

# Digital Transformation Demands New Digital DNA for Application Development

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Cloud, mobile, big data and social technologies have impacted application development, but new digital disruptions are forcing change even faster. Application leaders must splice new "digital DNA" into their culture, processes and technologies to transform into top performing organizations.

## Overview

### Key Challenges

- The cultural and structural composition of application development organizations are the main barriers to digital innovation, and application leaders struggle with how to make changes.
- Most development organizations have not institutionalized modern processes, such as enterprise agile and DevOps, so they are unable to increase the velocity of their digital transformation.
- "Killer" apps and digital experiences require modern tools, platforms and services that offer greater simplicity, but application leaders struggle to blend the new with the old.

### Recommendations

Application leaders responsible for development strategies for digital business need to:

- Hack the culture with small-but-powerful steps, such as redefining teams, roles and personas to drive greater collaboration and innovation.
- Institutionalize "product thinking" into development processes that support continuous improvement and delivery with clear customer value.

- Invest in new multiexperience technologies that maximize mesh app and service architecture (MASA), thereby improving the agility and quality of application development.

## Strategic Planning Assumption

By 2020, IT development organizations that have embraced the product model will deliver 40% more differentiated software than the competition that has not.

## Introduction

Leading companies build more software themselves, and they wield it as a competitive advantage in the market. According to a 2017 Gartner CIO survey, the top performing organizations, on average, expect to develop 40% of their new critical solutions in-house, which is significantly higher than what typical and trailing performers reported (31% and 26%, respectively). The main reason for this internal development need is because these organization's differentiating capabilities cannot be found via packaged SaaS or commercial off-the-shelf (COTS) applications.

**The gap between the software development "haves" and "have nots" is growing wider every year.**

Application development organizations face an increasing rate of change, driven by IT disruption on numerous fronts, including artificial intelligence (AI), conversational and immersive technologies. Gradual evolutionary steps are insufficient to catch (or leapfrog) competitors in your sector. The speed of change and innovation is stretching the capacity of application development organizations well beyond the breaking point of traditional best practices (see "Application Development Strategies for Digital Business Primer for 2018"). Application leaders need to move quickly to alter their team dynamics, processes and technology capabilities with new digital DNA – in the form of new thinking, roles, methodologies, tools and services.

**Figure 1. Transform Your In-House Application Development Competency With Digital DNA to Become a Top Performer**

Source: Gartner (May 2018)

Application leaders responsible for digital business development strategies must deftly infuse new digital DNA to scale, accelerate and simplify internal development capabilities. Use this framework to drive alignment across culture, process and technologies by transforming development competencies to drive digital innovation.

## Analysis

### Hack the Culture With Small-but-Powerful Steps

Peter Drucker's famous quote is more relevant than ever: "Culture [still] eats [digital] strategy for breakfast" is true from the C-suite on down to the individuals in IT development teams. In a 2018 Gartner CIO survey, CIOs cited "culture" as the greatest barrier to scaling digital business. Similarly, in a Gartner survey on DevOps adoption, team culture was cited as the "people-related" aspect of scaling DevOps with the most important impact. Application leaders must address culture within development organizations by introducing new team structures, roles and personas.

But "blaming culture" for application development challenges is like blaming everything and nothing. Application leaders should not try to tackle a massive "culture change" initiative. Instead, they should "hack" at the culture (see "The Art of Culture Hacking"). Small-but-powerful hacks must have four characteristics: emotional, immediate, visible and low-effort, but not low courage (see Table 1). Ideally, hacks should be self-sustainable, which reinforces the behaviors you seek without your intervention. Designing sustainable hacks avoids both one-offs that don't achieve lasting change and backsliding to old behaviors.

**Table 1: Sample Hacks to Shake Up Your Organizational Culture**

Problem ↓	Hack ↓	Description ↓	Outcome ↓
Too many people are in meetings or meetings run too long.	Only do stand-up meetings	A technique used in agile development, this can be applied to nearly any meeting to keep the meeting short and to the point.	Fifteen minute meetings can reduce the need to have large meetings and can drastically cut the duration of meetings.

Problem ↓	Hack ↓	Description ↓	Outcome ↓
IT staff are too focused on everyday tasks and default to an analytical way of thinking that isn't useful for creativity and innovation.	One-minute drawing	To kick off an innovation meeting, ask people to draw a concept, like "creativity," in under one minute using no words, and then have everyone describe what they drew.	In under five minutes, participants' mindsets shift to become more creative. The meeting atmosphere changes, signaling that this isn't your average operational meeting.
Tracking down the right people or information and getting quick updates are difficult.	Move to chat tools	Known as ChatOps, under DevOps, adopt a habit of using a messaging-oriented platform for collaboration, sharing and discussion for wider work scenarios.	Moving to familiar chat style communications that we all use personally can reduce the frequency and number of emails, and information flows more quickly and easily to allow work to continue.
IT teams often appear to be out-of-touch with the business and not focused enough on value and customers.	Creative project names	Name every project after the benefit you expect it to deliver. For example, the "double-our-margins project" or the "cost redux project."	The project name alone makes IT more focused on value and less IT-centric. Avoids fuzzy names like "Raptor" or "Phoenix."

