# SOFTWARE AS A GARDEN

Software Development for Non-Developers



Tomas Tulka

# Software as a Garden: Software Development for Non-Developers

## Tomas Tulka

This book is available at https://leanpub.com/software-garden

This version was published on 2025-08-19



© 2025 Tomas Tulka

# **Contents**

About the Book	. <b>i</b>
How to Read This Book	i
About the Author	iii
Software as a Garden	
Cultivating Success  Collaboration  Growth Through Change  Branching Out  Summary	6 6 7
Getting Hands Dirty         Programming          How to Catch a Bug          Testing the Soil          Summary	9 10 10
Harmony in Green Software Architecture Less Is More Together and Independent Patterns of Nature Bend but Not Break Summary	13 13 14 15 16
Front the Flowers  Frontend Development  Flourishing Screens  Summary	18 18 20
Back to the Roots	21

Entangled in the Web	21 21 22 24
Networking	25 25 25 29
Data Storage	30 30 31 31 33
Deployment	34 34 34 35 37
Operations	38 38 38 39 41
Security	<b>42</b> 42 42 42 43 45
Grow Your Mind	16
Further Reading	47 48 50 51

# **About the Book**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## Who Should Read This Book

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **How to Read This Book**

About the Book ii

## What This Book Is Not About

# **About the Author**

Software is all about change.

While software development is often compared to building a house due to similarities such as design and maintenance, I find this analogy lacking. It overlooks one critical detail: *software is in a constant state of change*. This continuous evolution is the essence of software—if it isn't evolving, it's either obsolete or will soon be. This is where the "soft" in software comes from: it's easy to change compared to hardware, which, like a house, is rigid.

A better analogy for software development is gardening. Just like a garden, a software system is continuously changing, evolving, and growing. Interestingly, many terms in software development, such as "bugs" (errors in software), seem to be borrowed directly from gardening!



Imagine a typical garden filled with fruit trees providing shade, vegetable beds overflowing with tomatoes and cucumbers, vibrant flowers attracting bees with their sweet fragrance, soft grass for lounging, and winding sandy paths for strolling. Creating such a space takes time, effort, and careful planning.

A gardener must determine where to place each plant for optimal sunlight, decide when to sow seeds or transplant, and consistently water, weed, and fertilize the garden.

These gardening tasks have direct parallels in software development. Just as a garden needs a vision—whether it's to serve as a peaceful flower retreat or as a space for growing fruits and vegetables—software needs to deliver business value, fulfilling a specific purpose and functionality.

For a garden to thrive, one must follow fundamental principles: plan the layout, choose the right plants for the environment, and ensure proper soil. Similarly, software architecture must ensure that the software remains adaptable to evolving needs. Just as pruning and weeding sustain a garden's health, maintaining software quality is essential for keeping it running smoothly and responsive to users.

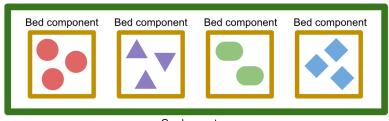
When the time comes, plants are transferred from pots to the ground or from a greenhouse to the garden—just as software is deployed and released to its users. And, just as a garden requires ongoing care—watering and fertilizing—software needs continuous attention: operating, diagnostics, and keeping it updated are crucial for its success.

A garden changes with the seasons, the weather, and as plants mature. In summer, plants can transform in just a few days: flowers bloom, leaves sprout, branches divide, and fruits ripen. Similarly, software evolves, grows, and adapts based on customer feedback, constantly improving.

Throughout this book, I'll use the garden metaphor to simplify complex topics, making them easier to understand. The terminology used in software development can also easily be mapped to gardening.

Gardening	Software development
Planning	Architecture
Seeding	Programming
Planting	Deployment
Watering	Operations
Weeding	Security

A garden is both a self-contained **system** and a *subsystem* within a larger system, such as a garden colony, landscape, or ecosystem. Unlike a **component**, which always exists as part of a larger system, both a garden and a software system are autonomous, with well-defined interfaces. For example, think of a garden bed as a component. A garden bed belongs to a garden; it would be rather surprising to find a bed of tomatoes in the woods.

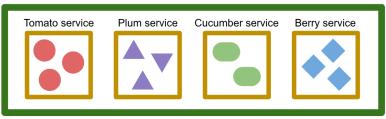


Garden system

A garden as a system with components

In this book, we'll design, implement, and deploy a simple e-commerce system—an online store, much like Amazon, but focused on gardening.

In a business context (a gardening business, for example), a system with a specific purpose (such as selling fresh fruits and vegetables) is called an *application*, while components with clear business functions are called *services*. In business contexts, systems and components are the same as applications and services.



Garden application

A garden as an application with services

# **Software Is About Change**

The only garden that doesn't change constantly is a dead one. Similarly, the only software that doesn't change is the one that no one uses.

