The CIO guide to cloud native applications

Own your cloud native journey

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Business demands are driving IT to cloud native approaches

To compete in today's world, business leaders are placing increased demands on IT. Unfortunately, many IT departments are not able to deliver future innovation with their current infrastructure, applications and processes. To meet these demands, IT must digitally transform the enterprise through the adoption of cloud native practices, allowing them to both optimize and transform their existing infrastructure and applications. Recent Avanade research supports this thinking, finding that 88% of senior IT decision-makers believe that IT modernization is crucial to addressing the emerging requirements of the digital business[1].

On the upside, those surveyed also indicated that by modernizing their IT infrastructures they expect to deliver real business results, such as boosting annual revenue by 14%, while at the same time reducing business operating costs by 13%[1]. For many, this sounds like a winning strategy but what does it mean to adopt cloud native approaches, and how does it impact the organization?

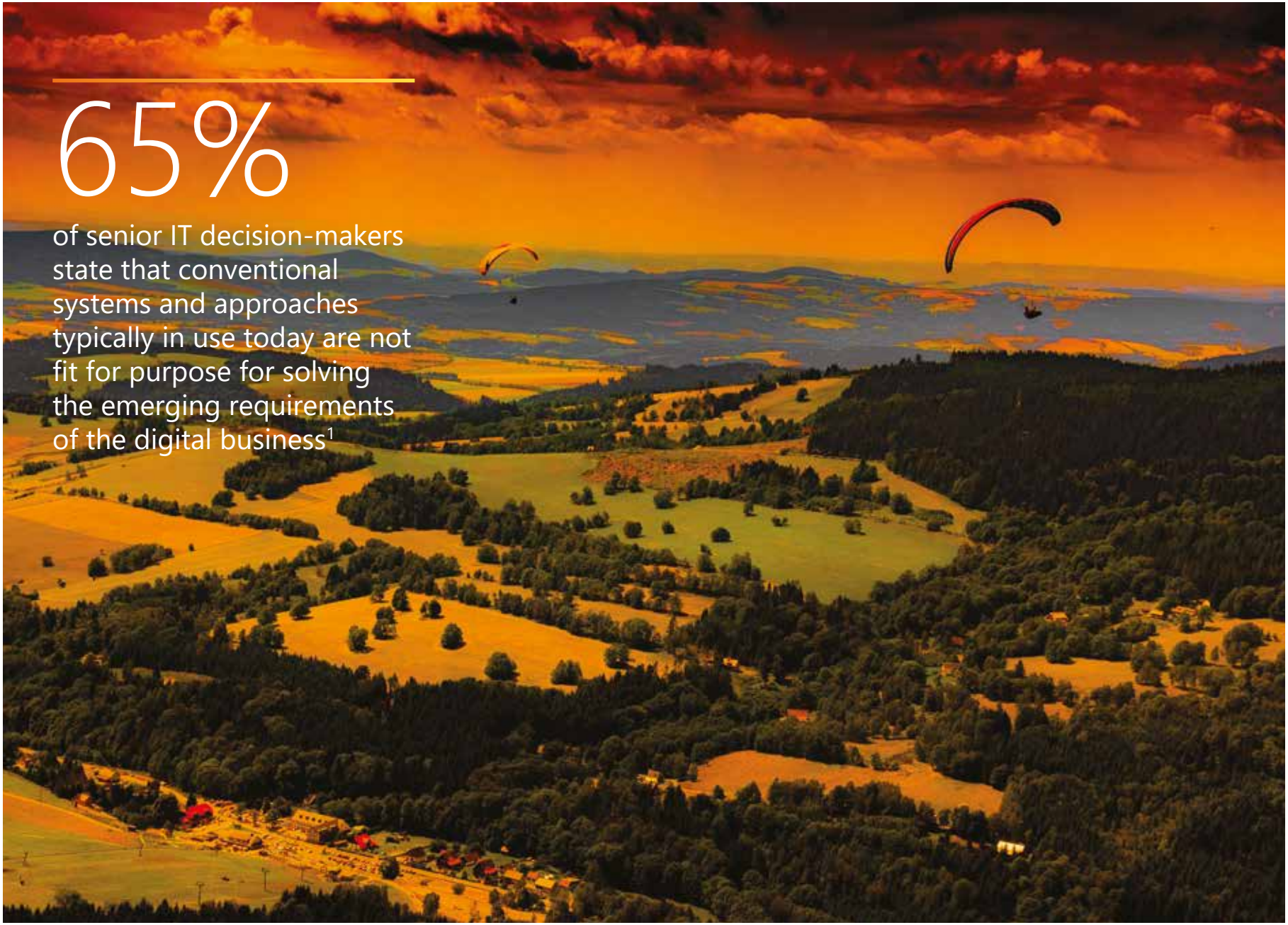
What does cloud native mean?

