Software Engineering Strategies Primer for 2021

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Initiatives: Software Engineering Strategies

> Software engineering leaders must transform themselves and their organizations to become more resilient, adaptable and effective. Our research will help them devise and continually optimize a development strategy to achieve this goal.

Scope

Gartner's software engineering strategies research helps organizations optimize delivery of effective digital products with the best tools, a motivated talent pool and proven techniques.

In addition to applications and software engineering leaders and business leaders, other IT roles involved in this initiative are:

- Chief information officers
- Enterprise architecture and technology innovation leaders
- Infrastructure and operations leaders

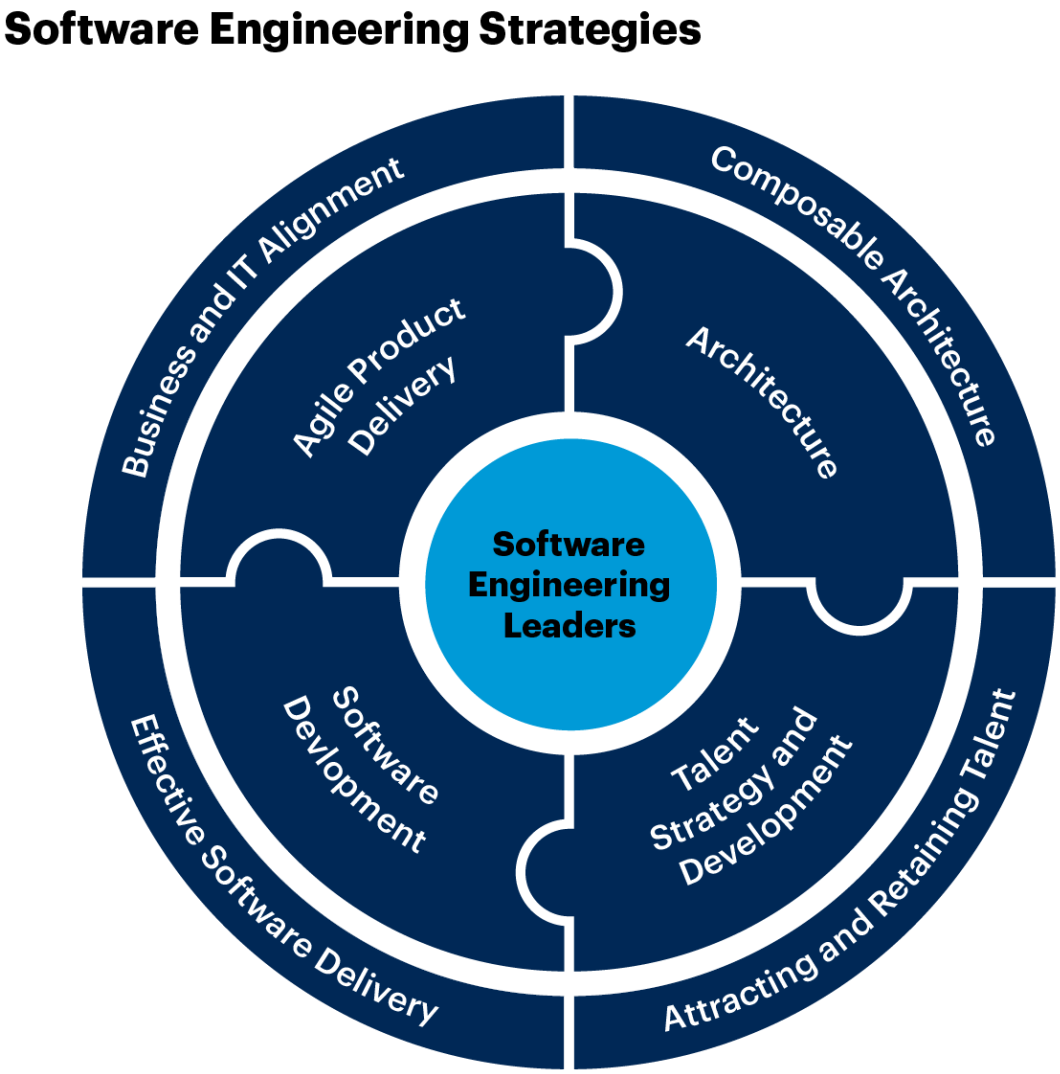
The topics we cover include:

