Use Continuous Modernization to Build Digital Platforms From Legacy Applications

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FOUNDATIONAL This research is reviewed periodically for accuracy.

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Initiatives: Application and Product Portfolio Governance

Legacy application portfolios are often viewed as a problem and subjected to large-scale rip-and-replace efforts. Application leaders should instead manage their portfolio as an asset, removing impediments and executing continuous business-driven modernization to provide optimum value.

More on This Topic
This is part of two in-depth collections of research. See the collections:

- Creating Digital Value at Scale: A Gartner Trend Insight Report
- Getting to the Details of the Digital Platform: A Gartner Theme Insight Report

Overview

Key Challenges

- In many application modernization cases, the risk, cost, time and impact of "rip-and-replace" programs outweigh any potential benefits. Even if such a program is justified, organizations are often unwilling or unable to commit to one.
- Many of the data and functions that digital business initiatives require still reside in legacy applications (aka legacy systems).
- Application leaders are challenged to provide timely and continuous support for Mode 2 digital business initiatives, but legacy applications and their ecosystems are not ready to support such a delivery cadence.

Recommendations

Application leaders responsible for a strategy to build a digital business platform should:

- Exploit and extend the value of your legacy applications by removing obstacles, rather than viewing and treating those applications as a problem.

- Use continuous modernization as an alternative when a rip-and-replace program would be too costly, risky or time-consuming.
- Prioritize continuous modernization efforts by focusing on the friction points: business capabilities with poor application support.
- Transform your legacy application into a platform by identifying, prioritizing and removing obstacles for digital business one by one.
- Establish a continuous modernization culture combined with product and platform teams to align backlog and cadence across teams.

Strategic Planning Assumption

Through 2020, every $1 invested in digital business innovation will require enterprises to spend at least three times that to continuously modernize the legacy application portfolio.

Introduction

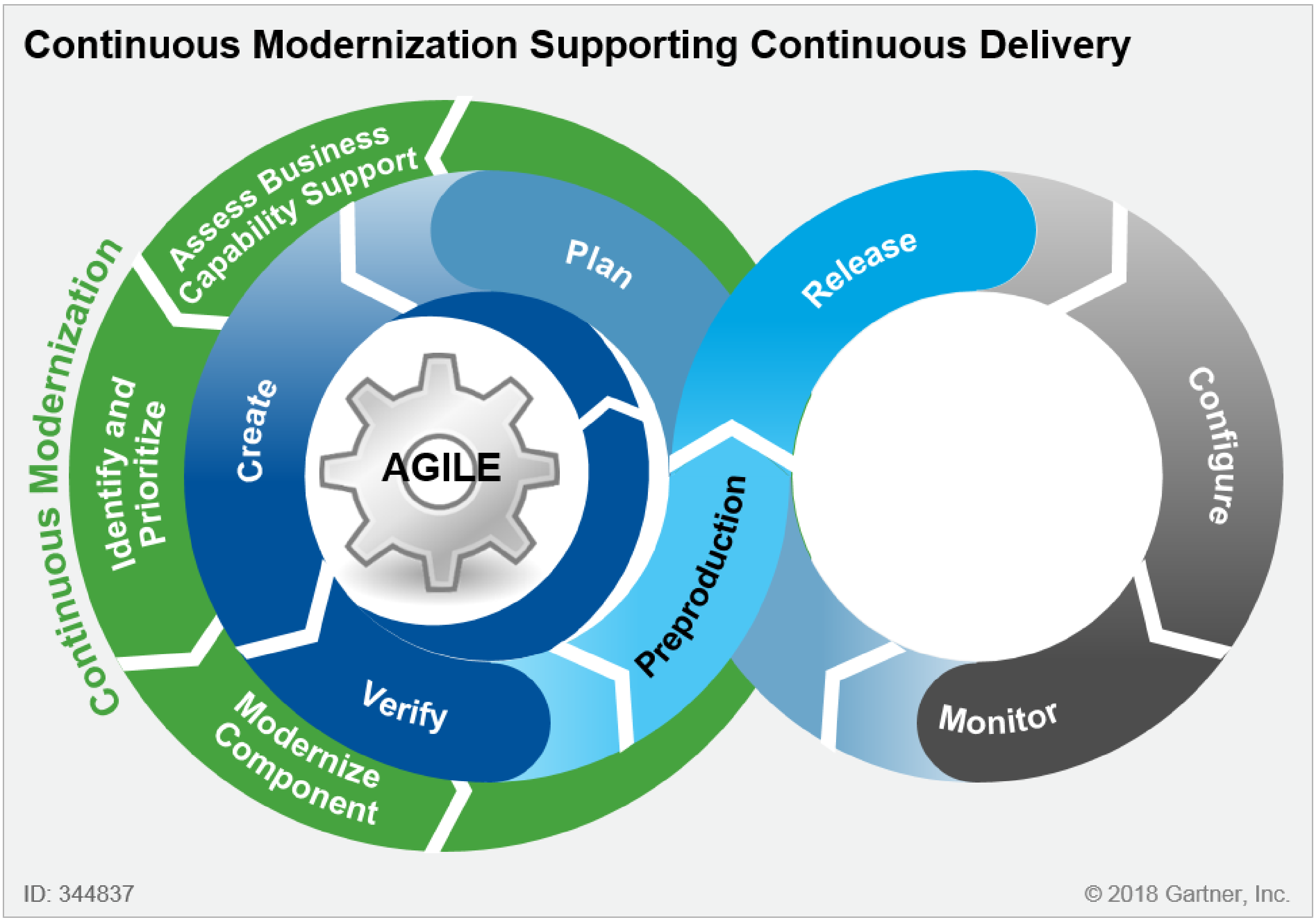
Digital business transformation is not "one thing" that happens at "one particular moment." It is a continuous process that explores and improves new business models as well as exploits new technology. CIOs and application leaders are trying to keep up with digital business demand by providing the best and most timely support for digital business initiatives. Each initiative creates additional demand, and IT needs agility and velocity to stay in sync or, better, stay ahead.

