Software engineering leaders must transform themselves and their organizations to become more resilient, adaptable and effective. Our research will help organizations to lead, innovate and continually optimize their development strategy to achieve these goals.

**Scope**

Gartner’s software engineering strategies research helps organizations to optimize delivery of effective digital products, equipped 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 attract, grow and retain staff, while delivering software that drives competitive advantage.
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. 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 resilience and scalability. However, they also need to cope with the needs of new application architectures, platforms and infrastructures. The increased 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 resilience, scaling, security, team morale, open source, low code, managing stakeholders, emergent technologies and legacy solutions. 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 to our corporate strategic objectives?

Recommended Content

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

- Break Through the Barriers to Scaling Agile and Product-Centric Delivery
- Overcome Objections and Sell the Benefits of Moving From Projects to Products and Agile
- Use the Right Metrics in the Right Way for Enterprise Agile Delivery
- Toolkit: Move the Funding Model From Project to Product Starting Today
- 10 Essential Practices for Success in Implementing the Scaled Agile Framework (SAFe)
- Market Guide for Enterprise Agile Frameworks
- Case Study: Accelerated Product Team Delivery Through Strategic Dependency Management (Ford)
Planned Research

- Magic Quadrant for Enterprise Agile Planning Tools
- Managing platforms as products
- Adapting application support for a product delivery environment
- How to Get Started with Agile (Video)
- Ignition Guide to Creating a Resource Allocation Plan for Product Management Teams

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 for addressing 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 do I tackle the legacy, monolithic applications in the 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
Planned Research
- Application architecture maturity model
- Being successful with microservices architecture
- Not Just Microservices: Choose the Right Service Granularity for Your Applications
- Innovation Insight for Microservices Orchestration Engines

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 do we choose low-code and no-code development over 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 do we align our software engineering strategies to corporate priorities and objectives?
Recommended Content

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

- Magic Quadrant for Enterprise Low-Code Application Platforms
- How to Help Software Engineering Teams Modernize Their Application Development Skills
- 3 Steps to Integrate Security Into DevOps
- How to Establish a Reskilling/Upskilling Talent Development Program for Software Engineering
- 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

Planned Research

- How to create top-rated composable applications
- Drivers of software delivery effectiveness
- How to Build a Testing Strategy
- How Software Engineering Leaders Can use Value Stream Metrics to Improve Agile Effectiveness
- Impact Assessment on Python
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
- Application Leaders: Master Composable Enterprise Thinking for Your Post-COVID-19 Reset
- Quick Answer: How to Create a Frictionless Onboarding Experience for Software Engineers

Essential Reading

- Magic Quadrant for Enterprise Agile Planning Tools
- Overcome Objections and Sell the Benefits of Moving From Projects to Products and Agile
- Becoming Product-Centric Should Be an Evolution, Not a Top-Down Transformation
- 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
**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 among 205 respondents working for service providers, cloud providers and end user organizations that have deployed or are 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 primarily operate in either:

- Banking and financial services
- Government
- Insurance
- Healthcare providers
- 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. Respondent’s role had to be primarily focused on application development, infrastructure and operations, or business intelligence and information management. For these focus areas, respondents were also required to perform relevant roles or activities.

Results of this study do not represent global findings or the market as a whole but reflect sentiment 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 to actual executive action and overall corporate performance.

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

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

The study was developed collaboratively by Gartner Analysts and the Research and Data 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.
## Related Priorities

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Position your IT organization for success. Explore these additional complimentary resources and tools for software engineering leaders.

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3 Digital Priorities for Software Engineering Leaders
Discover three priorities to enable digital transformation.

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Accelerate Digital for Future-Ready Business
Guide for software engineering leaders to drive digital momentum.

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