

# Building a Resilient SAP Enterprise

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*Build a resilient SAP enterprise  
in the era of RISE, GROW, and  
cloud-native services*

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**Dedicated to**

*Our families for their patience,  
our mentors for their encouragement,  
and our friends for challenging us*

## About the Authors

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# Acknowledgements

This book is a labor of love, a testament to the passion we hold for our work and the cherished relationships we have built with partners, customers, and colleagues throughout our years in the SAP ecosystem. Every page reflects countless conversations, shared challenges, and collective victories that have shaped our understanding of enterprise transformation.

First and foremost, we extend our deepest gratitude to our families. Their understanding during the long hours, their unwavering support through missed dinners and working weekends, and their constant encouragement as we documented our experiences have been the foundation of this endeavor. Their love has been our anchor throughout this journey.

At its core, this book is about building a resilient SAP enterprise, a vision that would not be possible without acknowledging SAP itself, a pioneering force that continues to transform business processes globally. For nearly five decades, SAP has not just developed software; it has revolutionized how organizations operate, adapt, and thrive in an ever-evolving business landscape.

To our customers and partners: your trust in allowing us to be part of your transformation journey has been our greatest privilege. Every challenge you have shared, every success we have celebrated together, and every lesson we have learned collectively has contributed to the insights within these pages. Your willingness to let us guide you through complex transformations has enriched our perspective, and we're honored to share these experiences with a broader audience.

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This book represents not just our knowledge, but the collective wisdom of a community dedicated to excellence in enterprise transformation. Together, we continue to build more resilient, efficient, and successful businesses through the power of SAP.



# Preface

The landscape of SAP development and implementation is undergoing its most significant transformation since the introduction of ABAP in the 1980s. As we navigate this pivotal shift toward cloud-native solutions and software-as-a-service offerings, SAP professionals face both exciting opportunities and complex challenges. This book serves as your comprehensive guide through this evolution, particularly in the era of RISE with SAP, where traditional customization approaches are giving way to new paradigms of solution building. Drawing from extensive experience in enterprise SAP implementations, we have witnessed firsthand the journey from traditional ABAP development to today's cloud-based, full-stack solutions. The emergence of SAP Build, combined with generative AI capabilities and the SAP **Business Technology Platform (BTP)**, has created unprecedented possibilities for innovation, while simultaneously introducing new complexities in architecture, security, and deployment.

A central theme of this transformation is the strategic integration between SAP and hyperscaler environments like AWS. Throughout this book, we present practical use cases demonstrating how this powerful combination enables organizations to leverage both SAP's business process expertise and the advanced cloud services of hyperscalers. From data federation and machine learning to serverless architectures and edge computing, we explore how these integration patterns solve real business challenges while maintaining security and governance.

This book bridges the critical gap between traditional SAP development and modern cloud-based approaches. We have structured it to provide both theoretical understanding and practical guidance, ensuring you can confidently navigate SAP's new builder space while maintaining the resilience and reliability your enterprise demands. Each chapter includes concrete use cases drawn from real-world implementations, helping you translate concepts into actionable solutions for your specific business needs.

Whether you are an ABAP developer transitioning to cloud solutions, an integration architect exploring new possibilities, or a DevSecOps specialist seeking to optimize SAP implementations, you will find actionable insights for building and maintaining robust SAP environments. We pay particular attention to the guardrails and best practices necessary for success in this new landscape, while never losing sight of the ultimate goal: delivering business value through well-architected solutions.

As SAP continues its cloud transformation journey, understanding how to leverage these new tools and platforms becomes not just advantageous but essential. This book is your roadmap to mastering this evolving ecosystem, ensuring your SAP enterprise remains resilient, adaptable, and future-ready.

Welcome to the next generation of SAP solution building.

**Chapter 1: Introduction to the Modern SAP Enterprise** – This foundational chapter sets the stage for modern SAP development, introducing the critical concept of clean core methodology and its impact on business operations. Readers will discover how the evolution from traditional development to API-based applications fundamentally changes the SAP landscape. The chapter explains why maintaining a clean core reduces operational costs and simplifies upgrades while optimizing performance. It addresses the urgent need for ABAP developers and architects to modernize their skill sets, providing a clear pathway to understanding modern SAP development practices alongside the latest available tools and training resources.