To support this, the application organization needs to go into a continuous delivery mode. But often, legacy applications are part of the value chain, and introduce impediments and delays with a negative impact on agility and velocity. Legacy applications contain valuable core functions and data that are essential for digital business initiatives. Application leaders should look to transform these legacy applications into the basis of a platform for digital business.

Rip and replace is in many cases too costly, risky and time-consuming, and has a high impact on the business. We advise organizations to instead take an iterative approach: continuous application modernization. Doing so will demand that you pave the way for digital business by understanding the impediments. Then you must prioritize these impediments and remove them one at a time.

Continuous application modernization is a gradual approach that focuses on providing digital business support and value in a timely manner. In other words: continuous delivery *requires* continuous modernization (see Figure 1).

Figure 1. Continuous Modernization Provides Digital Business Support and Value



Source: Gartner (January 2018)

Analysis

Exploit and Extend the Value of Your Legacy Applications

For most organizations, older or legacy applications are still the "center of gravity" within the application portfolio. This is demonstrated by size, spend, number, risk and other measurements.

They are containers of valuable data. They provide valuable functions. We should look at them as assets, not merely as problems, and ask ourselves how we can best utilize these assets as long as they are around. We should get them to play the role of a platform in the digital business application portfolio, providing valuable functions and data to digital products and services.

Older custom and package-based applications impose impediments that impact business agility and velocity. Older applications and their development ecosystems are often pressured by digital business demand, and considered slow and expensive to change. We must be conscious of these impediments and their causes, such as:

- They were not designed and built for digital business demand and pace of change.

- They may contain functions that are now better-suited to be delivered by other (and more modern) platforms and technology.
- They are closed systems — functions and data are not easily accessible.
- They are aging. We have not done a good job of managing them as assets, meaning that they have deteriorated over time: business fit, business value and agility have declined while cost, complexity and technical risk have increased.

All this doesn't mean that we need to discard them. In many cases, it is an 80/20 rule problem: 20% of the functions and features of an old application are causing 80% of the pain and concerns. Thus, 80% of the application is still fit for purpose. We often call these old applications "legacy" because they are causing us problems, but, according to the Gartner definition, they are not. An 80/20 situation is not actually "legacy," but a situation where we can salvage the application by addressing its technical debt, improving the application and/or modernizing its platform.

Gartner Definition: Legacy Application

One where the cost of addressing the technical debt exceeds the cost of replacement.

