# Software Development Process

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## Abstract

The article provides some information about software development process. At first, report tells us the history about software development process.And it also gives Phases and common methodologies of Software Development,such as waterfall,prototyping model and so on.It also explain information about Process meta-models.

**Keywords:** software development process;common methodologies;waterfall model; Process meta-models.

## Introduction

In software engineering, a software development process is a splitting of software development work into distinct phases containing activities with the intent of better planning and management. It is often considered a subset of the systems development life cycle. The methodology may include the pre-definition of specific deliverables and artifacts that are created and completed by a project team to develop or maintain an application.We address the following concepts in this report:

**1.What is the history about software development process?**
**2.Phases of Software Development**
**3.What does common methodologies include?and what are they?**
**4.Some example about Process meta-models.**

### 1.History about software development process:

The software development methodology (also known as SDM) framework didn't emerge until the 1960s. According to Elliott (2004) the systems development life cycle (SDLC) can be considered to be the oldest formalized methodology framework for building information systems. The main idea of the SDLC has been "to pursue the development of information systems in a very deliberate, structured and methodical way, requiring each stage of the life cycle—from inception of the idea to delivery of the final system—to be carried out rigidly and sequentially"[2] within the context of the framework being applied. The main target of this methodology framework in the 1960s was "to develop large scale functional business systems in an age of large scale business conglomerates. Information systems activities revolved around heavy data processing and number crunching routines".

### 2.Phases of Software Development

Some of the activities in the software development process are sequential in nature, dividing the process into the following phases.
**Requirements analysis** -specifying the functional capabilities needed in the software. Use-cases are an important tool for communication about requirements between software developers and their clients.
**Domain analysis** - developing concepts, terminology, and relationships essential to the client's model of the software and its behavior. Conceptual-level class diagrams and interaction diagrams are important tools of domain analysis.
**Client-oriented design** - specifying components of the software that are visible to the client and the components' behavior in terms of their attributes, methods, and relationships to other components. Specification-level class diagrams and interaction diagrams are important tools of client-oriented design.
**Implementation-oriented design** determining internal features and method algorithms for the software.
**Implementation** - writing and compiling code

for the individual software components.
**Integration** - putting the software components into a context with each other and with client software.
**Packaging** - bundling the software and its documentation into a deliverable form.

## 3.What does common methodologies include?and what are they?

Common methodologies include waterfall, prototyping, iterative and incremental development, spiral development, rapid application development, extreme programming and various types of agile methodology.
**The waterfall model** is a sequential design process, used in software development processes, in which progress is seen as flowing steadily downwards (like a waterfall) through the phases of conception, initiation, analysis, design, construction, testing, production/ implementation and maintenance.

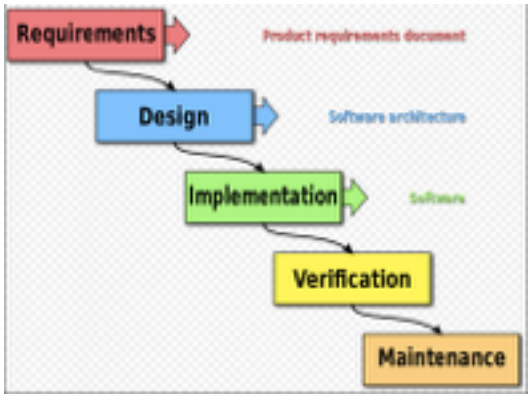



**Figure 1:The Waterfall Model**

**Software prototyping** is the activity of creating prototypes of software applications, i.e., incomplete versions of the software program being developed. It is an activity that can occur in software development and is comparable to prototyping as known from other fields, such as mechanical engineering or manufacturing.

