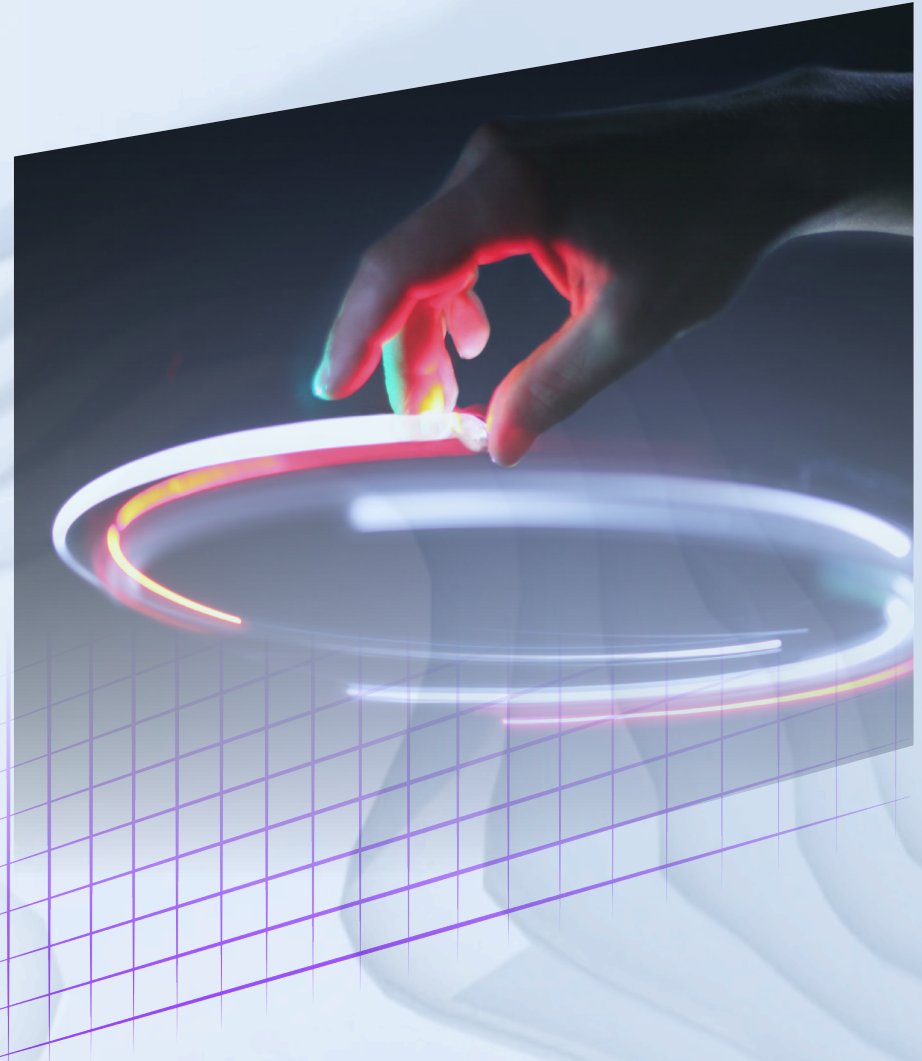




Modernize and accelerate

Unleash your enterprise in the cloud by understanding when to restructure your infrastructure, applications and data



Move faster. Be nimbler. Increase performance.

Maximizing value in the cloud means being willing to rethink your infrastructure, applications and data

Getting to cloud is only the first part of the journey. Now that you're there you need to learn how to thrive in your new cloud environment—and capitalize on the huge efficiency and innovation potential it offers. This means, ultimately, becoming a more cloud native enterprise—one that modernizes infrastructure, applications and data specifically to maximize the value of a cloud environment.

Further, in a world of multi-cloud, hybrid-cloud and increasingly edge computing, cloud environments need to be viewed as a continuum. It's about creating a singular cloud experience – whether on one or more public and/or private clouds and beyond to the edge – and providing the same level of service/capability regardless of where or how it's accessed.

“ Becoming cloud native is like learning a new language for enterprise IT. You need to jump right in and immerse yourself in your new environment. ”

For new greenfield developments that shouldn't be a problem. But what about your legacy estate? If you're a large organization, you'll likely have hundreds, thousands, maybe even tens of thousands of applications in your portfolio, a significant number of which will be mission critical.