Further reading: "A Primer on Technical Debt"

We can see old and legacy applications as problems, or as opportunities with obstacles. Removing the obstacles can create an effective digital business platform.

Use Continuous Modernization as an Alternative to Rip and Replace

In some cases, a single and sequential modernization program might be the most efficient approach in removing technical debt and creating a digital platform. However, there are important reasons why gradually transforming legacy applications to platforms is often a better option:

- **Cost, risk and impact.** In many cases, to rip and replace whole systems is too costly, too risky, too time-consuming and comes with a significant impact on the organization. Is your organization willing and able to accept that?
- **We cannot wait.** Even if you are willing and able to go through a rip-and-replace approach, it will probably take a year or longer to execute. Digital business cannot wait that long. It needs support as soon as possible. As IT, you are probably on the backburner of that digital business initiative anyhow.
- **We cannot predict.** It is difficult to predict what kind of services and data upcoming digital business initiatives will require. New and changing demand will challenge your rip-and-replace project.

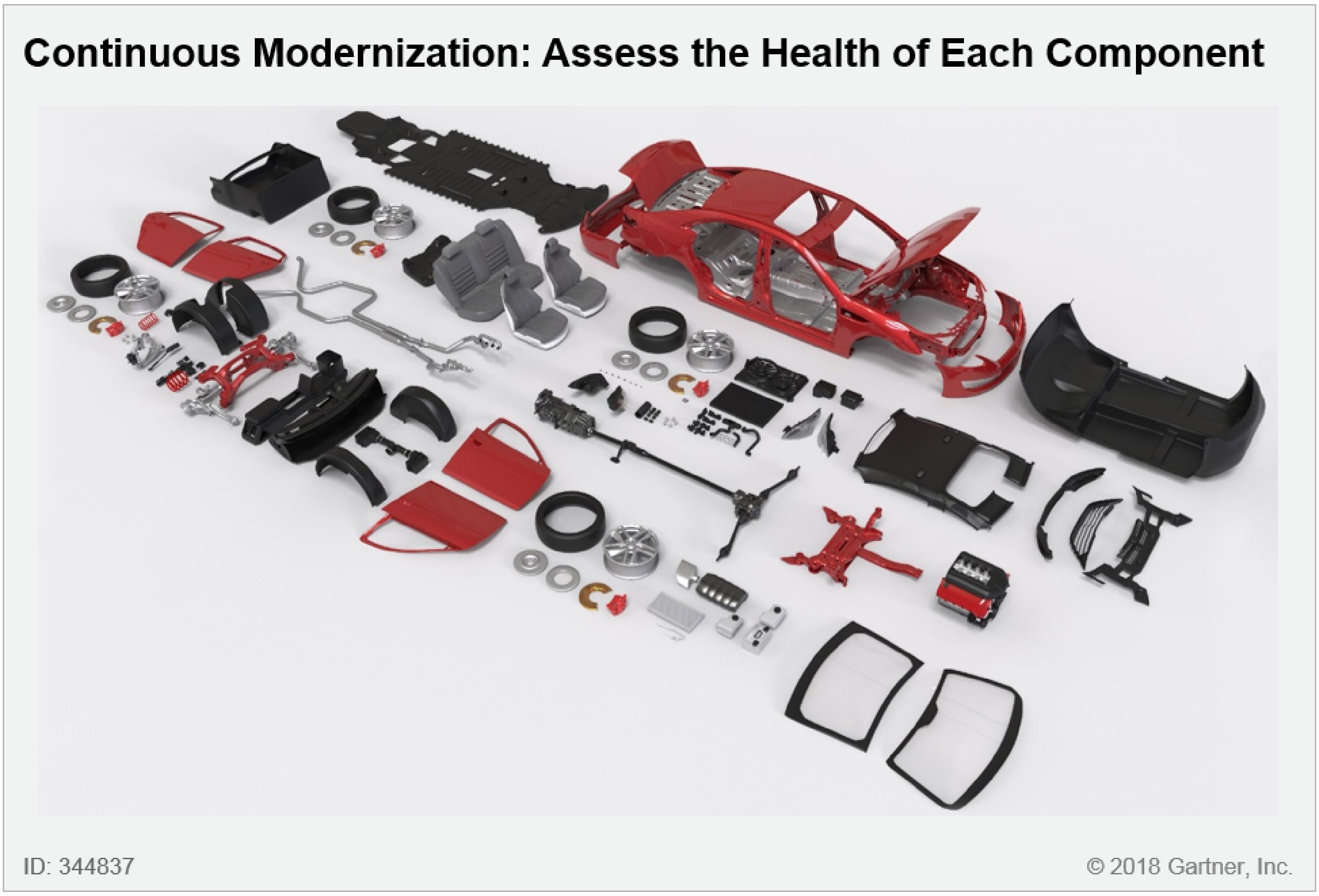
Making application modernization a continuous and gradual process will provide a way around these three challenges.