While there is no universally accepted definition of cloud native, in this guide we will set forth our definition as follows:

Cloud native applications are architected, designed, developed, packaged, delivered and managed in a manner that is consistent with the cloud environment in which they will run. They are developed using DevOps practices, a microservices architectural style that takes advantage of PaaS platforms and API integration across a broader ecosystem.

A cloud native infrastructure is a standardized, scalable, multi-tenant environment that provides all of the hardware and services required to support applications; with redundancy and failover capabilities to prevent disruption of service and application availability. High levels of automation are also a key ingredient in the cloud native world.

1. Avanade: 'IT Modernization: critical to digital transformation', March 2018



65%

of senior IT decision-makers state that conventional systems and approaches typically in use today are not fit for purpose for solving the emerging requirements of the digital business[1]

1. Avanade: 'IT Modernization: critical to digital transformation', March 2018

Cloud native transforms the entire organization

Cloud native is not a destination but an ongoing journey that represents the best practices you will adopt in your IT strategy. It is about adopting a specific set of practice and continuing to adhere to those over time.

Although the move to cloud native is often seen as an IT transformation, the reality is that it makes digital business transformation possible, and as a result transforms the entire organization. Cloud native is a shift in IT and business operations philosophy. When organizations take an application-led approach, they focus first on the existing application estate and determine where each of these applications will reside in the future and to what extent the estate will be cloud native. The underlying message being: "the more cloud native you become, the greater the benefits you will achieve".

Not all applications will be cloud native, in fact, many applications will live out their remaining useful life in a non-cloud native manner. The important step is to review the entire application portfolio and define the long-term plan for each application.

Cloud native is not a destination but an ongoing journey that represents the best practice you will adopt in your IT strategy. It is about adopting a specific set of practices and continuing to adhere to them over time. With cloud native, the enterprise increases velocity, agility and innovation while also gaining access to much needed wider capabilities. With the increased velocity, the business can go to market faster with more innovative solutions. IT becomes more agile and responding to business needs quicker through agile and DevOps approaches, but also by gaining access to prepackaged services built on public cloud infrastructures, such as Microsoft Azure.

When it comes to taking full advantage of cloud native architectures and approaches, it is important to recognize that careful consideration of your applications, infrastructure and data are required. While for many, the first thought is: "what infrastructure will I run my apps on", we recommend that you take an application-led approach. This is because applications deliver the services that are the direct drivers of business processes, data and value, while infrastructure supports the applications, and not the other way around. Other elements, from infrastructure and security, through to efficiency, serve the goal of delivering services through those applications quickly, dependably, securely and cost-effectively.