To capture long-term value, you'll need to carefully decide which of these applications need to be modernized, and to what extent, to fully exploit the cloud. You'll also need to consider your infrastructure and data architecture choices. These modernization choices apply irrespective of whether you've already "lifted and shifted" your applications to the cloud or are just starting out on a cloud migration.

Modernize applications ... and show the real value of cloud

Simply rehosting your applications in the cloud will likely cut some costs and solve some technical debt issues. But how much difference will your business users see and how much additional business value will it unleash? Very little. Your applications will have the same functionality, the same development cycles, and the same level of flexibility they had before the shift to cloud.

Only when you modernize your applications for the cloud will the business really start to extract value from the new environment. By leveraging more flexible cloud-native architectures and advanced Platform-as-a-Service capabilities, you'll create systems that can talk to each other better, that allow new business rules to be encoded more easily, and that support continuous improvement, faster releases, and greater innovation.





Modernize infrastructure ... and let the handbrake off your business

As the world moves towards software-defined infrastructure, having systems that can operate in the new without an operator or human intervention paradigm will become increasingly essential. Modernizing your infrastructure for this kind of environment—enabling vastly more automation and intelligence-driven management—can significantly optimize not only your costs, but also your business agility and flexibility. It means you can move from reactive operations (monitoring the estate and fixing any faults) to proactive operations (using machine learning and predictive analytics to head off faults and issues before they happen). And when the unexpected does strike, you're able to deploy or rebuild infrastructure in minutes rather than days, greatly enhancing your IT resilience.

Modernize data ... and start innovating faster

Data should be the third key pillar of a modernization strategy. In many enterprises today, legacy on-premise data architectures are too complex, expensive, inflexible, and hard to maintain. That ultimately hinders the level of analytics—and business innovation—an enterprise can achieve. In contrast, modern data architectures in the cloud allow you to spin up advanced hyperscaler analytics services—including machine learning and deep learning—at a speed and with a level of simplicity that would be impossible in your own data center.

Balance short-term speed against long-term value

Be smart about your cloud objectives—and craft an application modernization program that works for your needs.

Understand the full range of your modernization options. There's a wide spectrum of application modernization approaches to choose from, with widely differing levels of cost, complexity, and ultimate value to the business. Accenture's "7Rs" framework (see inset) breaks down this spectrum into a clearly defined set of migration options. As you go across the scale, the degree of modernization increases from zero (i.e. rehosting and replacing) to comprehensive (i.e. refactoring and reimagining).

The 7Rs of a cloud journey

- Retire the applications you don't need any more.
- Retain on-premises applications that are too complex or costly to migrate.
- Rehost applications quickly in the cloud.
- Replatform applications that need to run on a different operating system in the cloud.
- Replace applications for which better and/or cheaper SaaS solutions are available.
- Refactor applications that need significant code rework for the cloud, decoupling from other systems as needed.
- Reimagine business processes in the cloud by redefining and enhancing core value propositions.



Build the business case.

When it comes to making the case for modernizing an application and choosing which of the 7Rs are most suitable, there are some key questions to ask:

Do you even have a choice? A key distinction is between discretionary and non-discretionary modernization (see inset). If you need to modernize an application even to get it to cloud in the first place, it's a 'must do'. Think of an important business application running on an old operating system that isn't supported in the cloud and has no viable replacement alternative. In such a case, replatforming at a minimum is unavoidable.

Will the application actually benefit from modernization? If you have a stable legacy application with a limited lifespan, think very critically about whether modernization is necessary. The guiding principle should be 'if it ain't broke, don't fix it'. If they're already meeting business needs, these kinds of applications will most likely be candidates for rehosting or containerization or simply remaining in their current legacy environment. Only if they're actively holding the business back should you look to increase agility through modernization.

Can the application make use of its new cloud foundation? Very few applications will be able to use the full capabilities of cloud through rehosting alone. More than likely, you'll need to modernize them to benefit from the new cloud environment. Think of a highly seasonal ecommerce application or a workplace T&E tool with intense bursts of activity once a month. To benefit from cloud's ability to scale up and down on demand, applications like these will need modernization.