There's another reason why application modernization should be a continuous process: You are never finished. We often look upon legacy applications as those old mainframe applications from the 1970s and 80s. But when we are done modernizing them, new legacy applications will emerge such as client/server applications from the 90s as well as early Java and .NET applications. Technology ages and requirements change, constantly creating new legacy applications over time.

Prioritize Continuous Modernization Efforts by Focusing on Friction Points

How does continuous modernization work? Think about it in the same way you would overhaul a car (see Figure 2). You look at the individual components and assess their health and fitness for purpose. Do you need to clean it, repair it or replace it? If the majority of the components are worn out or bad, you have a "total loss." But in many cases, most are good enough. This means you have only to repair or replace some components in order to extend the life of the car and make it a valuable, safe and comfortable means of transportation.

Figure 2. Continuous Application Modernization Is Like Overhauling a Car



Continuous Modernization: Assess the Health of Each Component

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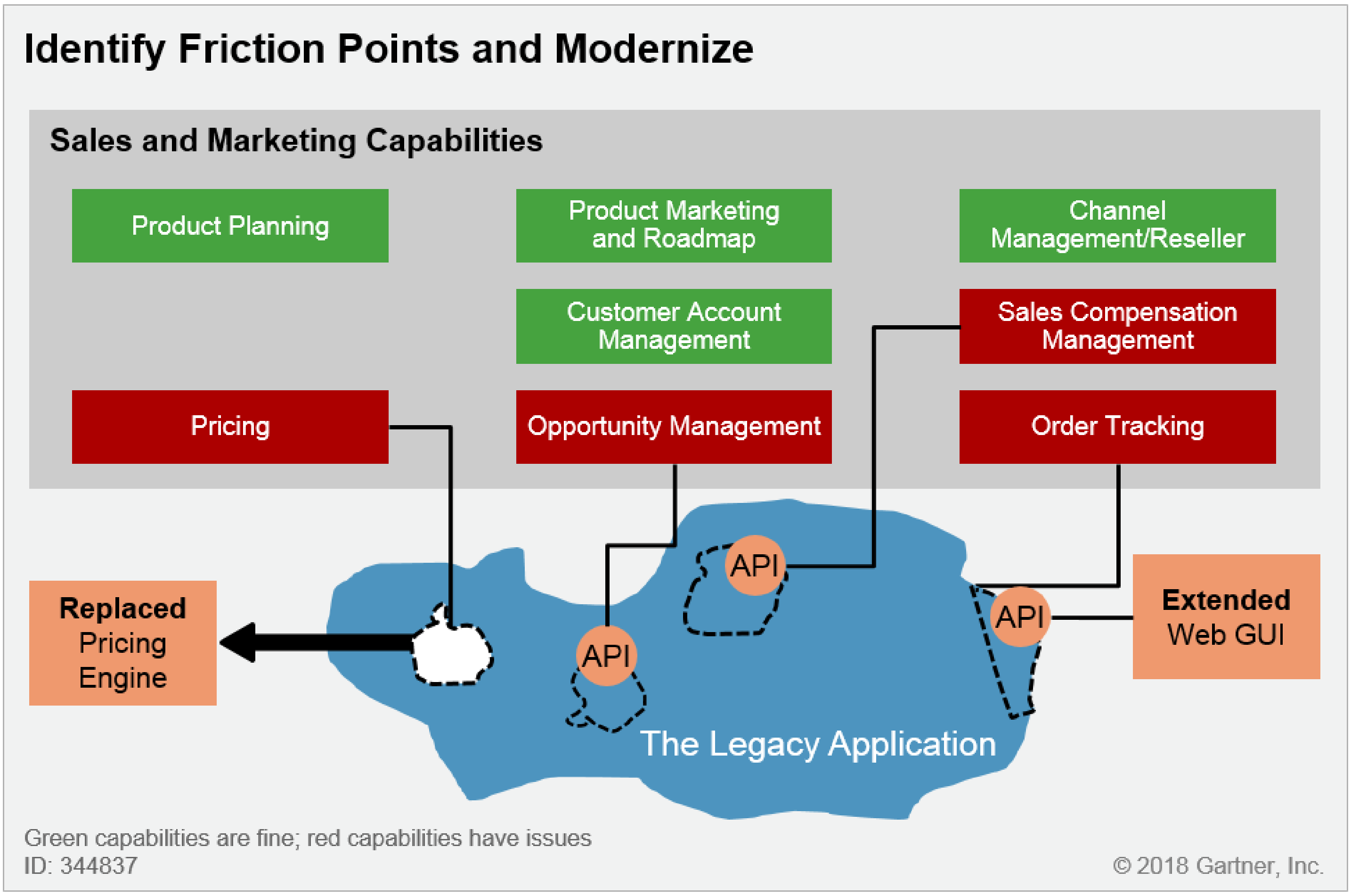
You can apply the same methodology to your legacy application by:

- Identifying the components that cause problems with business fit, value, agility, cost, complexity or risk.

- Assessing your legacy applications through a digital business lens.
- Identifying and prioritizing opportunities for improvement, and removing obstacles. These obstacles — or friction points — are points at which the technology platform and development ecosystem are not able to provide satisfactory support for a business capability or keep up with demand.
- Assess these friction points and decide what to do: clean, repair or replace.

Let's look at an example. Figure 3 shows a legacy application that supports business capabilities in the context of sales and marketing. We have assessed how well these business capabilities are supported. The green capabilities are fine, but the red ones have issues. These issues can be a combination of any of the modernization drivers we mentioned earlier: low business fit, value, agility, or high cost, complexity, or risk.

Figure 3. Identify and Remove Obstacles and Friction Points in a Legacy Application


Identify Friction Points and Modernize
Sales and Marketing Capabilities
Product Planning
Product Marketing and Roadmap
Channel Management/Reseller
Customer Account Management
Sales Compensation Management
Pricing
Opportunity Management
Order Tracking
Replaced Pricing Engine
API
API
API
Extended Web GUI
The Legacy Application

Green capabilities are fine; red capabilities have issues
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Source: Gartner (January 2018)

Each capability is supported by particular parts of the same legacy application. Instead of replacing the whole application, we can:

- Focus on modernizing parts of the application to improve support.
- Create services and add APIs to make particular functions and data accessible.

- Replace parts of the application or extend it with new functionality using more appropriate technology.

Take, for example, the "pricing" capability in Figure 3. Let's assume that pricing is a differentiating capability and the legacy application is not able to keep up with the rate of required change (e.g., to add subscription pricing). Changing pricing schemes comes with a high amount of effort, time, risk and cost. A solution might be to replace that functionality with a rule engine that is more flexible. This rule engine could be implemented outside of the legacy platform on a new technology platform or using a SaaS service, and integrated back into the legacy application via APIs.

It is not only the technology platform that is causing friction here — the whole ecosystem for this legacy application is not helping either. The technology, governance, methods, tools, processes, people, culture — all can be part of the friction. Basically, the pricing capability is supported by software that is implemented on the wrong technology platform, supported by the wrong ecosystem. Moving it to a better technology platform and a better ecosystem — for example, a rule engine managed by an agile team — will improve support drastically.

Another example is the requirement for a customer-facing "order tracking" function on the customer portal. We can support that requirement by implementing an API on the order tracking part to reuse the data and functions, and extend it by building a Web GUI on top of it. The Web GUI part is implemented in a suitable technology platform and supported by a development ecosystem that allows continuous improvement of that capability.

The process of continuous modernization is as follows:

1. Identify the business capabilities that are supported by the legacy application. Perform the assessment on a business-capability-by-business-capability basis.

2. Identify which components or parts or the legacy application are supporting each business capability.

3. Assess the support for each business capability and identify any modernization drivers, such as low business fit, value or agility, or high complexity, risk or cost. This assessment can be performed using Gartner's fitness and value review process (see "How to Assess Your Application and Product Portfolio for Business and Technical Fitness"). In this case, however, we are assessing the components and not the whole of the application (see "Use Bimodal and Pace-Layered IT Together to Deliver Digital Business Transformation").