Understanding the application continuum of cloud maturity

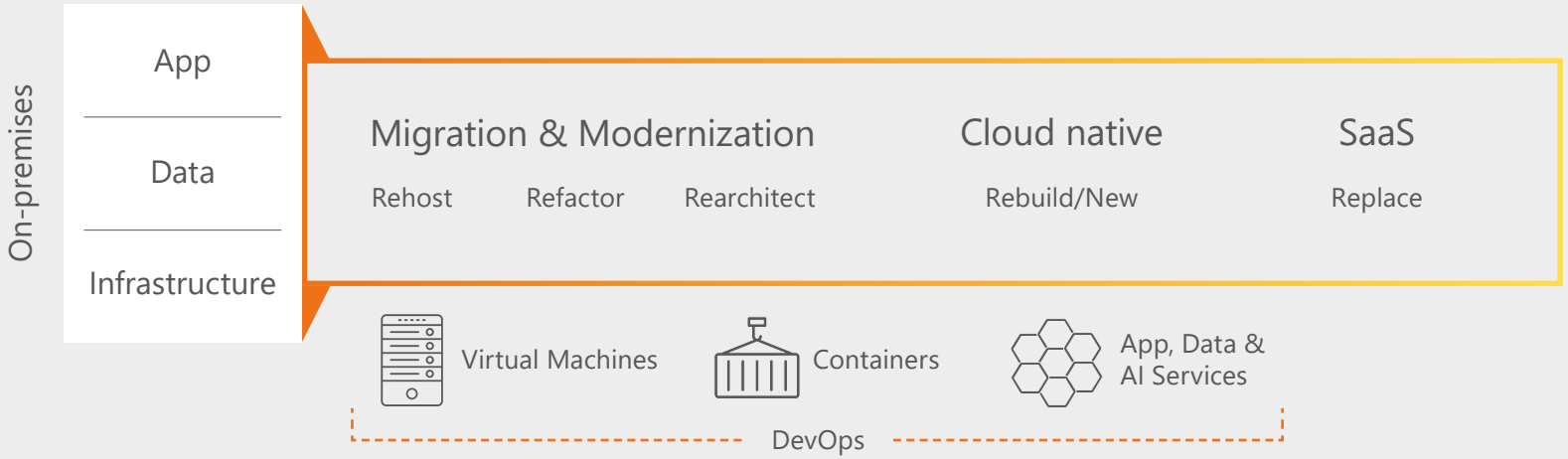
It is helpful to think of your organization's journey to cloud native as being a continuum upon which all your applications will reside. Apps that reside further along the cloud native continuum will be more transformational to your business and as a result you will see increased value, not only for IT but for the entire business.

The continuum is commonly defined by the following "stages": rehost, refactor, and rearchitect. These stages are often grouped together under the category of "migration and modernization", where increasing levels of cloud benefits are incorporated into the application through increasingly involved efforts to modify the application.

Rehosting is the simplest and often quickest way to get an application into the cloud. However the benefit derived by rehosting is often seen as limited. Refactoring and rearchitecting typically involve more effort but in return allow the application, and subsequently the business stakeholders, to realize greater benefits.

An additional stage is rebuild, or new, where an application is designed and built to be cloud native. The final stage of cloud maturity is when the business function of the application is delivered via a SaaS solution. We will look at each of these terms and discuss what they mean.

Journey to the cloud



Source: Microsoft Apps & Infra GTM team, "Priorities & Big Bets for Modern Apps", July 2018

Rehosting: The lift and shift

Rehosting is typically carried out with an infrastructure as a service (IaaS) offering, and is often referred to as a "lift and shift". With this approach you move your existing applications out of your data center and off your hardware into someone else's data center and on to their hardware. Traditionally, this has been perceived as the quick and easy way to access the cloud without incurring a great deal of cost – and for the most part that's correct. However, this is typically only the first step to realizing the full benefits of native cloud.

Lift and shift is a common approach, especially for legacy applications that are either too complex or too costly to refactor. Furthermore, rehosting is fast but doesn't deliver the big dividends in terms of increased business value, and may actually increase costs in the long-term. The business value isn't there because your business has the same applications with many of the same limitations they have always had.