Is this a candidate for a cloud native transformation? By replatforming or refactoring an application for the cloud, you'll create more flexible architectures and more value for the business. Even something as seemingly straightforward as swapping an embedded on-premise database for a PaaS equivalent can generate significant cost savings, sometimes reaching tens of millions of dollars. The question is how much modernization is appropriate in each case (see below).

Will you recover the costs of modernization? The more changes you make, the more expensive and time consuming your modernization initiative is likely to be. This needs to be weighed carefully against the extra value you'll be creating as part of a total cost of ownership assessment. Lower operating costs may seem initially attractive, but will they ever be enough to cover the expense of a tricky modernization exercise?

Are there knowledge or talent constraints? When it comes to older mainframe applications in the estate, it's essential to consider whether you still have the legacy skills and knowledge to even attempt a modernization. If not, you'll have to invest a significant amount of time and effort simply understanding the application well enough to do anything with it. This will inevitably weaken the case for modernization. Then comes the question of whether you have the software engineering skills necessary to conduct the modernization. Both sides of the equation must be considered when making your decision.

Discretionary vs non-discretionary modernization

Discretionary modernization is where you know replatforming or refactoring an application will deliver better functionality and more value to the business, but it's not essential for getting it to cloud. You can simply rehost it if you need to.

Non-discretionary modernization is where some aspect of your application (its operating system for instance) is not compatible with cloud operations. This means you have no option but to modify it to get it to cloud. You're unable to simply rehost it in its original form even if you wanted to.

This distinction is an important factor in defining a migration roadmap. Non-discretionary modernization will need to happen before or during the migration itself. Discretionary modernization gives you the option of either modernizing up front or deferring if your immediate priority is to get to cloud as fast as possible. Either way, you have options when it comes to how you modernize (see below for more detail).

How much modernization makes sense?

The degree of modernization an application would benefit from is entirely dependent on its unique context. Generally speaking, the more modernization you do, the greater the ultimate value you'll achieve. But, equally, the greater the cost, time, and complexity you'll need to manage.

One key decision is whether to **replatform or refactor**. When you replatform an application, you'll typically look to make minimal changes to the code—just enough to ensure it can deliver the same functionality in the new cloud platform.



Refactoring, on the other hand, is far more interventionist. Here, you'll be effectively breaking the application apart and reconstructing it in a new cloud native architecture. You may also be using a new programming language. The degree of code change—and subsequent testing required—will be significant.

For some applications it could make sense to take refactoring one-step further and consider **service decomposition**. This is where you decompose your application into a series of reusable components or microservices, expose them via APIs, and use an orchestration layer like Kubernetes. You may even decide your application warrants a **serverless architecture**, in which you run code in the cloud without managing infrastructure at all.

This kind of highly advanced and elegant form of refactoring is sometimes called “service enablement”. The long-term benefits it brings in terms of organizational agility and digital capability will almost always transcend other kinds of modernization treatment. But it's an option to be exercised carefully, as part of a well-considered strategy for microservices or product-based operations. In most organizations, only a small fraction of the portfolio will qualify for such consideration.



Digital decoupling—Run old and new in parallel

Digital decoupling is an advanced technique for modernizing large legacy applications, such as mainframe software.

Older applications can be challenging to rebuild in the cloud, especially when it comes to replicating their embedded business logic and data. Even carving out subsystems for incremental refactoring can be very difficult unless the original application was architected in the right way.

The result is that these modernization projects can rack up more costs and incur more risk than the business is prepared to tolerate. But digital decoupling can help solve this using the very latest techniques in data synchronization. Instead of trying to refactor the existing system, with all the constraints that come with it, you build a new system alongside as a greenfield cloud-native development.

By synchronizing data in your new and old systems in close to real time, both can run in parallel. This means you can modernize the application a piece at a time, using cloud-native architectures, modern techniques like DevSecOps, and high levels of automation.

Think of it as building a brand-new house right next to your existing home. You get to live in both buildings, while you gradually connect up each room and transfer your furniture across. Eventually you're ready to live only in the new, without ever having had to renovate the old. The downside? Two houses always cost more than one.

Sidestep the modernization pitfalls

Modernization comes in different shapes and sizes. Here's how to set yourself up for success.