4. Identify and prioritize the friction points with TIME analysis (see "Use TIME to Engage the Business for Application and Product Portfolio Triage"). Discuss them with business stakeholders to create a backlog of modernization activities.

5. For each selected modernization activity, analyze the cause behind the problem and select the appropriate modernization approach.

6. Execute the modernization to remove the friction points or obstacles and improve business support.

7. Re-evaluate the backlog to include any new or changed priorities.

8. Select the next activity from the backlog and go back to Step 4.

This approach has an interesting side effect. We are improving support for the business capabilities, but also relieving the burden and pressure on the legacy application. Instead of trying to make it to do something that it was never designed for, we are relieving it of those functions. This lowers demand, lowers the pressure to support velocity and agility, and leaves the legacy application with tasks that it can do best considering its technology platform and supporting ecosystem. This process might also create time and space to do some refactoring in the background.

Transform Your Legacy Application Into a Platform

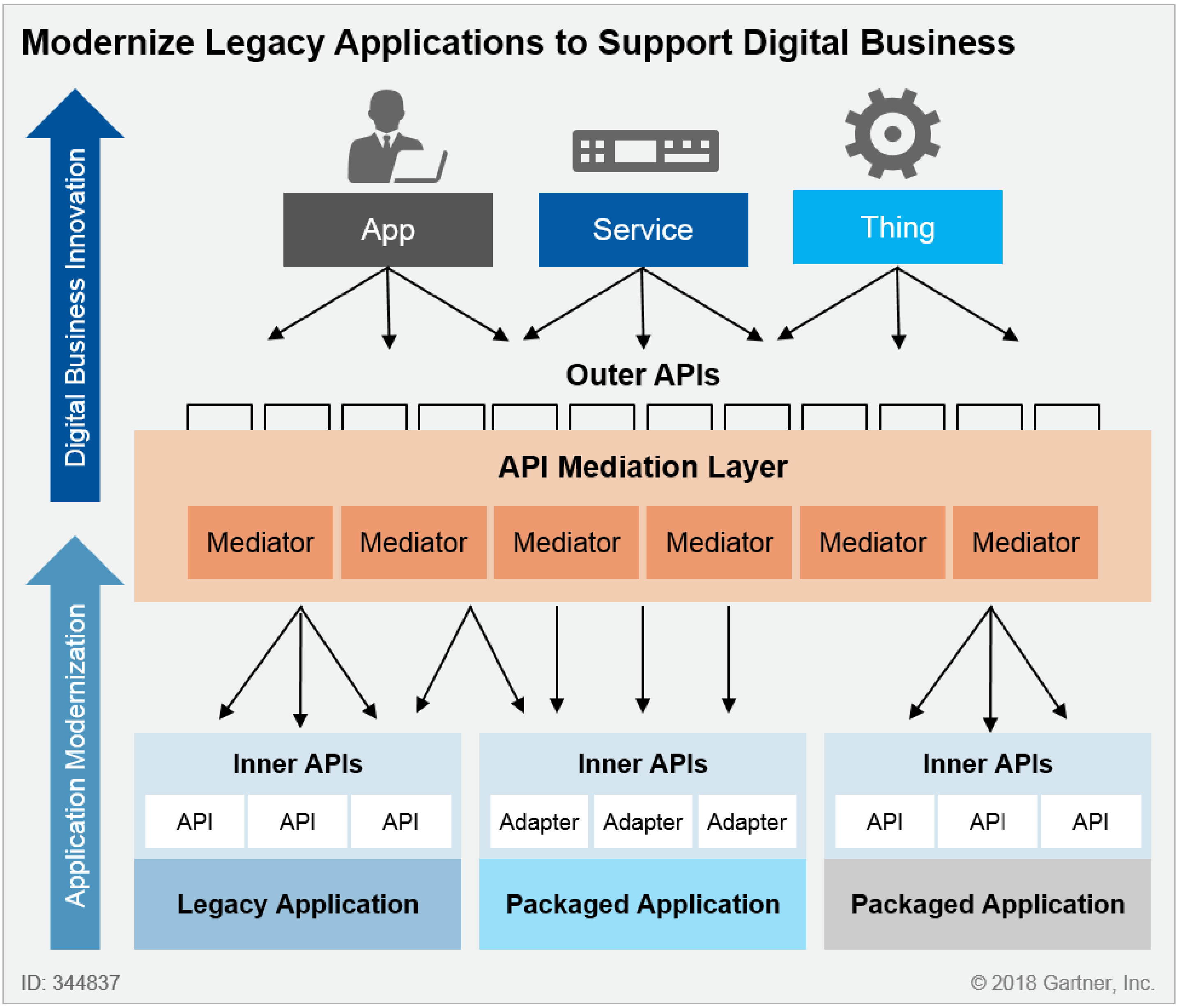
Continuous modernization identifies, prioritizes and removes obstacles for digital business in our legacy applications one by one. Different modernization approaches are used to remove an obstacle, such as encapsulating, refactoring, replatforming or replacing application components.