For companies that choose lift and shift, they are changing their IT model. They will need to put into place a series of cloud foundations. With the new IT operating model comes the need to consider governance, security, and how to align IT and finance for a variable expense model. All of these considerations will start to prepare the enterprise for cloud native adoption with other applications.

Ambitious cloud migration with Towergate

Towergate - one of Europe's largest independently owned insurance brokers - offers over 200 specialist insurance products to SMEs, corporate clients and direct customers. As the company grew through acquisitions, Towergate's environment became fragmented, outdated and unstable. This was expensive and made collaboration difficult. Customer experience wasn't as good as it could be.

Together, we embarked on one of the most comprehensive IT reboots and ambitious cloud migration efforts the financial services industry had ever seen. In just 12 months, we implemented solutions such as data center and hosting, network and telephony, end user computing and service support.

The results speak for themselves. Towergate began to see immediate, tangible results, with a 30% cost saving. Today, the company is smarter, faster, more reliable – and ready for the future.

The pros and cons of rehosting:

Pros

- Creates increased resiliency, scalability and security
- Allows an enterprise to quickly turn down infrastructure and change the cost model
- Minimal code change required to execute

Cons

- Return on investment (ROI) tends to be focused on IT savings and may not impact the business ROI
- Expected cost savings often do not materialize as the expenses of outsourcing applications and infrastructure "as is" can be costly
- End user experience with applications does not change

Refactoring: Making your applications work on the cloud

Reducing costs of existing applications with MetLife

For MetLife, the Docker Modernize Traditional Apps (MTA) program presented an opportunity to reduce the costs of existing applications.

The MTA project started with a single, important application that helped handle customer experience.

The app was containerized in a single day, immediately securing improvements in the time to deploy and scale of the application.

Of the almost 6,000 applications at MetLife, roughly 10% used the same technology stack as the application from the MTA POC. The resulting analysis projected a 66% total cost saving for those applications. This means tens of millions of dollars in savings for MetLife – and it all started with a single application.

Moving along the continuum we arrive at the next stage of migration and modernization known as "refactoring". In this phase, the focus is on making changes to the application rather than to the infrastructure. Application refactoring is the process of altering an application's source code without changing its external behavior. The purpose of code refactoring is to improve many of the non-functional properties of the code, such as readability, complexity, maintainability and extensibility.

Refactoring applications can be seen as the first real step in the direction of moving towards cloud native because as you refactor, you will typically look to adopt some of the characteristics of cloud native applications.

A popular approach to refactoring is the use of containers, as they give you the flexibility and choice to engage with cloud migration or application modernization in ways that are most appropriate for you and your business. With containers you can speed up a data center exit without having to address updates to all of your applications at the same time. This data center exit changes your infrastructure demands, allowing you to begin

leveraging your existing applications in the cloud as you develop and execute a long-term application modernization strategy. As part of that strategy you may have applications that remain in containers for the balance of their useful life, while others are rearchitected or rewritten.

Containers also have the added benefit of setting the stage for much higher levels of automation in your application deployment and management. This is a key attribute and benefit of cloud native applications, especially when it comes to offering velocity and agility to your business.

The pros and cons of refactoring:

Pros

- Typically improves application performance
- Can increase deployment flexibility and allow for faster, more automated deployments
- Relatively cost-effective to implement

Cons

- Minimal change to the end user experience or application functionality
- Costs can be high as you may need to rework a significant portion of the application
- Does not enable the applications to exploit the cloud native services that unlock new sources of business value

Rearchitecting: Making the old new again

The final option in the migration and modernization stage of our continuum is rearchitecting. In this scenario you are introducing cloud native aspects to your application, such as PaaS services, new architectural styles (potentially "microservices"), and also altering the code to give it many of the characteristics and benefits of a cloud native application.

