White Paper

Modernizing Applications and Data: The View from Customers That Have Taken the Journey with Microsoft Azure

Sponsored by: Microsoft

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EXECUTIVE SUMMARY

Spurred by the COVID-19 pandemic, digital transformation efforts in 2020 and 2021 have accelerated dramatically. This year, 95.5% of enterprises are implementing a digital platform, compared with 91.8% in 2019, according to a July IDC survey.

Meanwhile, approaches to digital transformation are diverging. Many companies have retreated from a vision where a single end-to-end platform must drive and govern all digital transformation efforts. Rather, companies are increasingly focused on specific business cases and selecting the right technologies for each one. The percentage of companies choosing this approach grew by 80.2% between 2019 and 2021 and now comprises 46.2% of enterprises pursuing digital transformation.

This shift occurs amid the rise of public cloud, hybrid cloud, and multicloud options, presenting a mix of both opportunity and complexity. Application modernization is a critical component of the digital transformation playbook, and its meaning has expanded and changed. It is now a discipline that considers a series of modalities, as defined by IDC: rehosting on-premises applications to the cloud with almost no changes; "replatforming" them so they can leverage basic cloud platform services such as autoscaling; refactoring their architecture to gain many more cloud-related benefits; the use of cloud-based development tools, from code editors to full DevOps toolchains; and finally, a complete cloud-native rewrite of an application, both to provide new functionality and to help retire legacy assets.

Enterprises have many choices when it comes to application modernization tools, services, and platforms. With Azure, Microsoft has sought to create a one-stop shop for such customers, with a vision that spans not only its proprietary assets but also a wide array of open source and partner-led technologies.

IN THIS WHITE PAPER

To assess the state of application modernization efforts among Microsoft customers and prospects, IDC conducted a web survey in August 2021 that drew 205 respondents. The results showed that while companies have experienced some challenges — particularly concerning IT culture change, upskilling, and costs — respondents enjoyed broad successes through their application modernization

efforts, with more than 80% reporting improvements in time to market, security and reliability, delivery of innovative experiences, and efficiencies.

IDC also conducted five in-depth interviews with companies that have heavily factored Azure into their application modernization journeys. Their stories provided ample anecdotal support for the survey data's findings.

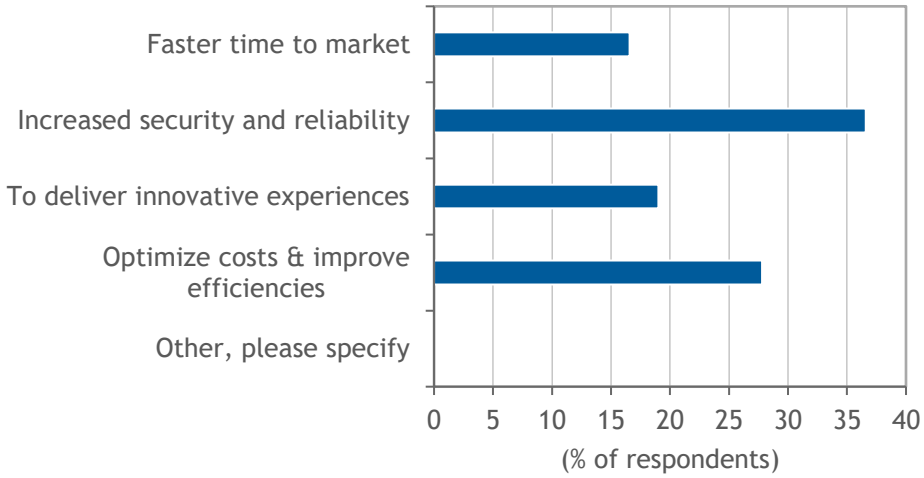
THE APPLICATION AND DATA MODERNIZATION JOURNEY

Application and data modernization can be a long journey, albeit one begun with the best of intentions. For example, companies seek to retire bespoke applications or find replacements to ISV offerings that are no longer supported or are simply too retrograde in their functionality to meet current demands. In other cases, organizations desire to lower their reliance on mainframe-based applications due to factors such as the lack of developers who are current in critical but legacy procedural languages such as COBOL and PL/I. In yet other instances, enterprises want to create a thriving DevOps culture and realize that cloud-native application development can dramatically further that goal. But factors such as inertia and the complexity involved in evolving legacy applications mean many of these efforts sputter and fail.

However, this hasn't deterred interest in the many opportunities for application and data modernization. Survey respondents cited improved security and reliability and cost optimization as the top two drivers, with improved customer experience and time to market coming in next. The good news is that whatever the motivation, the effort resulted in success for a vast majority of respondents.

FIGURE 1

Q. What was the primary motivation for app and data modernization?



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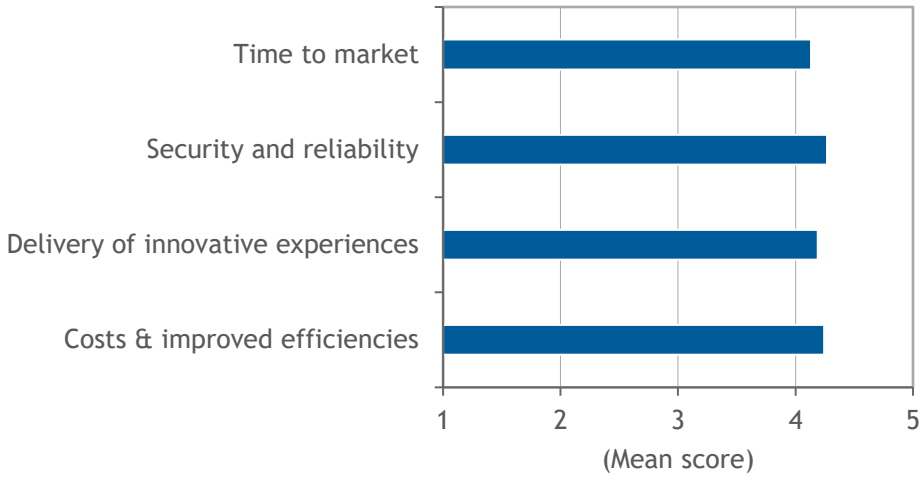
Source: IDC, 2021

FIGURE 2

Q. For each of the following, please rate the level of improvement received after app and data modernization (1 = no improvement, 5 = significant improvement).