Using continuous modernization, we are gradually transforming the legacy application into a platform for digital business to take a foundational role in our application portfolio, providing services via APIs that can be consumed by other applications (see Figure 4).

In Figure 4, the applications on top are typically new applications and products for digital business. These are supporting the differentiating and innovating capabilities. The applications (and consumers) are using services via an API mediation layer. This loosely coupled architecture will allow separation of concerns and difference in speed, or pace of change, between these applications. The API mediation layer also provides a point at which governance, security and monitoring can be applied. As per the example of the pricing engine, any friction points in the bottom layer will be moved to the top layer to allow better business support.

By gradually and continuously modernizing the core applications, we create platforms and support digital business innovation.

Figure 4. Continuous Modernization Turns Legacy Applications Into Platforms for Digital Business



Source: Gartner (January 2018)

Further reading: "Mediated APIs: An Essential Application Architecture for Digital Business," and "Design an API Mediation Layer to Underpin Your Digital Business Technology Platform."

Establish a Continuous Modernization Culture

Continuous modernization should be organized alongside product and platform teams.

Many organizations implement a product-based approach to provide the products and services for digital business. A business budget is put aside, demand is managed by product management, and prioritized roadmaps are created for the product teams to work on (see Figure 5). As we have seen, products are dependent on functions and features from platforms. Platform teams maintain and enhance these platforms to provide timely support for the product teams.

Application leaders must create a continuous modernization culture. Any product or platform team must manage their technical debt, develop a modernization strategy and continuously modernize their products and platforms — including the ecosystem — so they don't fall victim to "drift" over time. The modernization strategy must be an integral part of the overall application strategy — not only to "cure" technical debt in current application portfolio with modernization and rationalization, but also to "prevent" technical debt by setting principles and guidelines for the teams (see "Engage the Business by Developing an Application Strategy Together").