With rearchitecting, you start with an existing application that is performing a valuable business function but due to its architecture is preventing you from being more responsive to changing business needs. This in turn impacts on how you respond to customer demands, and how you remain competitive in the market. These monolithic applications can be broken down into microservices, which leverage modern frameworks and platforms. As a result, your business will be more agile, accelerating how code is written, tested, deployed and enhanced. Rearchitecting will make the applications more resilient and scalable. Rearchitecting also allows you to natively incorporate emerging innovative capabilities into your applications.

It is important to consider that rearchitecting an existing application can often be complex and success requires changes in not only the application itself but also the engineering discipline used to construct, test and deploy the application. Things like DevOps become essential in bringing together the infrastructure, operations and development viewpoints, and also in activating a new level of automation in these activities.

AI and cloud transformation enables 27% incremental product revenue opportunity for billion-dollar company

A global cleaning products vendor had a great deal of data residing in multiple devices and systems. This lack of data integration meant that it wasn't efficient, and for a billion-dollar business that just wasn't good enough.

We extracted data from Salesforce, which we then processed, securely stored and used Azure Machine Learning for outcome prediction.

Additional data was fed through API Apps and a Data Catalog Service. This allowed the business to predict health inspections with 90% accuracy, meaning additional product revenue and deeper customer loyalty - a 27% incremental product revenue opportunity.

The pros and cons of rearchitecting:

Pros

- Allows you to begin using some cloud native application development approaches
- Using containers can be a short-term solution for some apps and a long- term solution for others
- Can produce a reduction in required infrastructure and increase portability of applications

Cons

- Minimal change to the end user experience
- Many organizations will need to reboot their IT organizations culture to adopt modern engineering approaches like agile and DevOps
- Finding the people with the right skills in your own organization to undertake this type of work

Cloud native: Taking the plunge

> "By 2020, more than 50% of Mode 1 applications migrated from private data centers to the public cloud will be rewritten using cloud-native architectural precepts, up from less than 10% in 2017."

Gartner: "Why You Must Begin Delivering Cloud-Native Offerings Today, Not Tomorrow", 9 January 2018

Moving on from migration and modernization, we arrive at the cloud native stage. Here we focus on rebuilding applications from the ground up as a cloud native application. For enterprises that have made the strategic decision to extract maximum value and capability from the cloud, this is where they will be focusing their effort and investment.

This is where organizations have the opportunity to create a custom, cloud native application that creates a real competitive differentiator in the market. Cloud native applications are typically developed and optimized to run on a specific public cloud provider platform, allowing you to exploit the cloud computing model, tools and consumer services that are provided as part of the platform.

The investment to rewrite an application is significant and many aren't convinced of the benefits. This is where you need to focus beyond IT ROI and consider the business impact. By making that existing application cloud native, you dramatically change how the application will be able to meet the current and emerging needs of the business, and how it will be managed. The application will be able to change and evolve at a much faster rate and will be able to natively incorporate advanced technology and functionality, such as AI and cognitive services. This will enable new capabilities and a much faster time to market for your business. All these factors must be considered in the funding case.

As with rearchitecting, you will need to adopt cloud native engineering and process disciplines to realize the benefits. Cloud native applications are built from new, allowing you to make the right architecture and design choices without the added complexity of managing your "legacy" code and application components.

Additionally, cloud native applications deliver the ability to change at pace and continually deliver a differentiated experience to your customers or employees in a cost-effective manner, making them a very powerful part of your business strategy.

The pros and cons of cloud native:

Pros

- Realize the scale of innovation that comes with transformative services like AI available to cloud native applications
- Unlocks new sources of value to provide the greatest transformational impact
- Provides the IT function with the necessary velocity, agility and innovation required to drive business transformation

Cons

- Often requires a business case that will need to demonstrate IT and businesses ROI to be successful
- Initial time to market can be a challenge when replacing feature/function parity from an existing application. A phased approach is recommended.
- Requires a transformation of process and culture, in addition to technology, to be successful

SaaS – A powerful option for core functionality

Courtesy NASA/JPL-Caltech

The final option that we will discuss is the idea of replacing an existing custom application, or commercial off-the-shelf (COTS) application, with software as a service (SaaS). In many cases, companies have legacy applications that were developed years ago to support the enterprise but now have SaaS options available. In other instances, they are finding that in the future, their current COTS application will only be available as SaaS. Regardless of the reason, adopting SaaS applications is the final stage in cloud applications maturity.