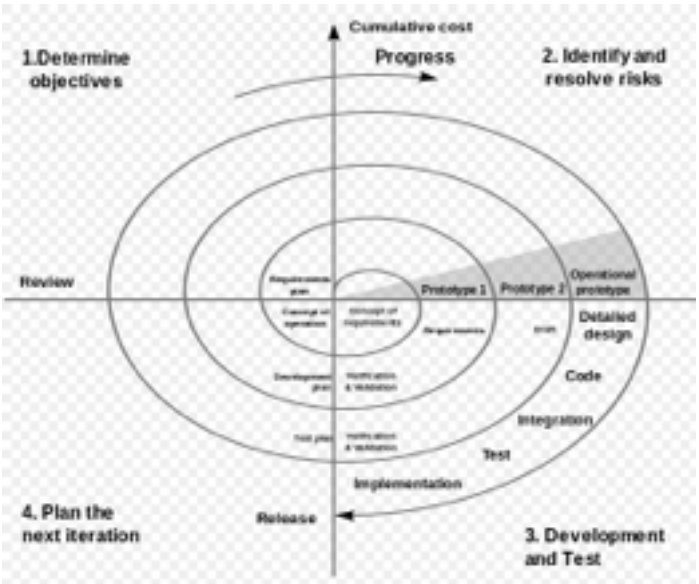
**Incremental development**
Various methods are acceptable for combining linear and iterative systems development methodologies, with the primary objective of each being to reduce inherent project risk by breaking a project into smaller segments and providing more ease-of-change during the development process.

**Iterative and Incremental development** is any combination of both iterative design or iterative method and incremental build model for software development. The combination is of long standing [1] and has been widely suggested for large development efforts.

**Figure 2: Iterative and Incremental development**


**The spiral model** is a risk-driven process model generator for software projects. Based on the unique risk patterns of a given project, the spiral model guides a team to adopt elements of one or more process models, such as incremental, waterfall, or evolutionary prototyping.

**Figure 2:Spiral Model**



**Rapid application development** is a software development methodology, which favors iterative development and the rapid construction of prototypes instead of large amounts of up-front planning. The "planning" of software developed using RAD is interleaved with writing the software itself. The lack of extensive pre-planning generally allows software to be written much faster, and makes it easier to change requirements.

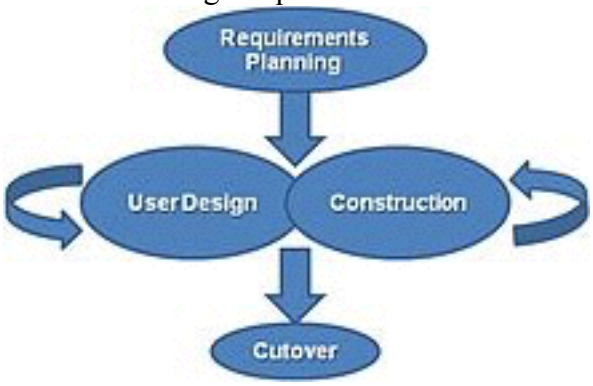



**Figure 2: Rapid application development**

**Agile software development** refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve via collaboration between self-organizing cross-functional teams. The term was coined in the year 2001 when the Agile Manifesto was formulated.

## 4.Some example about Process meta-models.

Some "process models" are abstract descriptions for evaluating, comparing, and improving the specific process adopted by an organization.

•ISO/IEC 12207 is the international standard describing the method to select, implement, and monitor the life cycle for software.

•The Capability Maturity Model Integration (CMMI) is one of the leading models and based on best practice. Independent assessments grade organizations on how well they follow their defined processes, not on the quality of those processes or the software produced. CMMI has replaced CMM.

•ISO 9000 describes standards for a formally organized process to manufacture a product and the methods of managing and monitoring progress. Although the standard was originally created for the manufacturing sector, ISO 9000 standards have been applied to software development as well. Like CMMI, certification with ISO 9000 does not guarantee the quality of the end result, only that formalized business processes have been followed.

•ISO/IEC 15504 *Information technology Process assessment* also known as Software Process Improvement Capability Determination (SPICE), is a "framework for the assessment of software processes". This standard is aimed at setting out a clear model for process comparison. SPICE is used much like CMMI. It models processes to manage, control, guide and monitor software development. This model is then used to measure what a development organization or project team actually does during software development. This information is analyzed to identify weaknesses and drive improvement. It also identifies strengths that can be continued or integrated into common practice for that organization or team.

•Soft systems methodology - a general method for improving management processes

•Method engineering - a general method for improving information system processes

**2.Overview**

From the article, we know what the history about software development process is.There are some phases of Software Development Besides, common methodologies includes waterfall, prototyping, iterative and incremental development, spiral development, rapid application development, extreme programming and various types of agile methodology.Report gives some example about Process meta-models.

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