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Source: IDC, 2021

Approaches and Trade-Offs to Application Modernization

There are several ways to approach application modernization, but each comes with trade-offs, as discussed below.

- Rehosting, often referred to as "lift-and-shift": It is fast and often aimed at lowering reliance on private datacenters. Companies faced with a hardware refresh find the cloud's elastic pricing and provider-based management attractive. However, little or no functionality is added to the application.
- Replatforming an application so it can take advantage of cloud platform capabilities such as autoscaling: This work can be tricky and could result in unexpected (and unwelcome) surprises that impact application stability and performance.
- Refactoring applications written with aging and rigid architectural patterns such as three-tier to take advantage of new approaches including microservices and serverless: This approach is time-consuming and somewhat lacking a well-understood set of best practices at present. It can also be pricey, given the frequent need to bring in specialized consultants to help with the journey.
- A full application rewrite: This gives an enterprise the most flexibility in terms of application functionality. But like refactoring, it is costly and complex.
- Replacing an application completely, such as with a new SaaS application from an ISV: This approach can offer speed and free up internal development resources for other projects, but it could result in risk given the business process change, limitations to customizations, and the cultural adaptation to new software that is frequently involved.

Finally, there are deployment considerations to mull over. Should a project leverage virtual machines, given the technology's broad familiarity, stability, and security? Use containers for greater agility?

What about adopting a full-blown platform as a service (PaaS) and only worrying about the application code, leaving the rest for a vendor to worry about and guarantee?

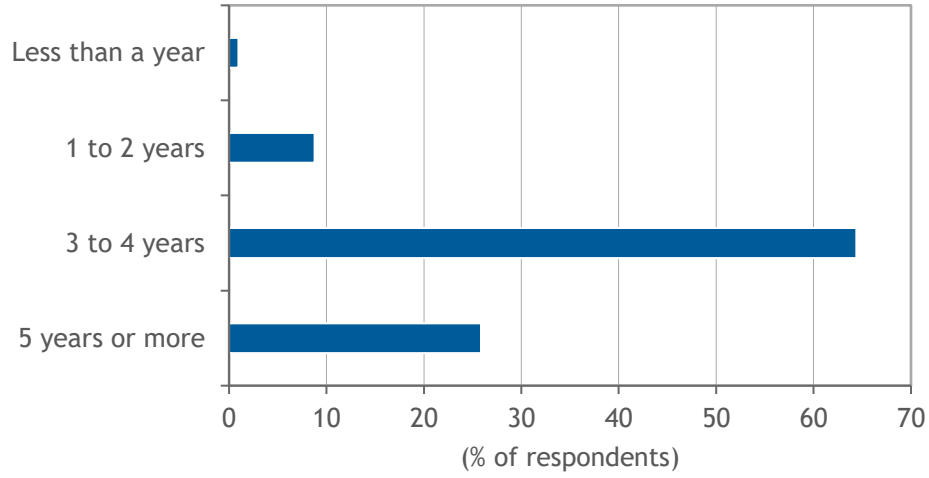
Enterprise Adoption

Application modernization relies heavily on the use of public cloud. IDC sought to gain an understanding of respondents' experience level with such services and which ones they are using, as shown in **Figures 3 through 5**.

More than 90% of respondents have been using public cloud services for at least three years, which indicates a strong baseline for application modernization in the cloud. While compute ranked highest in terms of public cloud services used (51.2%), analytics, data integration, databases, and PaaS also showed healthy adoption.

FIGURE 3

Q. How long has your organization been using public cloud services?



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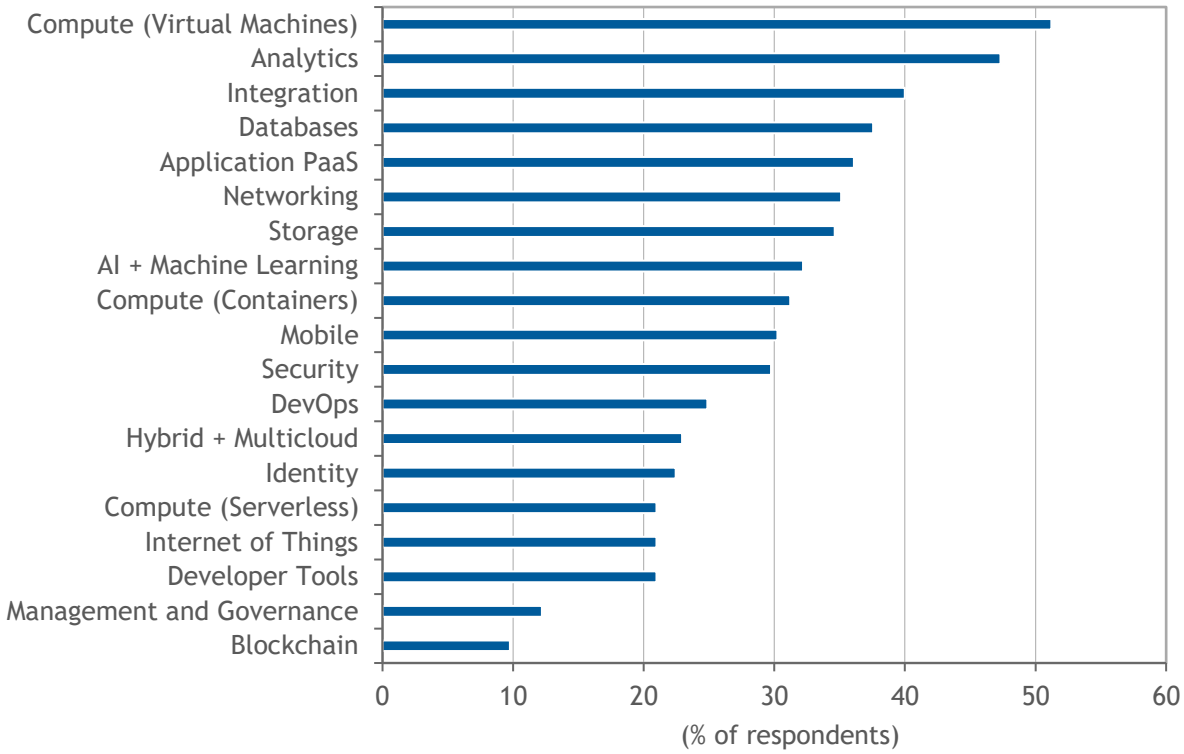
Source: IDC, 2021