**Chapter 2: Overview of SAP's Latest Offers, RISE and GROW** – A comprehensive exploration of SAP's transformation from perpetual licensing to subscription-based models through RISE and GROW with SAP. The chapter examines how this strategic shift impacts development methodologies, tools, and approaches. Readers will gain clear insights into the differences between traditional S/4HANA development environments and new cloud-based platforms. Special attention is given to the changing landscape of development capabilities,

including both new opportunities and limitations in code deployment, configuration management, and change control processes.

**Chapter 3: SAP Business Technology Platform and Cloud Provider Integration**— An in-depth examination of SAP **Business Technology Platform (BTP)** and its strategic integration with hyperscaler environments. The chapter explores how this powerful combination enables organizations to build scalable, resilient applications while leveraging cloud-native services. Readers will understand the core components of SAP BTP, key integration patterns with hyperscalers like AWS, and practical implementation approaches. The discussion includes real-world examples demonstrating how data federation, API management, and machine learning capabilities create new opportunities for digital transformation and innovation in SAP landscapes.

**Chapter 4: Introduction to Generative AI** – An exploration of how generative AI is revolutionizing the SAP ecosystem, providing unprecedented capabilities for content creation, process automation, and decision support. The chapter presents SAP’s comprehensive approach to business AI, examining the Generative AI Hub and integration patterns with foundation models. Readers will gain practical insights into implementing generative AI solutions within their SAP landscape, understanding key concepts like prompt engineering, RAG, and embeddings. Special focus is given to enterprise use cases and how organizations can balance innovation with security and governance requirements.

**Chapter 5: Building Well-Architected Applications on SAP BTP**— A detailed guide to applying well-architected principles when developing applications on SAP BTP. The chapter examines the five foundational pillars: operational excellence, security, reliability, performance efficiency, and cost optimization. Readers will learn practical methodologies for evaluating and implementing architectural decisions that maintain resilience while enabling innovation. The discussion includes architectural patterns, implementation strategies, and measurement frameworks that help organizations build SAP applications that are both technically sound and aligned with business objectives.

**Chapter 6: Managing Application Security and Costs** – A comprehensive examination of security frameworks and cost optimization strategies for SAP cloud deployments. The chapter details the shared responsibility model and its implications for enterprise applications. Readers will understand how to implement effective security controls across their SAP landscape while maintaining operational efficiency. Special attention is given to RISE with SAP security considerations, connectivity options, and practical approaches to cost management. The chapter provides actionable guidance for balancing security requirements with budget constraints in today's complex threat landscape

**Chapter 7: Concluding Remarks and Addition Resources**– The final chapter synthesizes the book's key concepts into actionable insights for building resilient SAP architectures. It provides a strategic framework for establishing and scaling SAP build environments, with particular attention to future-proofing investments. The chapter serves as both a summary and a roadmap, helping readers plan their next steps in modernizing their SAP development practices.

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# CHAPTER 1

# Introduction to the Modern SAP Enterprise

## Introduction

SAP customers often leverage code customizations as part of their enterprise transformation journey to tailor SAP solutions to fulfill their business needs. These customizations involve modifying, extending, or creating the business functionality of SAP applications by developing custom code. This is essential to aligning SAP software with unique business processes, industry requirements, or specific organization needs based on a customer's geography or global footprint. Development is not just about writing code.

A modern approach to the SAP enterprise involves keeping the core clean and building loosely coupled API-based applications that integrate with the customer's core **enterprise resource planning (ERP)** systems. There is often more than one system to integrate with. This approach reduces the operational burden of maintaining many ERP systems, efficiently upgrading and patching systems, optimizing performance, and pinpointing trouble before it begins in the enterprise.

SAP is the leading provider of ERP software since being founded in 1972. Over the course of five decades, SAP has evolved from providing systems and frameworks of packaged applications to industry-leading

software and solutions, offered as a managed service, with a suite of products that enable customers to integrate with their internal has been the leading provider of ERP software since it was and develop new applications leveraging the latest cloud services the market has to offer.

