be adopted by every engineer for a systematic and fully organized to all the facet of software development. Software engineering phases act as a sticky glue which holds all the technology modules together and enable them to intelligent development of software.

Model based software engineering (MBSE) meant to expand the productivity by maximizing understanding and compatibility between models. Easier the process of designing with helps of various recurring models in any application domain and increase the communication between single unit and team. Model based software engineering (MBSE) mainly focus on create a conceptual model so the software have a high quality product these increase the quality of software plus the productivity also increase because both are vice versa.

In the era of Process aware information system (PAIS) and work management, software model played a specific role and right from the beginning it is in the focusing part. The models are used to elaborate and define the solution of any software.

## II. ADVANTAGES OF MODEL BASED SOFTWARE ENGINEERING

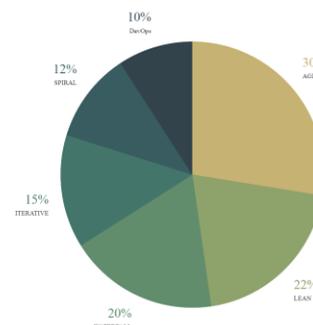
Let's learn some of the many advantages of Model based software engineering:

1. Model driven engineering is a perfect way to deliver better results through less coding and more functionality since it involves modification and not creating a program from the scratch.
2. As model based engineering provides a base already, it makes delivery of solutions faster and better.
3. Since the base blueprint of a program is already tested and operational, the chances of failure minimizes.
4. One monetary advantage of model driven engineering is that it reduces the cost and makes the solution finding profitable. MBSE makes purpose-programming cost effective and viable for both developers and businesses.
5. The model driven software engineering gives the engineers a wider time window to focus and learn on the complex tasks like functional technicalities.
6. MBSE also helps one to gain domain knowledge along with creation and modification of software.

## III. SOFTWARE ENGINEERING MODELS

The SDLC model is a way of defining the complexity and productivity of any software. There are major six type of SDLC model divided inot two group sequential and evolutionary models. In the below chart you can find all the major and most popular SDLC models

Major SDLC model



Popular SDLC Model.

#### IV. TECHNIQUES OF MODEL BASED SOFTWARE ENGINEERING

Since model based software engineering requires splitting of the software into two parts to operate upon, there are three different techniques associated with it. Though the old and new methods vary transitionally, lets learn about the ones in operation in the tech world.

1. The first being, the Domain Specificity, is the kind of technique wherein the emphasis is put on creating codes that can be used in many other applications as well. The reusable components that are created in Domain Specificity MBSE includes DSLs, domain components and reference architecture.
2. The second technique of Model based software engineering is named Metamodeling. Metamodeling includes the creation of codes in meta (coding) language so that a system can understand and comprehend the information, that was earlier only understood by humans. The most commonly adopting areas of metamodeling are Model driven development and architecture based software development.
3. The last and third commonly used technique of model based software engineering is Iteration Transformation. Iterative Transformation involves simplifying an abstraction gap into groups and pairs which are all comparatively easier to be put to use and implement than the other parts. The need of iterative transformation arises when the source models are way too complex to generate codes for software development.

#### V. ISSUES AND CHALLENGES IN MODEL BASED SOFTWARE ENGINEERING

Like every other software creation technique and tool, model based software engineering also comes with its share of issue and challenges. MBSE is a great tool for software engineering, development and prototype creation but when it comes it lacks a precision when it comes to complex software development. It is because complex software require peripherals that can generate codes that appropriately handles multiple aspects of the software.

As the issues and challenges posed by using Model based software engineering are not much, the benefits must be appreciated for paving way to many technological advancement.

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