FIGURE 4

Q. Which public cloud services does your organization use?



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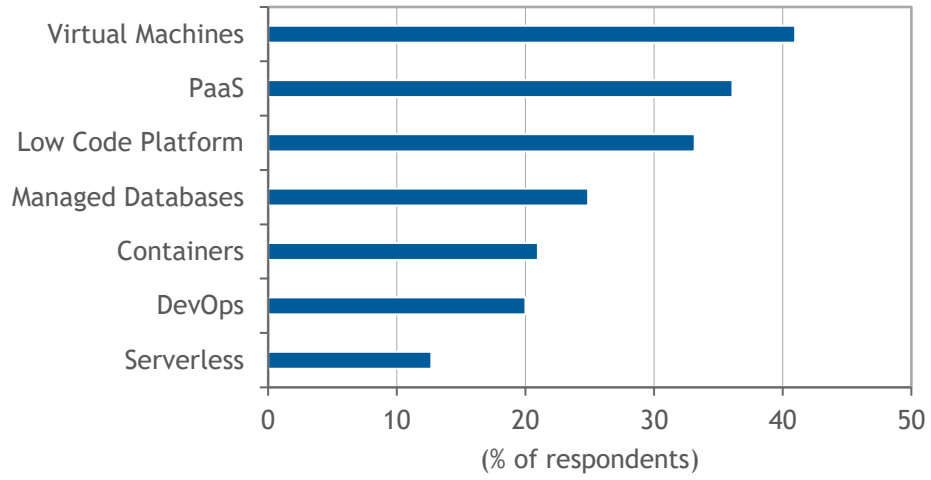
Source: IDC, 2021

FIGURE 5

Q. For the app modernized, which cloud services were used?



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Source: IDC, 2021

Respondents migrated off existing databases and frameworks as part of their application modernization efforts, in some cases to a significant degree. For example, nearly 30% of respondents said they moved away from IBM WebSphere, and 25% reported dropping Java SE when they sought to modernize a Java application. Another 15.5% migrated away from Java Spring, 15% away from Java EE, and 10.5% from WebLogic.

Meanwhile, nearly 45% said they migrated away from .NET 4.x releases, while 5.3% stopped using .NET Core 3.1. Given that .NET 5.0 was released in November 2020, this can be seen not as a retreat from Microsoft's development framework but rather as an eagerness to take advantage of its latest innovations.

Developers are also increasing the use of low-code platform services to accelerate development of new applications. Of the survey respondents, 33% have employed a low-code platform such as Microsoft Power Apps in their app modernization process as a way of increasing developer productivity.

On the database front, about 33% said they chose a different database than MySQL when modernizing an app, and 28% did not use Oracle. In contrast, about 22% selected a database other than SQL Server. Less than 10% said they migrated off IBM DB/2 and Sybase. These low percentages could reflect less a sense of satisfaction and loyalty and instead current market share for those products, in particular for Sybase, which has not received major updates for years as owner SAP focuses its energy on the HANA in-memory database.

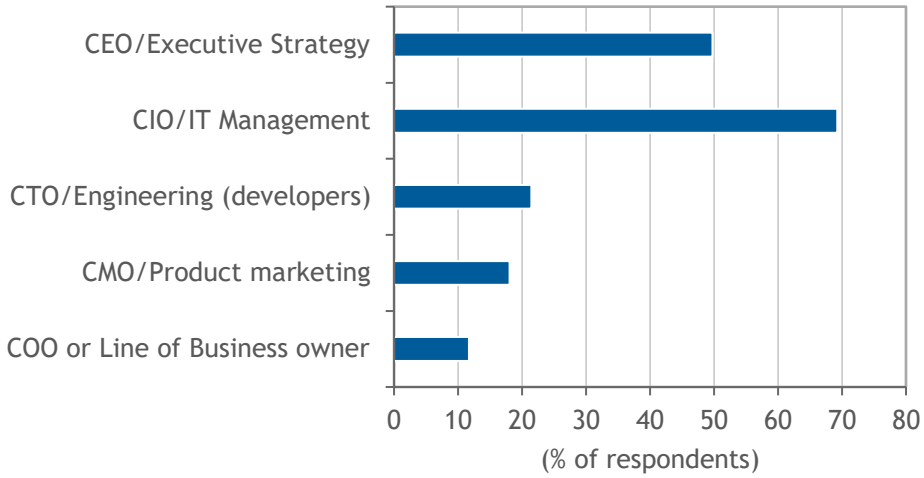
Adoption of any new IT initiative is highly dependent on support from those holding the checkbook inside the enterprise. Survey respondents indicated that application modernization has become a top priority in the C-suite, with CIOs most often taking the lead on decisions (69%) and CEOs coming in

second (50%). Engineering teams were much less likely to have the top leadership role on application modernization decisions (21.5%).

Moreover, when asked how strategic application and data modernization is in their organization today, 42% ranked it as a 5 (critical) on a scale of 1 to 5, while more than 47% ranked it as a 4. Only 1% said it is not a strategic priority.