- **Agile product delivery:** Transition and scale to a properly funded and managed, product-centric delivery model that drives faster time-to-market, continuous improvement and innovation.
- **Architecture:** Apply the patterns, principles and practices that guide the structure and emergent design of applications and products, to enable the move to a more composable business.
- **Software development:** Use proven techniques to deliver secure and scalable software that creates competitive advantage.

- **Talent strategy and development:** Create and maintain effective teams by attracting and retaining engineering talent, while fostering an inclusive culture.

Analysis

Figure 1: Software Engineering Strategies Overview



Source: Gartner
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In software engineering, it often seems like the problems never change. The challenges that we faced yesterday are still challenges today. The topics covered at a 1968 NATO Science Committee conference on “software engineering” (around reliability, scheduling and education) look very familiar. [1] It would be easy to say nothing has changed.

The way that software engineering has changed is analogous to the way cars have changed in the last half century. Cars still have doors, engines and steering wheels, but now they perform better and employ AI. They have improved security and increased resilience in order to better withstand an accident. Software engineering leaders are grappling with age-old challenges, such as those around maintainability and scalability. However, they also need to cope with the needs of new application architectures, platforms and infrastructures. The proliferation of applications introduces new users with diverse requirements and expectations.

This evolution of software engineering has expanded the scope of a software engineering leader's job. It is not, as often thought, only about delivering code. On a daily basis, software engineering is concerned with skills shortages, scaling, security, team morale, open source, emergent technologies, legacy solutions and attracting the right talent. Some of these complement each other, while others are in direct conflict. In the center of it all is you — your leadership, your strategies and your empathy. You are at the nexus of business and technical domains, between strategy and implementation. As such, you are in a perfect position to enact positive change.

Our research will help you deliver that change by providing the most efficient and effective ways to deliver resilient and adaptable applications that meet business demands.

Topics

Software engineering leaders face many different challenges when leading their teams into the digital business world. You must use the right skills, tools and technologies to maintain a fresh portfolio, retain precious personnel and keep teams engaged. You must tackle that legacy monolith in order to unlock agility and the capabilities it can provide to business. Above all, you must deliver customer value through the right features, combined with the right methodology and the right quality.

Our research in this area addresses the following topics:

Agile Product Delivery

Agile product delivery promises shorter time to market, enhanced ability to manage changing priorities, and better synergy between IT, business and finance. The entire enterprise must learn to operate in agile ways — affecting culture, people, skills, funding, governance, development methods, tools and application architecture. The 2020 Achieve Business Agility With Automation, Continuous Quality and DevOps Survey found that agile was the top skill invested in for software quality.

Questions Your Peers Are Asking

- How can organizations develop agility at scale across the enterprise?
- How should software engineering leaders choose between the various approaches to scaling agile, including enterprise agile frameworks?
- How do we measure whether or not we are succeeding in our agile transformation?
- How can we transition from a project-centric delivery model to a product-centric operating model?
- How do we align our agile operational metrics with our corporate strategic objectives?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- Overcome Objections and Sell the Benefits of Moving From Projects to Products and Agile
- Toolkit: Move the Funding Model From Project to Product Starting Today
- Market Guide for Enterprise Agile Frameworks
- Case Study: Accelerated Product Team Delivery Through Strategic Dependency Management (Ford)
- Client Question Video: What Are the Four Keys to a Successful Agile Transformation?
- How Software Engineering Leaders Can Use Value Stream Metrics to Improve Agile Effectiveness