We wrote this book to provide the reader with an overview of SAP's shift in delivering its flagship ERP software, the sizing and license requirements that customers should consider, the journey to either upgrading or initiating their ERP business transformation, leveraging native cloud services provided by cloud providers, and harnessing the power of GenAI in their ERP applications.

## Structure

The topics covered in the chapter are as follows:

- Introducing SAP clean core methodology
- Evolution of the SAP development platform
- Introduction to SAP Cloud Platform extension tools

## Objectives

By the end of this chapter, you will gain a comprehensive understanding of SAP's latest solutions and methodologies as of this book's writing. For those beginning their SAP journey, this chapter serves as an essential foundation, introducing key concepts and current best practices. You will learn critical SAP terminology, explore the platform's core solutions, understand SAP's emerging generative AI strategy, and discover the essential tools that will help you succeed in your SAP projects.

## Introducing SAP clean core methodology

Many organizations have been using SAP for decades, and their systems have evolved over time. Here's an overview of the typical state of SAP systems in many enterprises.



## SAP custom code and configuration

For decades, customers have been customizing the ERP core to accommodate their implementation to their business needs and business processes. Writing custom code to enhance and modify the standard functionality has been the usual course of action for almost all enterprises. The primary development language for SAP systems is SAP's **Advanced Business Application Programming (ABAP)**. Maintaining custom code not only involves boundary systems and resources, but it also requires dependency validations and configurations during major and minor releases, the utilization of SAP transport management, and a thorough understanding of SAP's business process design and development. It also involves ongoing activities to ensure that custom code remains functional, efficient, and compatible with system upgrades and changes.

## Challenges with managing custom code

Managing custom code in SAP is a crucial aspect of ensuring system stability, security, and ease of maintenance. Effective management practices help SAP customers keep track of their custom developments, adapt to changing business requirements, and seamlessly integrate with future SAP updates. Here are common strategies SAP customers employ to manage their custom code:

- **System upgrades and S/4HANA conversion:** Managing custom code during system upgrades requires careful attention, particularly when transitioning to S/4HANA. Each new SAP software release necessitates a comprehensive impact analysis of existing custom code. This analysis identifies required modifications to maintain system compatibility, from adjusting code logic to adapting new data structures and replacing deprecated functionalities. The SAP ECC to S/4HANA transformation presents particular challenges. Organizations typically undertake extensive custom code analysis projects spanning multiple months to ensure successful adoption. While SAP provides tools like **Custom Code Migration and Analysis (CDMC)** to support this process, the scope of work remains substantial. Many organizations leverage specialized tools and frameworks developed by SAP partners to streamline their transformation journey.

- **SAP patching and support pack update:** SAP patching and support package updates are important for customers to remediate security vulnerabilities, known bugs, and performance issues. Custom code adds an extra burden of unit testing and integration testing of business scenarios during and after the support package is applied to SAP systems. It is important to test custom code after applying these updates to ensure a successful business outcome.
- **Ever-growing custom code:** Over the period of time, custom code becomes stale and unused in the system. There are many customers who do not retire their custom code even if the business process does not use it anymore. This is one of the biggest factors for maintaining the custom code in the long run. There is no governance around the custom code retirement and verification process. Old custom code can lead to hindrance in performance and increase operational issues.
- **Testing and quality assurance:** As part of maintenance activities, thoroughly test custom code changes to ensure they function correctly and do not introduce any new issues. This includes regression testing, integration testing, and performance testing. Maintaining a comprehensive test suite helps validate the stability and reliability of the custom code.
- **Performance monitoring and optimization:** Leveraging SAP tools to continuously monitor code performance, capturing and analyzing code execution in order to identify performance remediation, and data access pattern performance.
- **Version control systems:** SAP customers often use **version control systems (VCS)**, such as Git or SAP's own Transport Organizer, to manage changes to custom code. This enables tracking of code versions, collaborative development, and the ability to roll back changes if needed.
- **Transport management system (TMS):** TMS is a key tool in SAP for managing the transport of custom code between different system landscapes, such as development, testing, and production environments. TMS ensures that changes are properly transported and synchronized across systems.
- **Code documentation:** Comprehensive documentation is vital for maintaining and evolving custom code over time. SAP customers implement a multi-layered documentation strategy, combining code comments, inline documentation,