FIGURE 6

Q. Who is responsible for decision making for app and data modernization in your organization?



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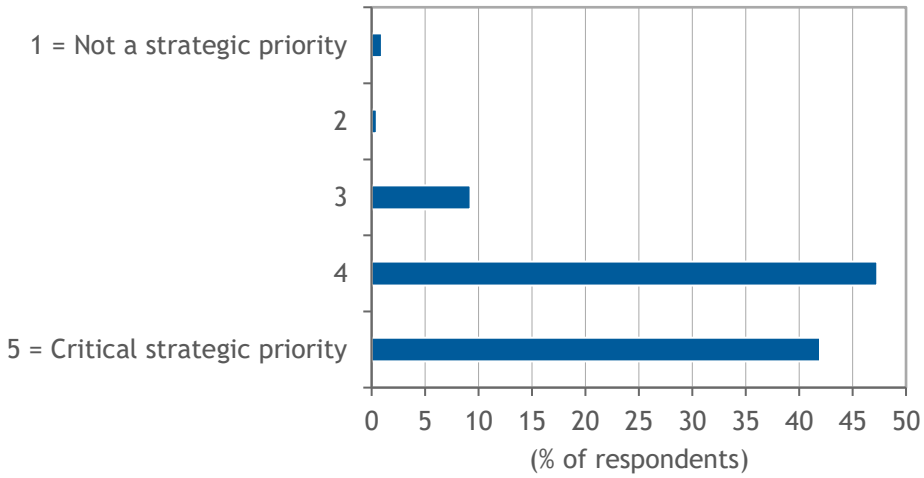
Source: IDC, 2021

FIGURE 7

Q. How strategic is app and data modernization in your organization?



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Source: IDC, 2021

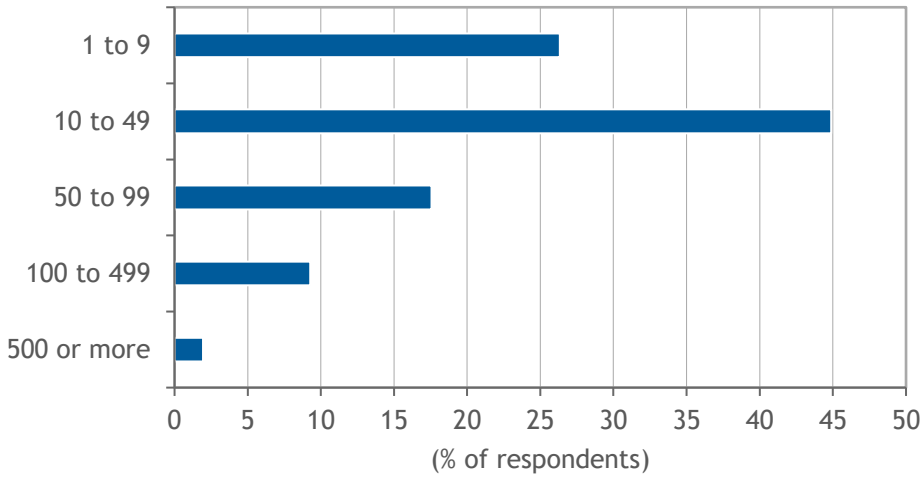
While relatively few survey respondents said their companies had modernized a large number (500+) of applications, nearly half (45%) reported modernizing between 10 and 50, the biggest percentage in the survey pool. This suggests a state of early to medium maturity for application modernization in general, meaning that customers along with vendors and service provider partners have much work and opportunity ahead.

Survey data also suggests that many respondents are scoping projects modestly as well as finding success with delivery. About 48% said projects took between three and six months. Just under 10% said it took a year or longer. Despite this, nearly 50% said their modernized applications serve thousands of users.

Moreover, the enterprises surveyed are modernizing applications without much outside help. About 66% of respondents reported using only internal resources, while about 18% used a combination of internal and external staff and roughly 15% leveraged entirely outside consulting.

FIGURE 8

Q. For how many apps has your organization completed the process of migrating to a modern architecture on a public cloud platform?



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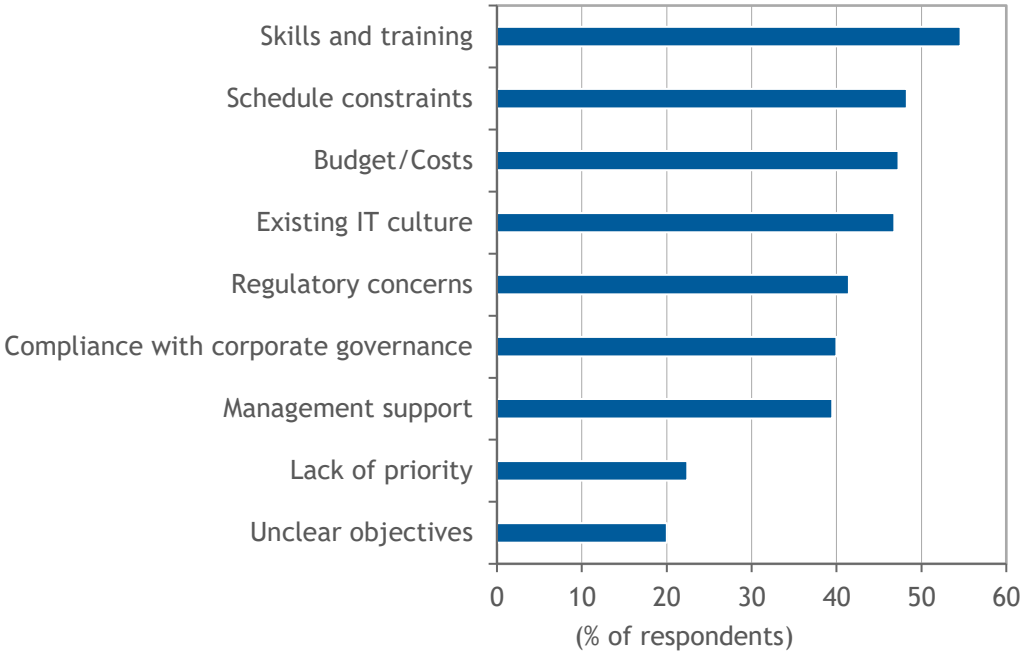
Source: IDC, 2021

Challenges

Meanwhile, although respondents have found high rates of success with their application modernization efforts, they also experienced a series of challenges that will sound like familiar music to anyone involved in enterprise IT.