1 Focus on the value, not just the cost.

Modernization needs to be a carefully considered process based on a solid assessment of what you have now—and where your organization wants to be in the future. Not every application will be suitable for modernization immediately. But it's still crucial to look beyond short-term savings and bring questions of future value into the equation. Even if there are compelling reasons for accelerating a migration with a simple rehost, you need to be clear on the longer-term trade-offs this incurs.

2 Don't try to boil the ocean.

If you've got a large legacy estate, it's easy to get overwhelmed by the sheer scale of a cloud modernization initiative. So consider breaking your application portfolio down into segments, whether by business unit or functional area. The interdependencies within your estate are critical here. You'll likely have key integration points, interfaces, etc., meaning certain groups or "families" of applications need to be considered together.



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3

Get the whole organization aligned behind the program.

One of the biggest hazards in any cloud journey is a lack of alignment between IT and the rest of the business. In fact, according to Accenture research, 40% of companies site this misalignment as a top barrier to achieving their expected cloud results. Attempting to drive cloud modernization purely as an IT initiative, with no business buy-in, is a surefire way to lead your program astray. It needs full engagement, especially when it comes to testing new code. So look to involve business managers and application owners at every stage of decision making.

A modernization program also needs a C-suite sponsor. For the reasons outlined in this paper, modernization can be complex. It can also require creative ways of handling a sometimes significant capital investment. Commitment from the very top of the organization is essential.

4

Think about the operating model.

A modernization program risks not achieving all it intended if it doesn't also consider how the organization will run and manage applications in the cloud. In fact, this has a significant influence on whether or not you realize the substantial value the cloud offers. There needs to be a fundamental change in ways of working, both at the infrastructure, application, and data levels, towards an agile DevSecOps model. This may ultimately be as important as the modernization program itself and needs to be driven forward in parallel from day one. And a final thought, your cloud operating model needs to be developed with an eye towards the culture, organization and skills required to make it successful.