With SaaS applications, you purchase on a pay-as-you-go basis and rent the use of the application for your organization. Users typically access it via the internet and connect using a web browser. Common examples of SaaS include productivity apps such as email, collaboration and calendaring; as well as sophisticated business applications, such as customer relationship management (CRM), enterprise resource planning (ERP), and document management. The incentive, or even requirement, to move to SaaS for many of these applications is significant as some of these vendors are moving to a SaaS first or SaaS only model.

When considering SaaS as an option, you should think about whether the application is providing a service or function that needs to be unique or differentiated in your business. While some SaaS solutions are highly configurable, it would be hard to call them customizable, which means it is difficult to create a competitive advantage with SaaS.

Email is a classic example of an application that serves an important function but isn't something you rely on to differentiate yourself and therefore is a great option for SaaS. However, if you think about companies like Netflix, Uber or LinkedIn, the application is the business and how the end user interacts with the company is a significant part of how they differentiate themselves. We call this differentiation view "consume to create" and recommend that you consume applications that do not differentiate your business and create those applications that represent true differentiation for your business.

If you aren't using SaaS broadly, your business risks falling behind

Forrester Report, June 2017

The pros and cons of SaaS:

Pros

- Easy to adopt and no need to invest in hardware to move to a SaaS solution
- Low start-up costs with high adoption rates all under a pay for what you use model
- Frequent small updates and patches rather than large updates

Cons

- Customization is difficult making it hard to differentiate your business
- You are limited to the features developed by the SaaS provider and their prioritization of new features
- Finding a provider able to meet security, compliance, availability and financial viability requirements of your business

Get started on your cloud native journey

Earlier we talked about the business benefits that are possible through IT modernization. Specifically, we talked about IT executives and their expectation of boosting annual revenue by 14%, and reducing business operating costs by 13%[1] by modernizing their IT systems. To achieve these results, you must take a holistic approach to the modernization of your IT strategy and that starts with understanding the cloud native continuum:

- How business is done is changing and to be competitive, IT must transform to increase velocity, agility and innovation.
- Adopting the cloud provides access to prebuilt capabilities that can be leveraged by IT.
- There are several stages on the cloud maturity continuum and you should not view them as a process to work through, but as separate destinations designed to fit the specific needs of individual applications.
- Let your applications lead your infrastructure decisions because applications deliver the services that are the direct drivers of business processes, data and value, while infrastructure supports the applications, not the other way around.
- Finally, cloud native is not a destination at which you arrive but instead is an approach you adopt and leverage as you set strategy and make IT decisions for the future.

84%

say they want a partner with proven experience in modern software engineering skills like DevOps and agile[1].

75%

want to work with a partner that has proven experience building and modernizing applications on the cloud using PaaS[1].

1. Avanade: 'IT Modernization: critical to digital transformation', March 2018

The adoption of cloud native requires new approaches and skills and with that comes unforeseen pitfalls but that's where partnering with someone that has done this before can help you. Only 31% of decision-makers see themselves as experts in a cloud-first approach[1]. Furthermore, just 30% say they are experts in DevOps and agile - essential tools and methods required.

As the world's number one Microsoft Azure SI partner, we have unparalleled expertise and experience to help you get the most out of the Microsoft ecosystem.

No matter where you are on your cloud native journey, we can help. Find out more at avanade.com/cloud-native-applications or contact us avanade.com/contact-us

81%

want a partner with proven experience migrating businesses to the cloud[1].

95%

of Fortune 500 companies trust their business on the Microsoft cloud.[2]

59%

want a partner with a Microsoft relationship[1].