FIGURE 9

Q. What were your greatest challenges in the app modernization process?



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Source: IDC, 2021

Skills and training represented the challenge cited most often by respondents (55%). This result is not surprising for a few reasons, including high demand for developers with the latest cloud-native tools and frameworks. Another 47% named their existing IT culture as a difficulty, along with 47% citing budgets and costs.

Despite these changes, 57% of respondents have migrated more than half of their applications to the public cloud, and 71% indicated that the rate of future modernization will either stay constant or accelerate.

NOTES FROM THE FIELD

Survey data tells a story, but not the entire story. To that end, for this white paper, IDC conducted in-depth interviews with five Microsoft customers that have successfully modernized applications with the help of Azure's tools and services.

While each customer offered unique examples and end goals, common themes emerged, chief among them a strong desire and urgency to meet customer demands and competitive landscapes. Customers also repeatedly stressed the importance of skills and internal culture change. They also described divergent approaches to application modernization, with some undergoing broad-based efforts and others taking a more experimental, iterative approach.

Supermarket Modernizes Apps and Data to Meet Customer Demand and Experience

A 130-store West Coast supermarket chain with more than $3 billion in revenue has leveraged Azure in the past few years to boost its ecommerce strategy, which launched about 10 years ago.

The chain's ecommerce platform is in its third generation and today provides in-store pickup for online orders as well as delivery. Orders are shipped to a store of the customer's choosing for pickup and to so-called "dark stores" — which aren't open for in-store shopping — for delivery.

Compared with many of its rivals, the chain is well ahead in ecommerce. In fact, it has offered same-day delivery for the past seven years, according to a principal software engineer in charge of the ecommerce platform's development and the chain's overall digital strategy.

"There's been a huge growth in both delivery and in-store pickup because of the [COVID-19] pandemic," he said. "Being in Azure and being in the cloud definitely helped us scale out more easily and be able to expand and grow our capacity to meet that demand."

Microsoft's embrace of open source technologies in recent years has been a boon to the chain, as all of its back-end services are Java-based.

"I've been in the industry for 20-plus years, and back when I started, if you were doing anything with Microsoft, it was all Microsoft or nothing," he said. "If it wasn't for that, you know, I don't think we would be with Microsoft, because a lot of our stuff is Java or open source or different platforms."

Microsoft has developed top-notch documentation for Azure, in particular for Azure Spring Cloud for building Java apps, he said. "They have a reference architecture. You can go out to GitHub. You can download examples and you can deploy those examples into your cloud and then you can modify and have a good starting point."

The chain views application modernization in a few ways. For example, when it moved from Windows Server 2008 to 2012, some applications stayed the same functionally but became cloud deployments using infrastructure as code. The picture is more complex when it comes to the chain's ecommerce platform, which has matured from a monolithic application to one comprising many microservices, which could be viewed as individual applications themselves.

There are three main components to the platform. The front-end mobile application is supplied by Instacart, which offers a white-label version of its shopping software. Then there is the order management system, followed by the fulfillment system.

Overall, the chain has modernized about five applications within the ecommerce space and has created about 10 more with the cloud in mind.

The chain met some challenges on its journey to the cloud. "You've got to find the right kind of developer: somebody who's willing to go out and read the Azure documentation," he said. The chain has a test subscription that allows developers to go into Azure, where they can deploy and experiment with a wide range of services.

Systems engineers 10 years ago may not have had coding skills. That is different today, if someone wants to thrive in a cloud-native world. "They have to have some software background," he said. "They have to know how to use Git. They have to know how to do pull requests. They have to know how to

do infrastructure as code. Within [the company] there's two camps of people: [those who] have totally embraced it and the people that we're having to drag along."

Although the chain today has a broad-based application modernization strategy with Azure, it is not necessary for a company to make rapid wholesale moves to the cloud, he said. One first step could simply be to move an on-premises application to Azure, make small changes, test those changes to be sure nothing broke, and then iterate, such as by containerizing it or running it on Azure App Service. "It doesn't have to happen overnight, and it doesn't have to be a Big Bang. It can happen slowly and little by little."

Modernizing Apps and Data to Meet High-Net-Worth Customer Needs

A New York-based wealth management firm focused on high-net-worth individuals (defined as those with at least $1 million in liquid assets) has a large, long-standing footprint of on-premises applications that will likely remain that way, but the heavily Microsoft shop is using Azure to modernize some apps and conduct development for all new ones.

So far, the firm has rehosted a few on-premises applications to Azure, but its main focus is on the buildout of three major new applications. One is already live, and two are set for deployment in the next three to four months.

The completed application, which took two years to build, centers on the sales stage of the customer journey. Under the company's business model, its customers aren't the actual high-net-worth individuals, but rather the financial advisors who serve them. The company's application analyzes a customer's portfolio of investments and assets and creates a proposal for how to reinvest and reallocate it for better gains.

It uses a goals-based system to make recommendations. For example, a customer may want to retire with $5 million while allowing for a withdrawal of funds to pay college tuition. "We give them a proposal which incorporates this goals-based framework, and with that we are able to show them the cash flows, the kind of returns, and how likely they are to meet that goal," said the firm's director of digital technologies.

Currently, the firm works with about 1,500 financial advisors and hopes the new application can attract more. "This essentially drives any new business," he said. The application previously used was around 15 years old, and while it provides some automation, a lot of manual processes are involved. Proposals can now be generated instantly, compared with a couple of days with the old application.

"We think that this is not only caught up with the industry, but in some ways we are ahead of the industry as far as the experience and the attractiveness of what we're offering," he said. "We don't have very hard numbers to back it up as of this moment, but we're already seeing a lot of interest, a lot of traction in terms of winning business."

The firm is using a wide array of Azure services, including Azure CosmosDB, Azure Logic Apps, Azure Data Factory, Azure Functions, Azure Service Bus, and Azure App Service. Applications are .NET-centric, although there is some open source technology in the mix, such as Angular and Python. While it uses Azure DevOps for deployment, Atlassian's Bitbucket, Confluence, and Jira products handle source control, team collaboration, and project management.