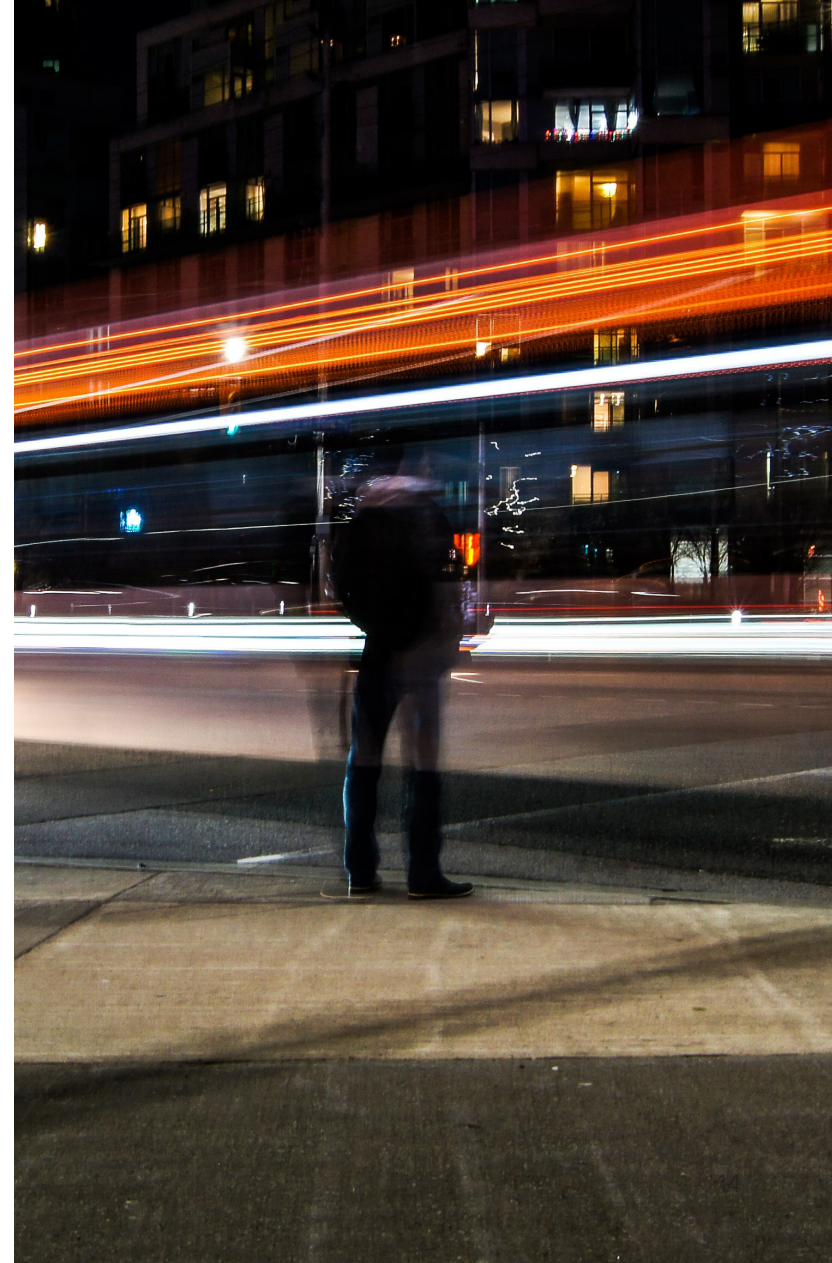
5**Be smart about your priorities.**

In deciding which applications to modernize first, it's absolutely essential to be application- and value-led. But keep in mind the need for program momentum and business engagement. Getting bogged down in your most challenging modernization project straight away is guaranteed to sap the rest of the organization's enthusiasm, even if it ultimately delivers the most value. So consider starting with projects that will get the flywheel started and deliver tangible benefits quickly.

6**Decide about the data.**

If an application has a database sitting behind it, modernizing the two together is a given. But you should also think about the bigger data picture, including any analytics platforms you're using to generate business or customer insights. These may need to be modernized in the cloud too.

When it comes to the data itself, there are two principal approaches to consider. The first is driven by use case—define your particular analytics objectives and migrate and modernize the supporting data sets accordingly. The second is driven by future value to the business—identify the key data sets in the business, consolidating and structuring disparate data sets in the cloud with the confidence they will be central to your future analytics needs, irrespective of present use cases.



7

Make time for testing.

One of the most common pitfalls in application modernization is failing to set aside enough time and resources for testing. Many legacy applications are the result of years of accumulated knowledge and effort, with perhaps thousands of developer days of finetuning. To achieve the same level of performance, your modernization program needs to respect that degree of effort and carefully test the refactored code.

One counterpoint to consider: the less modernization you do, the easier testing will be. Cloud migrations offer a unique feature within IT programs – you still have your legacy systems running for validation, comparing outcomes, and providing assurance that the application functions as expected in its new environment. As soon as you change the code, you lose that opportunity.

8

Third-party tools can accelerate development—but be cautious.

There are several solutions available in the market that can automate aspects of your modernization program, such as translating legacy code into a new programming language. However, it's unrealistic to expect any tool to automate modernization with 100 percent accuracy. So it pays to demystify these solutions, understanding exactly what they can do, and what they can't, and what that means for ongoing code maintenance and development.



Move and improve: The potential of language translation tools

Language translation tools can help automate the conversion of legacy code like COBOL into modern cloud-friendly programming languages like Java. The end results, while not at the standard of developer-written code, enable legacy applications to function in the cloud.

This can accelerate a cloud migration, enabling a “move and improve” approach which gets an application to the cloud quickly with a view to future cleanup and modernization.

Once the code is converted and functioning in the cloud you can decide whether to get your developers to proactively clean, correct and rewrite it. Or you can consider “just in time” cleanup, where you leave the code as is until such time as you get a business request which requires touching it—at which point you do the cleanup and refactoring.



Welcome to the modern world

Modernization—of infrastructure, applications, and data—is the key to reducing technical debt and ramping up your organizational speed and agility in the cloud.

But full-scale modernization won't be right for every application or indeed every company. There may be good business reasons for focusing initially on rehosting as a means to get to cloud quickly. The point is, even if you choose to defer modernization for now, it needs to be on your agenda for the future.

Ultimately, if you want to benefit from the full value of cloud, you need to be working towards cloud native architectures, applications, and data. A carefully considered modernization program is how you get there.



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