Planned Research

- Research on managing platforms as products
- Research on adapting application support for a product delivery environment
- An Ignition Guide to creating a resource allocation plan for product management teams
- A Client Question Video offering an overview of the Spotify model and insights into how to make it work
- An Agile Transformation Roadmap (update)

Architecture

Architecture prevents misalignment, reduces wasted effort and averts a descent into chaos. As you aim to promote a total experience mentality, and as the barrier to entry for application development is lowered with low-code platforms, your architecture decisions must guide the front end, while evolving the back end. Mesh app and service architecture (MASA), API platforms and event processing help form the foundations of resilient and agile digital businesses.

Questions Your Peers Are Asking

- How can we best apply modern application architecture to optimize our efforts to achieve targeted business outcomes?
- What application architecture patterns and principles do I need to enable digital business?
- What are the key trends in platform architecture that will support digital business?
- How should I tackle the legacy, monolithic applications in our portfolio?
- How does composable application architecture affect the design practices for new applications and application modernization?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- Adopt a Mesh App and Service Architecture to Power Your Digital Business
- Mediated APIs: An Essential Application Architecture for Digital Business

- Maturity Model for Event Driven Architecture
- Strategic Architecture Roadmap for Composable Enterprise Applications (Presentation)
- Leading Teams to Success With Microservices Architecture

Planned Research

- Not Just Microservices: Choose the Right Service Granularity for Your Applications (update)
- Innovation Insight for Microservices Orchestration Engines
- A Quick Answer on the essential patterns that microservices should follow for successful use in production environments
- A video on how a service mesh and API gateways relate to each other

Software Development

The era of centralized IT owning all applications and managing code factories is fading away. Software development is not just focused on writing code. It is concerned with, for example, security, quality, reusability, interoperability and scalability. According to Gartner's 2021 View From the Board of Directors Survey, 69% of surveyed boards responded to COVID-19 with digital business acceleration. Organizations must navigate this world of democratized development and composable applications.

Questions Your Peers Are Asking

- Where should we choose low-code and no-code development, rather than traditional coding?
- How can we attract, train and retain skilled developers?
- What are the key trends in development methodologies that support digital business?
- What are the best practices to improve delivery effectiveness and reduce delivery friction?
- How should we align our software engineering strategies with corporate priorities and objectives?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- 3 Steps to Integrate Security Into DevOps
- Quick Answer: What Is the Difference Between No-Code and Low-Code Development Tools?
- Quick Answer: How to Create a Frictionless Onboarding Experience for Software Engineers
- How to Design Enterprise Applications That Are Composable by Default
- Quick Answer: What Are the Best Practices to Improve Code Quality?
- Infographic: Artificial Intelligence Use-Case Prism for Software Development and Testing

Planned Research

- An Impact Appraisal document on Python
- A Quick Answer on application quality assurance for nonfunctional requirements
- Research into driving innovation by enabling “innersource”
- Infographic on the components required when building a software quality strategy

Talent Strategy and Development

Effective teams are key to delivering better organizational results in any industry. The difference in the field of software engineering is that the pace of change is not only rapid but constant. Technology, business and skills requirements demand a robust talent strategy that develops the software engineering workforce of today to meet the demands of tomorrow.

Questions Your Peers Are Asking

- How can we attract, develop and retain the right people?
- How can we build and support high-performing teams?
- What people skills and practices are key to successful software engineering?
- How should our talent strategy promote a diverse, equitable and inclusive culture?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- How to Establish a Reskilling/Upskilling Talent Development Program for Software Engineering
- How to Help Software Engineering Teams Modernize Their Application Development Skills
- How to Help Software Engineering Teams Modernize Their Application Architecture Skills
- Proven Strategies to Drive Software Engineering Team Effectiveness

Planned Research

- Software Engineering Jobs Description Library
- A data-based view of the software engineering talent market
- Research into software engineering career paths
- Advice on how to attract and retain talent

Suggested First Steps

- IT Score for Applications
- Avoid Agile Transformation Failure by Using Agile Coaches
- How to Use Product Roadmaps for Funding and Governance of Agile Product Delivery Teams
- How a Service Mesh Fits Into Your API Mediation Strategy
- Quick Answer: How to Create a Frictionless Onboarding Experience for Software Engineers
- Client Question Video: How Do I Get Started With Agile?
- Quick Answer: What Are the Best Practices to Improve Code Quality?