Although the firm has deployed just one major application on Azure so far, it learned some important lessons during the move to the cloud. The firm's infosec team had to familiarize itself with the cloud, and its traditional security posture led it to choose a certain design for the project.

"Every single VNet or subnet talking to each other had to go through a firewall, Palo Alto, inside Azure itself," he said. "As the organization learned more about things, they realized that was overkill. We had to redesign the entire networking infrastructure right after we rolled out our first version."

If the firm could hit the reset button on its cloud journey, he said, it would take a different approach to staffing, skills training, and organizational structure: "I wish we had done deeper training in terms of cloud-native thinking."

The company also staffed up four scrum teams very quickly. A better approach would have been to put together a squad of highly senior resources to build the application's foundation, then scale up the development teams, he said. Ultimately, understanding cloud-native at a fundamental level is critical.

"There needs to be a shift in thinking when moving into the cloud, to actually immerse oneself and get into this thought process of cloud-native architecture," he said. "Be very aware of what you're doing in terms of not replicating that all traditional thinking in terms of applications. It's not just simply taking some old traditional skills and converting that into the cloud."

Soft Drink Giant Sheds Datacenters, Gains Security Boon Through App and Data Modernization

Sometimes a company wants to place a huge bet on the cloud. That's the case with a global soft drink provider that has shed all of its datacenters over the past several years. It is a heavy user of Azure and AWS but has a presence on Google Cloud as well.

"We're pure Azure when it comes to enterprise [applications]; I would say we're pretty much consuming the top 80% of their services that you can find out there," said the company's global head of IT engineering.

Prior to the cloud migration, the company had about 1,800 applications. Like other customers interviewed for this report, it took account of the entire portfolio and decided which applications would move largely untouched, which needed some modifications, and which would be replaced by new ones built in a cloud-native manner. "We found apps that were only being used by a handful of people," he said. "This gave us an opportunity to retire some of those."

Applications that support every business process are now running in the cloud, including the company's large SAP installation. That means that highly sensitive data, including the secret formulas for flavoring its soft drinks, lives in the cloud environment.

The company has made significant technical shifts as part of its move into the cloud. Nearly all — he estimated 95% — of its databases are consumed as PaaS on both Azure and AWS. Many workloads are being moved onto SQL Server in the cloud, and a goal is to reduce the amount of Oracle usage "drastically."

Java is used mostly on AWS deployments. While the company is a traditional .NET shop, it has moved away from .NET Framework, which is generally bound to Windows, and toward .NET Core, which is supported on Windows, Linux, and macOS. "That way, we could run the code irrespective of what server we wanted, rather than jumping into containers like many organizations," he said.

The company does have many virtual machines running in Azure, but those are mostly for legacy applications. Any new applications are predominantly written into serverless and PaaS services, including Microsoft Power Platform, Microsoft's low-code offering.

The move to the cloud helped the company improve and harden its security posture. "I said, let's try to migrate the most sensitive applications first, and let's move our Active Directory service to the cloud," he said. "If you can move them, you can move everything else securely."

Ultimately, the company entirely rethought its approach to security through measures such as encrypting boot volumes for Active Directory using its own encryption keys. "You cannot get more secure than that," he said. "Even if somebody takes a copy of your VM, they cannot bring up a copy. Anything else, we are in a far better place than we were when we started the journey, from a security perspective."

The company is committed to its all-in bet on cloud and views hybrid as more of a liability than an opportunity. "Hybrid puts more weight on you," he said. "It's like running a marathon with 100 pounds in a backpack. You can sustain it for a short time, but in the long run it becomes chaos."

That's not to say the company's cloud journey is truly over, in one important sense, as its products are manufactured and distributed by more than 200 bottling partners around the world. In some cases the company has an ownership stake in a bottler, but in many others it does not. Its bottling partners are also the main source of data on sales, inventory, and other factors, which is fed back to corporate headquarters for processing and analysis.

While the company doesn't directly control its partners' IT strategies, it can be a strong influence and help due to its experience moving into the cloud.

"We went through the pain of doing this migration, and there are a lot of lessons learned," he said. "If I can put all of that together, give it to a bottler, it can save that bottler six to eight months of going through the same pain."

Traditional Bank Creates Next-Gen Digital Bank with Azure

A traditional bank with offices in 120 locations across the United States and mainland China saw an opportunity in creating a digital-only bank aimed at people living outside of the United States who want a U.S.-based bank account. Users can set up an online account through the digital bank's mobile app without needing to visit a location in person. Features and options include checking accounts, certificates of deposit, money transfers, and mortgages.

Work on the digital bank began in late 2017. At the time, the parent bank had a minimal digital presence, said the digital bank's senior vice president of data engineering. Choosing Azure made sense given the legacy bank's enterprise-wide, long-standing relationship with Microsoft, although the company uses other clouds as well.

The digital bank is 100% cloud-based and uses a wide array of Azure compute, networking, storage, and database technology. While the parent bank has many applications running on premises, the digital bank project was designed to be fully cloud from the start.

Considerations for going all in on the cloud for the digital bank included a desire to have a clean slate for a CI/CD process as well as keeping costs in check as development work proceeded. "We didn't want to have a lot of capex [to start]," the SVP said. "We definitely wanted to start small. The cloud

solution was much better as opposed to a traditional IT environment, where you can overprovision and underutilize."

Also, digital banks require a fundamental rethink. They may offer many of the same services as a traditional brick-and-mortar bank but can't be bound by time zones or limited hours of operation given their focus on international customers. "It has to be real time, all the time," he said.

From one perspective, the digital bank can be viewed as a start-up operating under the auspices of the parent bank. He recalled the early days of the project, with four people in a room brainstorming with a whiteboard.

The digital bank's development team took an iterative approach from the beginning, creating a first release within seven to eight months and getting it in front of pilot users. "Fail fast; learn fast. That was the mantra," he said. "We were always very, very close to the customers. We're definitely an agile shop."