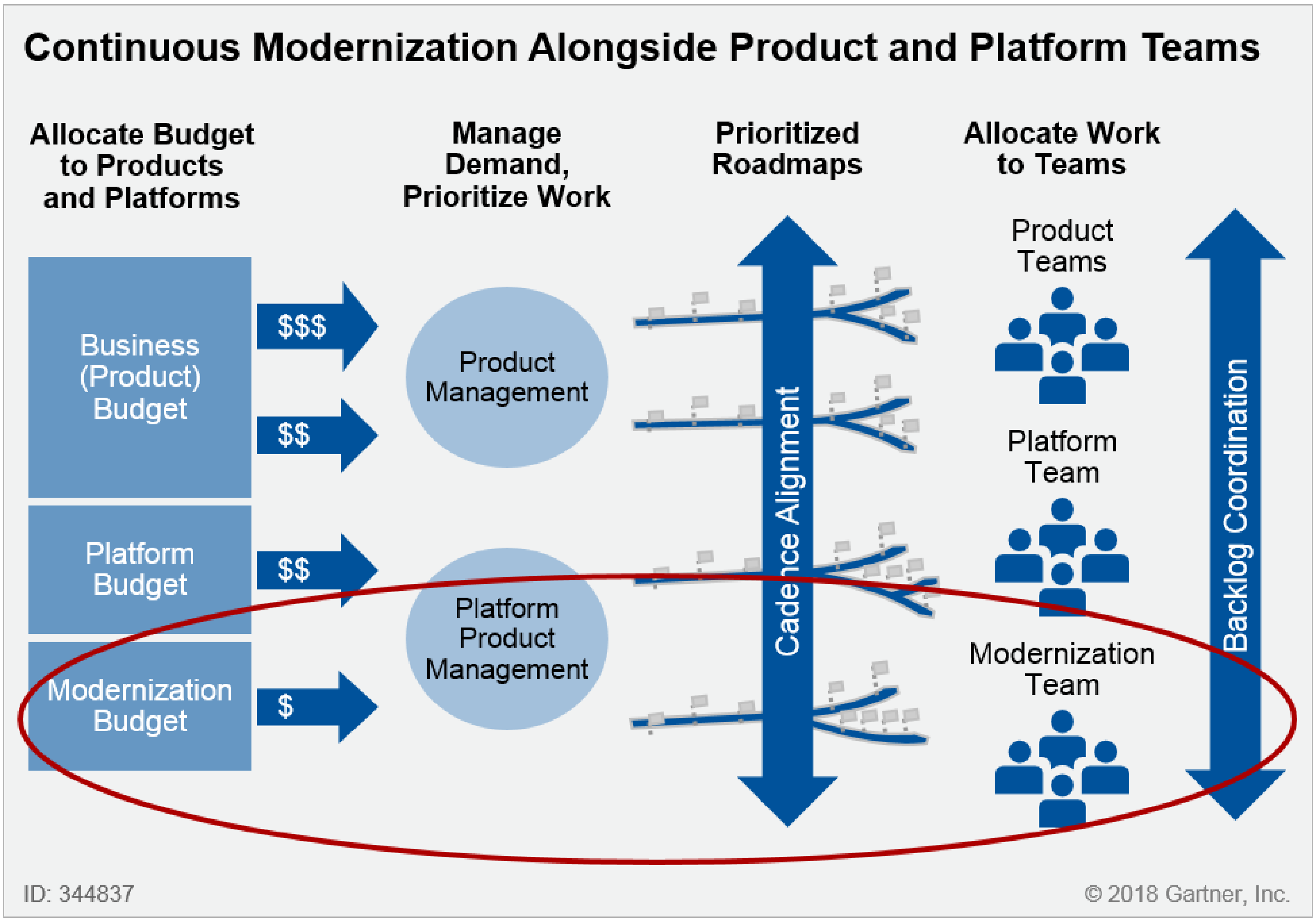
A continuous modernization culture is not only about IT — it should include the business as well. Business leaders should understand that applications need to be managed, maintained and modernized proactively, and that this requires time and resources. Ultimately, the business leaders are the owners of these applications. They should consider and manage their applications as an asset during their life cycle (see "A Primer on Application Ownership").

The work of modernization will fall on different teams in different circumstances:

- In some cases, **a platform team** will inherit and absorb legacy components as part of their platform. The modernization of these components would be managed by the same group responsible for the platform. A portion of every release cycle should be allocated to modernization/refactoring.
- In other cases, **a dedicated modernization team** will be required. This could be due to the size of the effort involved, or when specific skills, knowledge or experience are required (e.g., in the case of a mainframe application). A modernization budget must be allocated to allow such a team to create platforms from legacy applications, as well as to remove obstacles and provide ample support for product teams. The work that the modernization team is doing should be defined, prioritized and delivered based on the requirements from the product and platform teams.

Backlog coordination and delivery cadence alignment will ensure that the modernization or platform team will provide timely support for product teams (see Figure 5). The constant coordination will also allow all teams to deal with changes in demand, new requirements and newly discovered obstacles.

Figure 5. Implement Continuous Modernization Alongside Product and Platform Teams



Source: Gartner (January 2018)

Acronym Key and Glossary Terms

API	application programming interface
GUI	graphical user interface
TIME	tolerate, invest in, migrate or eliminate

Recommended by the Authors

Engage the Business by Developing an Application Strategy Together

Use Bimodal and Pace-Layered IT Together to Deliver Digital Business Transformation

Refactor Monolithic Software to Maximize Architectural and Delivery Agility

System of Record: You Can't Innovate on an Unstable Foundation

2018 Strategic Roadmap for Application Strategy

Strategic Roadmap for Becoming a Digital Product Delivery Organization

Mediated APIs: An Essential Application Architecture for Digital Business