Change is vital in software development because it keeps software fresh and relevant. As technology advances and user needs evolve, software must be flexible enough to adapt. Embracing change allows developers to continuously improve, update features, and fix bugs, ensuring the software stays relevant and useful. An open approach helps integrate new tools, keeping the software competitive over time.

For software to embrace change, it must be designed for flexibility and extensibility. Extensible software can grow and evolve over time, allowing developers to add new features or modify existing ones without disrupting the system.

Following best practices and principles of high-quality software makes it easier for the software to adapt. With an open architecture, software can integrate with new technologies and expand in unforeseen ways, making it more adaptable and better equipped to meet future challenges. This approach ensures software remains innovative and able to meet evolving user needs.



Both business and software development are constantly evolving, driven by rapid advancements in technology and practices. New programming languages, tools, and concepts emerge all the time, reshaping how developers build, deploy, and operate software.

This continuous change creates a dynamic environment where staying current is essential. Developers must embrace a mind-set of lifelong learning, constantly updating their skills and knowledge to keep pace with innovations, meet evolving user needs, and remain competitive in the industry.

For developers, learning isn't just a one-time thing: it's a habit that helps them grow and stay competitive as technology keeps moving forward.

Change will be a key theme in this book because software development is about learning to adapt and thrive in a constantly changing environment. If you're seeking stability, this might not be the right field for you! So, let's repeat this mantra three times:

Software is all about change, and software development is all about learning!

# **Cultivating Success**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Collaboration

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Developers**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Knowledge Transfer**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Growth Through Change**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Digital Transformation**

Cultivating Success 7

#### **Agile**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Branching Out**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Continuous Integration**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Git

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Libraries and Frameworks**

Cultivating Success 8

# Summary

# **Getting Hands Dirty**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Programming**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Programs**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Programming Languages**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Interpreters and Compilers**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Zeros and Ones**

#### **Code Quality**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Refactoring

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# How to Catch a Bug

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Errors and Failures**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Bugs vs. Features**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Testing the Soil**

## Unit, Integration, End-To-End

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Test Coverage**

# Summary

# **Harmony in Green**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Software Architecture**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Technical Debt**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# Legacy

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Documentation**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Architect as a Role

#### **Less Is More**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Complexity

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Dependencies**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Together and Independent**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Driven by Business**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Services and Microservices**

#### **Monoliths**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Team Topologies**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Patterns of Nature**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **APIs**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Dependency Injection**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Client and Server**

#### **Events**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Bend but Not Break**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **High Availability**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Scaling**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Resilience

# Summary

# Front the Flowers

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# Frontend Development

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Don't Make Me Think

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **UI Components**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Flourishing Screens**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Web Pages**

Front the Flowers 19

# **Native Applications**

Front the Flowers 20

# Summary

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Backend Development**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Entangled in the Web**

#### **Rest in Leaves**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### REST API

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **URLs**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Methods

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Status Codes**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Headers**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Data Formats**

#### **Cookies**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Secure HTTP**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **API Documentation**

# Summary

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# Networking

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Local Networks**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/software-garden.

#### The Internet

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Firewalls**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# Through the Vines

#### **Protocols**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Addressing**

#### **Connections**

# Signals

# Summary

# **Beyond the Harvest**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Data Storage**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

### **Information Fields**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Databases**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **SQL**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Indexes**

#### **Transactions**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **NoSQL**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **A Raindrop Away**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Caches**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### With the Current

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

### **Message Brokers**

## **Queues and Topics**

# Summary

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Deployment**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Pipelines**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Stages

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### In a Greenhouse

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Containers**

#### **Kubernetes**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

### Landscaping

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## To the Cloud

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Cloud Platforms**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Pay As You Go

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **DevOps**

### **Shared Responsibility**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

### **Service-Level Agreement**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Cloud Native**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Serverless

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Cloud Migration**

# Summary

# Caring for the Green

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Operations**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Observability**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## Logging

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Metrics**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Tracing**

## **Evergreen**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Failover**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Backup and Replication**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Disaster Recovery**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### At the Bedrock

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

### **Operating Systems**

#### Hardware

# Summary

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# Security

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

# **Weeding Out**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Authentication**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Authorization**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## One Login for All

#### Hidden in the Grass

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Hashing

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Encryption**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Digital Signatures**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Holes in the Fence

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Denial of Service**

### Hacking

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

## **Social Engineering**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Malware

# Summary

# **Grow Your Mind**

# **Further Reading**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Garden

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Collaboration

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Programming**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### Software Architecture

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Frontend Development**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Backend Development**

#### Networking

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Data Storage**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Deployment**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Operations**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Security**

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/softwaregarden.

#### **Grow Your Mind**

# Glossary

# **Credits**