Some of the feedback from beta testers resulted in features and functionality that aren't available in the legacy bank. The digital bank now has billions of dollars in deposits and 150,000 to 200,000 users. Those metrics aside, the team hasn't yet put together a formal return-on-investment analysis. The digital bank app gets a new release about once a month, with two weeks of development and two weeks of testing and QA.

The technical stack is largely Azure, with heavy use of real-time data services including Azure Event Hubs and Azure Stream Analytics. The team uses Azure Functions to support the app's serverless architecture and Azure Front Door as a load balancer. Databases used include Azure CosmosDB for unstructured and semistructured data as well as Azure SQL for relational stores. Other services in the mix include Azure Logic Apps, Azure Key Vault, Azure Data Factory, and Azure DevOps.

The bank's leadership team wanted the digital bank to have a complete disaster recovery and business continuity solution in place. Some extremely expensive options for third-party systems were mulled over and ultimately rejected. The SVP's team managed to set up one with Azure Front Door in just three weeks. "To date, whenever we test it, it works seamlessly, with no manual intervention whatsoever," he said. "That was a feather in our cap, and it really shows the power of the cloud."

Going forward, the digital bank's product road map includes plans to adopt Azure machine learning and artificial intelligence services to get more value from its banking data for customers. Proofs of concept are underway now, and the bank hopes to add AI/ML-based capabilities to the app soon. Possibilities include transaction fraud alerts, next-best offers, and churn analysis.

The partnership with Microsoft was critical. "Microsoft helped us throughout the way," he said. "I still know some of the solutions architects who were involved [initially]. There are multiple solutions architects and account teams who are very, very actively involved in making sure that we are successful."

Grocer Harmonizes, Rationalizes its IT Landscape with App and Data Modernization

One of the nation's largest supermarket chains has embarked on a large-scale application modernization effort involving not only Azure but AWS and Google Cloud as well.

The company operates about 2,300 stores, in every U.S. state, under 21 total brands. About four years ago, it began to accelerate its digital transformation efforts across websites, ecommerce, and in-store experience. It operates three datacenters now, but a couple of years ago it hatched a plan to completely migrate all applications to the cloud.

The application modernization effort began about four years ago, with Azure as the primary platform. About half of the chain's workloads are now running on Azure, and when the project is complete, about 90% will be. The chain is also committing a smaller number of critical workloads to other clouds.

Over the past six months, the company conducted development on Google Cloud centered on AI and machine learning capabilities for its marketing and customer experience efforts. It is also migrating its Oracle PeopleSoft payroll system to Oracle Cloud Infrastructure.

To get started with its application modernization journey, the company first created an application inventory, said a senior director who heads up the effort. "We were a traditional company with 20 years of application development happening in different phases and sitting in our datacenter," she said. "In such a big organization, with 3,000-plus engineers working on different initiatives, we have seen a huge amount of shadow IT happening across the board. So the first thing we did was identify the applications and then bucket them into different waves."

The company categorized the applications into buckets, including ones it wanted to invest in long-term, others it wanted to merely maintain, and some it wanted to fully retire.

The company also wanted to use application modernization as an opportunity to rethink how it develops applications. "What we said is, we will move ourselves away from building monolithic applications in-house and go to a microservices architecture," she said. "We're basically [breaking] applications into smaller chunks, which means faster delivery. [Teams] can monitor their stack in a much better way and are able to respond to challenges in a much more organized way than before."

Starting and rightsizing projects has become vastly improved in the cloud. Prior to the cloud, a team at the company that wanted to develop a small application typically had a three-month wait period to get virtual machine resources provisioned. Trouble would ensue when the application was built and teams conducting load testing discovered that the VM was insufficient, requiring another long wait for more resources.

"We had teams that were fast at developing code, but they're just waiting for someone to provide an infrastructure," she said. "This wasn't the case anymore. They ask, they get it the same day now."

The company has a heterogeneous environment when it comes to technology stacks, with large amounts of .NET and Java applications. This will continue to change as the application modernization project continues.

For any new in-house application development, the company created a stack that includes Java, supported by the Spring Boot framework for the back end and Angular and React for the front end. There is also some use of Node.js for unified front- and back-end development in JavaScript. It has curated a set of preferred databases that includes Cassandra, Azure CosmosDB, and Postgres. IBM MQ has been replaced by open source Apache Kafka for messaging, and Snowflake displaced Teradata for data warehousing. Other open source technology in the mix includes Jenkins for CI/CD as well as Prometheus and Grafana for monitoring and observability.

Curation of the new tech stack was critical as the company ventured deep into the cloud. Allowing too much freedom would lead to duplication of capabilities as well as increased overhead around training, the senior director says.

Starting out in its move to the cloud, the company faced challenges, particularly regarding skill sets and attitudes. "Right when I initially started, I was talking to a bunch of infrastructure engineers, directors, VPs," she said. "Everyone thought that cloud is a glorified datacenter. They started saying, 'Let's put this tool into the cloud' – the same tool they had been using in the datacenter. I said, 'If you're going to go and again build everything that you have in the datacenter and bring in your own firewalls, bring in your own load balancer, what's the point in going to cloud?'" Microsoft helped convince the company's teams to embrace what it had already built in Azure, she said.

The application catalog project produced some unwelcome surprises as well, given that some applications were built more than a decade ago by developers who had long since left the company. "When we ran our first scan on these apps, there were ones that came out with 2,000 vulnerabilities, 3,000, you name it. We had to completely throw away some of the code, and some of the libraries are so old and deprecated that we couldn't even find source code for many of those areas," she said.

With that difficult work done, the modernization effort took off. Along the way, the chain has harmonized its IT catalog across all 21 store brands, something critical for continued agility and growth.

The brands are supported by a single IT team. While each brand's website and mobile application is unique-looking via style sheets, it is all powered by the same set of roughly 400 microservices. "The flow is the same; the business logic is the same; the back-end APIs are the same," the senior director said.