Source: Gartner (May 2018)

As part of new digital DNA for culture, application leaders must also assign or hire new critical roles:

- **Product manager:** Transitioning work from a one-off project focus to delivering business capabilities that are improved over time will require the introduction of a product manager role (see "Moving From Project to Products Requires a Product Manager").
- **Product owner:** Agile product delivery must also have product owners to maximize business value and achieve desired outcomes. This is a high-profile role that requires a variety of "soft" skills and demonstrable business experience (see "How to Staff the Product Owner Role").
- **API product manager:** Treating APIs as products with an accompanying product life cycle increases the chances of digital business success (see "Create the Role of API Product Manager as Part of Treating APIs as Products").
- **Platform manager:** Define platforms for digital business as practical units of management by aligning them with business capabilities and stakeholders. Platform managers help delegate governance down the logical product structure (see "How to Govern a Digital Business Technology Platform").
- **DevOps leader:** Identify transformative leaders to lead DevOps efforts, develop their abilities and apply a management approach that will position these leaders for success (see "How to Find, Develop and Manage Transformative DevOps Leaders").

You must also embrace business users to embody citizen X personas:

- **Citizen developer:** Application development outside of IT control continues to expand as digital transformation accelerates. An effective partnership between application leaders and business leaders is essential to achieve positive results and to avoid negative consequences as a context for citizen development emerges (see "Citizen Development Is Fundamental to Digital Transformation").
- **Citizen integrator:** Business users are increasingly leveraging integration software as a service for simple integration tasks. Because their requirements typically do not distinguish between application and data integration, application leaders must be prepared to address demand for frictionless integration (see "Citizen Integrators Bring Application and Data Integration Into a Common Focus").

- **Citizen tester:** The way that applications are tested is changing. In addition to increased test automation, the use of real users to be part of the testing cycle is increasing, especially with mobile apps and interactions with nonstandard devices. Citizen testers are individuals within the enterprise that participate in the testing of apps to add real user feedback.

Not every culture hack will work, but every hack can teach you something. Keep them small to limit the damage when they don't work, and scale up the ones that do.

## Institutionalize "Product Thinking" Into Development Processes

Leading IT organizations choose products over projects, and more are moving in that direction (see Figure 2). This means big changes within the application development team to evangelize and adopt "product thinking." In digital business, Gartner defines a "product" as a named collection of business capabilities valuable to a defined customer segment (see the [IT Glossary definition](#) ([../..../Users/JASWONG/AppData/Local/Temp/notesAF3A78/IT Glossary definition](#))). Although products (in the context of digital business) principally serve external customers, software organizations can also apply a product model to any collection of business capabilities delivered in a coherent value stream to internal customers (see "Flattening the Application Organization – Everyone Must Be Part of the Agile Value Stream").

### Figure 2. Product Management in IT Is Growing

Source: Gartner (May 2018)

Moving to "product thinking" means that application leaders need to introduce digital DNA into development processes to support product managers and product owners, allowing for continuous improvement of the product. Product management plays a crucial role with the authority to drive digital business success by orchestrating all relevant stakeholders to manage a continually evolving digital strategy. The product owner is responsible for maximizing the value of the product by ensuring that the product backlog is aligned with the desired business outcomes and customer value.

To succeed today, application leaders must adapt their process, culture and style to align closely with the lean and agile delivery practices that product teams prefer. This means that application leaders must meld with lean, cross-functional teams, rather than standing apart. Fortunately, lean and agile delivery defines product roles and deliverables (such as the product owner and product backlog), so this is a natural blending of cultures (see "Mastering the Role of Products in the Digital Era"). The shift to product thinking also requires application leaders to:

- Use the concept of "product" to focus the organization on delivering a competitive set of business capabilities to a defined customer audience or market segment over an extended period. Product management for digital is most useful when implemented as part of an agile transformation that features design thinking and lean delivery, with the ultimate goal of making the customer happy.
- Apply lean practices to product management to maximize its relevance in the digital era. Product management should be an integrated part of the lean, cross-functional teams that deliver products.
- Manage the digital business platform as products, too, so that you can manage the continuous backlog of platform work in a way that will maximize value across the product lines and ecosystems that rely on that platform. This also pushes the prioritization decisions back on the business because it has to decide which items of work are the most valuable.