Essential Reading

- Magic Quadrant for Enterprise Agile Planning Tools
- Overcome Objections and Sell the Benefits of Moving From Projects to Products and Agile
- Use Gartner's Reference Model to Deliver Intelligent Composable Business Applications
- Adopt a Mesh App and Service Architecture to Power Your Digital Business
- Magic Quadrant for Enterprise Low-Code Application Platforms
- How to Establish a Reskilling/Upskilling Talent Development Program for Software Engineering
- Product Management Roles and Team Composition in Large Enterprises

Tools and Toolkits

- Tool: How to Use Product Roadmaps for Funding and Governance of Agile Product Delivery Teams
- Toolkit: Assess Your Product Management Organization to Scale for Digital Business Success
- Toolkit: Product Management and Roadmapping Tools Vendor and Product Data
- Toolkit: Move the Funding Model From Project to Product Starting Today

Evidence

Gartner's 2020 Achieve Business Agility With Automation, Continuous Quality and DevOps Survey was conducted online from June through August 2020 with 205 respondents who worked for service providers, cloud providers and end-user organizations that had deployed or were using DevOps. Respondent organizations came from North America and Western Europe.

Qualified organizations had at least $500 million in annual revenue and were required to operate primarily in one of the following sectors:

- Banking and financial services
- Government
- Insurance
- Healthcare provider
- Retail

Respondents were required to work in their organization's IT function, have a job title less senior than C-level, and be two or more layers away from the most senior executive in their organization. Their role had to focus on application development, infrastructure and operations, or on business intelligence and information management. For these focus areas, respondents were also required to perform relevant roles or activities.

The results of this survey do not represent global findings or the market as a whole. They reflect the sentiments of the respondents and companies surveyed.

Gartner's View from Board of Directors Survey 2021 was conducted to understand how boards of directors (BoDs) view digital-business-driven business model evolution, and its effects on their enterprises. It also aimed to understand the expectations that BoDs have of executive leaders, and the ways in which BoDs translate their focus into executive action and overall corporate performance.

The primary research was conducted online May through June 2020 with 265 respondents from the U.S., EMEA and Asia/Pacific. Companies were screened to be midsize, large or global enterprises.

Respondents were required to sit on a BoD or be members of a corporate BoD. If they served on multiple BoDs, respondents answered for the largest company for which they were a board member (defined by its annual revenue).

The study was developed collaboratively by Gartner analysts and Gartner's research data and analytics team.

[1] Report on a Conference Sponsored by the NATO SCIENCE COMMITTEE (Garmisch, Germany, 7th to 11th October 1968), School of Computing at the University of Newcastle.

The following topics were discussed at the 1968 NATO Conference on Software Engineering:

- The problems of achieving sufficient reliability in the data systems which are becoming increasingly integrated into the central activities of modern society
- The difficulties of meeting schedules and specifications on large software projects
- The education of software (or data systems) engineers

Document Revision History

Software Engineering Strategies Primer for 2021 - 4 February 2021

Related Priorities

Initiative Name	Description
Applications and Software Engineering Leaders	Application and software engineering leaders will face challenges in changing to meet the demands of 2021. Use this research to drive changes to support an effective, dynamic application environment.
Software Engineering Technologies	We help organizations build and improve technologies to create and scale differentiated, innovative digital products that support digital business demand.

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