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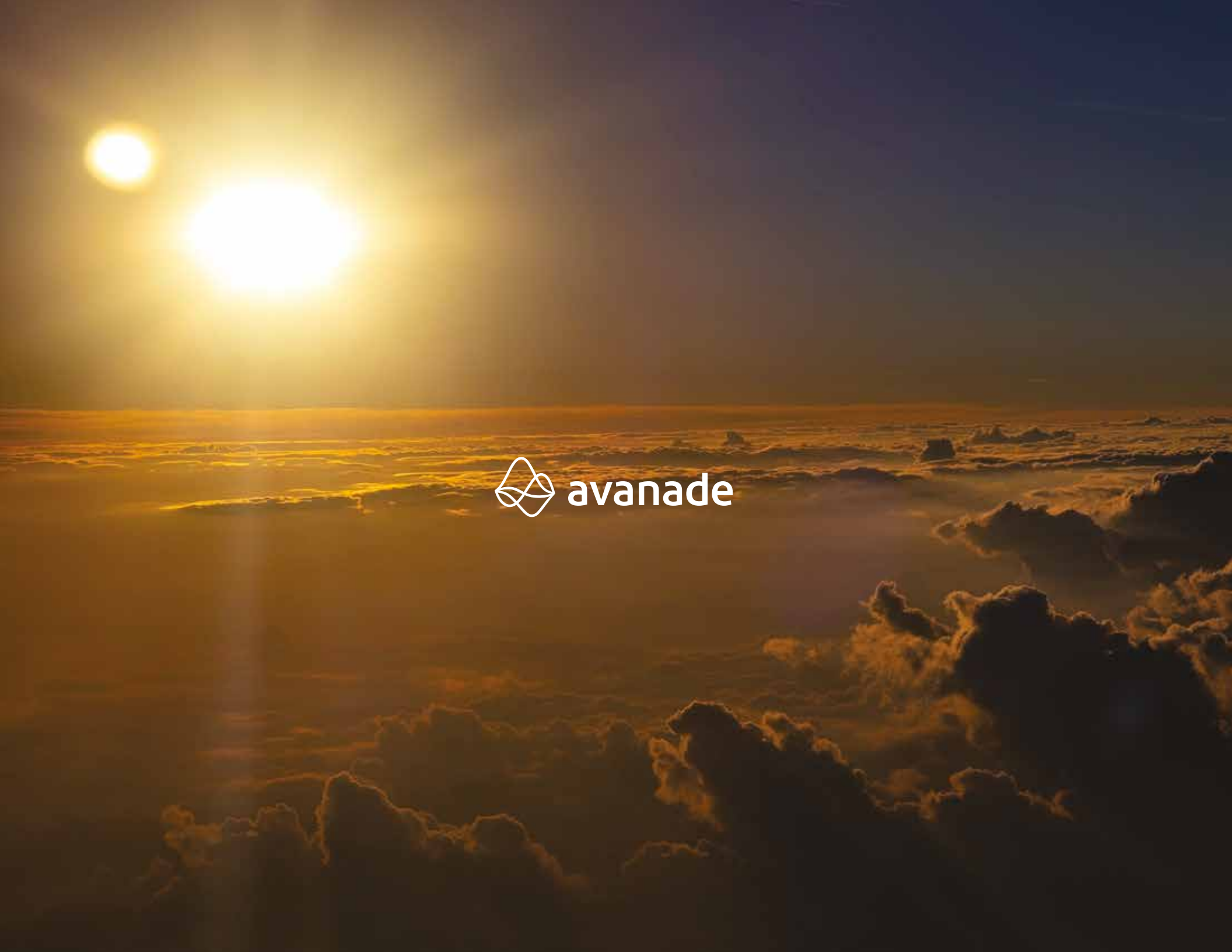
2. azure.microsoft.com/en-gb/overview/what-is-azure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