Lean and agile delivery teams need effective product management as much as product management needs agile delivery. The 2017 Gartner Agile in the Enterprise Survey, conducted in the fourth quarter of 2017, revealed that 77% of surveyed development organizations have considered or already implemented an enterprise agile framework. This represented significant increases of 7% over 2016 and 15% over 2015.

However, a significant challenge to meeting the demand of continuous improvement through agile development is the definition of "done" (see "Avoid Chaos in Agile Development by Defining When a Story Is 'Done'"). A project mentality is the byproduct of waterfall that impedes the shift to delivering business outcomes. Similarly, the overemphasis on individual productivity instead of consistent team practices and organizational objectives is the byproduct that impedes the ability to scale across teams reliably. When products are composed of features developed by multiple teams, the products' consistency, quality and predictability depend on the use of consistent practices across those teams. Agile application development organizations adopting key XP practices – including refactoring, pair work, test-driven development, continuous integration, automated testing and deployment – are more successful (see "Scrum Is Not Enough: Essential Practices for Agile Success" and "Survey Analysis: Agile Now at the Tipping Point – Here's How to Succeed"). Those organizations are not only more successful, they are prepared to scale (see "Solving the Puzzle of Lean/Agile Transformation").

## Invest in New Multiexperience Technologies That Maximize MASA

Most organizations' application portfolios comprise myriad siloed application systems with inflexible, monolithic architectures. Core capabilities are trapped inside these monoliths and are often redundantly implemented in multiple applications. Surfacing this functionality to build "killer" apps that are fit-for-purpose is not easy or inexpensive. Top-performing organizations are moving toward modern application architecture best practices using MASA to support fit-for-purpose apps and enable core runtime functionality (see "Adopt a Multigrained Mesh App and Service Architecture to Enable Your Digital Business Technology Platform").

MASA is an overall architecture for building modern apps and services that replaces client/server architecture. The basic concepts of MASA and many of its core technology enablers (for example, containers and cloud-native applications) are becoming mature and understood. So MASA is becoming a baseline for new trends in solution architecture and application development:

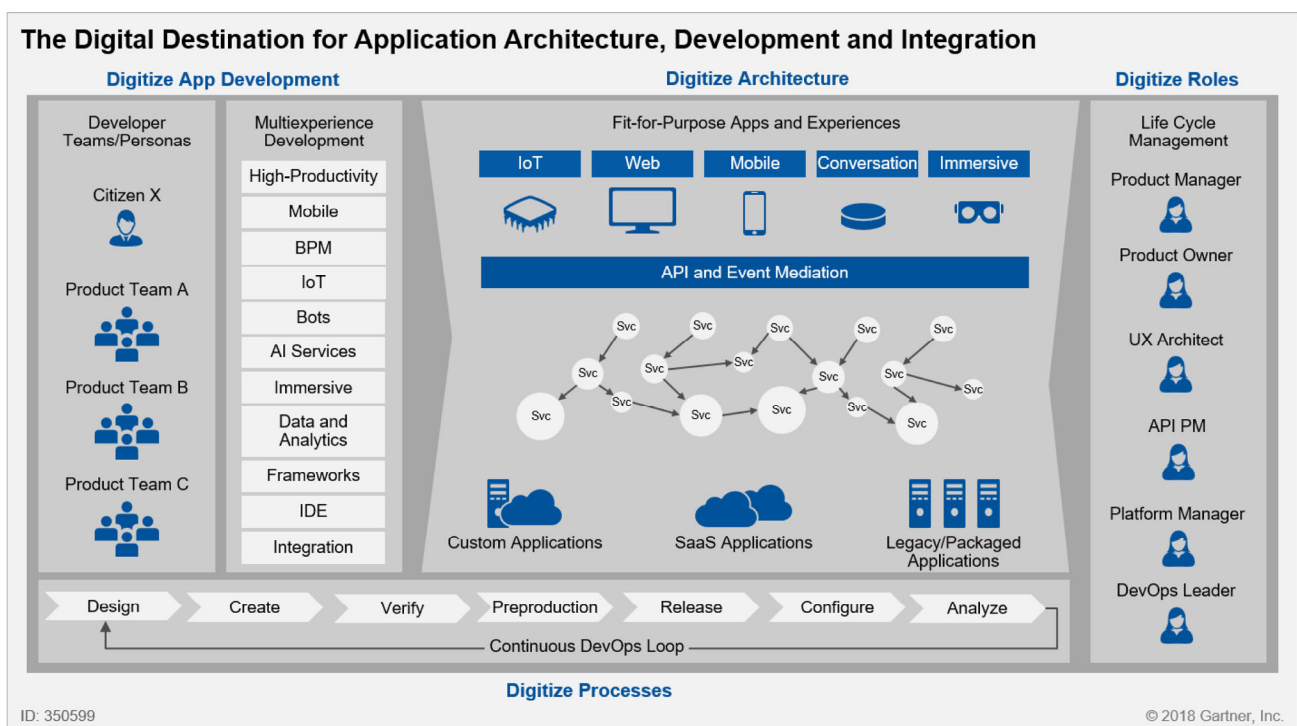
- MASA supports optimized user experiences, multiple client channels, cloud-native performance and continuous delivery of new features.
- A MASA application is made up of multiple apps (supporting different personas and interface channels) and numerous autonomous services (implementing workflow, algorithms and data management), which together support a business domain.