MICROSOFT AZURE'S APPROACH TO APPLICATION AND DATA MODERNIZATION

By modernizing applications with Microsoft Azure, customers can improve time to market by providing support for applications and databases using the framework language of their choice to help them achieve greater agility and scale in the cloud and be empowered to take advantage of low-code, containers, DevOps, machine learning and AI, managed databases, PaaS, and serverless. In addition, Azure can help deliver innovative experiences for customers and employees with data-driven insights across an organization's webs apps, infrastructure, and databases to increase efficiencies. Furthermore, Azure can help businesses improve the security and reliability of applications and data by ensuring that services are constantly available with high levels of performance, thanks to a wide array of built-in security services and a global footprint across more than 60 regions.

However, not all applications and databases will follow the same path to the cloud. For that reason, Microsoft's approach to application and data modernization involves a portfolio evaluation process to help customers understand the best path to the cloud for their applications and databases based on their specific business and IT needs.

Microsoft sees the following scenarios and opportunities for application modernization:

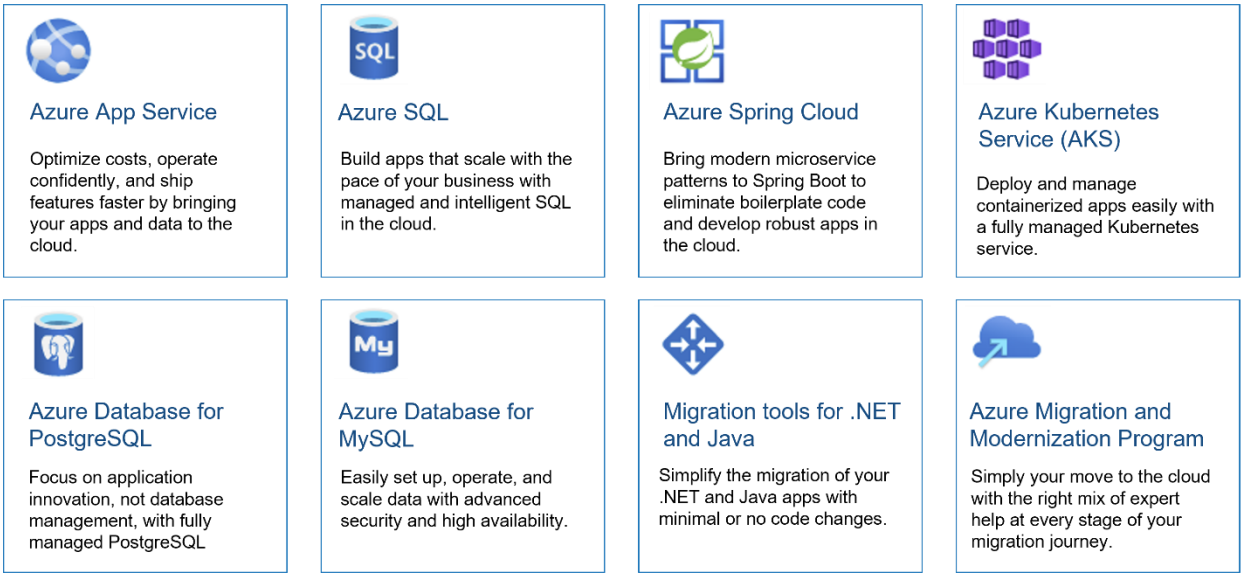
- Retire, rightsize, or eliminate environments
- Use or convert to a low-code solution or SaaS
- Extend functionality of existing solutions using PaaS and serverless

- Convert to serverless solutions
- Optimize for and move to containers
- No change, lift-and-shift to IaaS
- Remain on premises

For chief information officers (CIOs), customer experience officers (CXOs), and database administrators who need to accelerate time to market, deliver more innovative experiences, improve security and reliability, and optimize costs, they can look to Microsoft Azure. It supports the entire gamut of application and data modernization, from AI, DevOps, and low-code to managed infrastructure and databases. Free migration tools and the Azure Migration and Modernization Program (AMMP) make it easy to get started.

FIGURE 10

Azure Application and Data Modernization Services



Source: Microsoft, 2021

From the modernization of web applications to fully managed, highly productive PaaS services like Azure App Service and Azure Spring Cloud, customers can benefit from built-in scalability, high availability, an enterprise-grade SLA-backed uptime of 99.9%, and Microsoft's strong partner ecosystem of service offerings for industry-leading solutions from Red Hat, VMware, Oracle, IBM, Redis Labs, Confluent, Elastic, and more to run and extend apps on Azure. Microsoft also offers AMMP, which provides technical guidance and free migration tools and helps match customers with trusted partners.

CONCLUSION/IDC OPINION

Companies and public sector organizations don't have much of a choice regarding application modernization, lest they fall behind the competition as well as fail in their mission of serving customers and constituents. Those requirements will never change, but the methods of achieving them have, dramatically, in the cloud-native era. Legacy app-dev paradigms such as Waterfall don't make sense anymore in this environment. Agile remains relevant but is most effective when employed alongside a DevOps culture, and vice versa. Modern cloud services make this eminently possible.

The abundance of choice for cloud-native development services in today's market represents great opportunity for customers. It is critical to choose technology partners that offer both proprietary capabilities as well as a strong embrace of the ecosystem.

Microsoft Azure's large and growing catalog of services meets this goal with broad support for open source offerings and key partnerships, such as its pact with Oracle on an interconnect between Oracle Cloud Infrastructure and Azure, while AMMP appears to be a rich and growing effort that leverages Microsoft's traditionally close relationship with channel partners. That said, the cloud-native race is far from over, a fact that promises increased innovation from Microsoft and its competition to meet customer needs.

IDC recommends the following essential guidance when embarking on an application and data modernization journey:

- Perform an inventory and audit of all existing applications to determine which level of modernization is appropriate for each.
- Elevate the strategic importance of modernization to the organization as a whole, ensuring that the appropriate resources, schedule, and executive sponsorship are in place.
- Acknowledge that modernization is not just about new technology. It is also a shift in culture that may require new skills and training.
- Choose a cloud provider that supports a wide range of application frameworks and data management technologies, with flexibility in how those services are deployed in hybrid and multicloud environments.

About IDC

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