- MASA applications leverage leading-edge architectural models and infrastructures such as mediated APIs, microservices, event-driven architecture (EDA), platform as a service (PaaS), containers and serverless computing.

In order to capitalize on MASA and realize its full potential, development organizations have to embrace new UX design constructs and development technologies that can best leverage MASA and simplify the development of front-end apps and experiences. This modern development environment must also support product-oriented development teams, as well as citizen developer and integrator personas, and it must support the continuous DevOps processes connecting development and runtime environments (see Figure 3).

**Figure 3. The Digital Destination for Application Architecture, Development and Integration**



Source: Gartner (May 2018)

MASA sets the stage for the evolution of these multiexperience development platforms to create more purposeful and targeted apps. These apps not only run on the web and mobile devices, but also extend across new experiences across the emerging digital device mesh. User attention is shifting away from individual apps and splintering across emerging technologies, such as chatbots, virtual personal assistants, augmented reality (AR) and virtual reality (VR) experiences, and conversational UIs. A single application is no longer the

final destination. Thus, finding the right mix of development tools harnessing common MASA services will be crucial for scale and speed.

The rising need to support more user touchpoints is driving the emergence of multiexperience development (see "Technology Insight for Multiexperience Development Platforms"). Application leaders need to embrace and acquire new platforms and tools based on the ability to:

- Provide high-productivity development tooling for professional and citizen developers to easily build new apps and experiences with little or no coding.
- Support popular integrated development environments (IDEs) and frameworks via platforms' software development kits (SDKs) and APIs that professional developers need to use to build high-fidelity user experiences.
- Integrate to systems of record with data connectors and adaptors, along with API and event mediation services.
- Offer supplemental app services – not found in systems of record applications – that can be leveraged and reused within MASA, such as offline data synchronization, locations services, image recognition and NLP services.
- Leverage built-in or third-party tooling for DevOps practices to enable continuous integration and delivery.
- Address the requirements of diverse enterprise use cases, including external-facing and internal-facing scenarios, to support a unified digital experience.

Application leaders must push existing vendors to align their roadmaps and show ability to evolve to address these new interactions. You also must not be hesitant in exploring emerging tools and technologies that will be better-suited for a MASA and multiexperience focus.

## Evidence

**2017 Gartner CIO Survey:** The 2017 Gartner CIO Survey was conducted between 8 May and 9 July 2016, based on a number of hypothesis developed by the Gartner CIO research community. The sample included 2,598 organizations from 93 countries, representing approximately \$9.4 trillion in revenue/public-sector budgets and \$292 billion in IT spending. The respondents were members of Gartner Executive Programs and other IT leaders. The

sample was segmented into digital performance groups based on participants' responses to two questions. See "2017 CIO Agenda: Seize the Digital Ecosystem Opportunity" for more information.

**2018 Gartner CIO Survey:** The 2018 Gartner CIO survey was conducted online from 20 April to 26 June 2017 among Gartner Executive Program members and other CIOs. Qualified respondents are the most senior IT leader (CIO) for their overall organization or a part of their organization (e.g., a business unit or region). The total sample is 3,160, with representation from all geographies and industry sectors (public and private). The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested and administered by Gartner's Research Data Analytics team. The sample was segmented into digital performance groups: "Top," Typical" and "Trailing" based on responses to two questions. See "The 2018 CIO Agenda: Mastering the New Job of the CIO."

**Enterprise DevOps Survey 2017:** This research was conducted online from 15 September to 2 October 2017 among Gartner Research Circle Members – a Gartner-managed panel composed of IT or IT-business professionals. In total, 73 members who are using or piloting DevOps at their organization completed the survey. Qualified participants included business end users with either an IT or IT-business focus as a primary role. The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested and administered by Gartner's Research Data and Analytics team.

**2017 Gartner Agile in the Enterprise Survey:** This survey was conducted via an online survey in September 2017 among Gartner Research Circle members (a Gartner-managed panel comprising IT and business leaders). In total, 185 members participated. Qualified participants included business end users with either an IT or IT-business focus as a primary role.

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