Cloud adoption to accelerate IT modernization

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The cloud is a means, not an end. Success in modernizing IT through the cloud is driven by a complete standardization and automation strategy.

Cloud-computing adoption has been increasing rapidly, with cloud-specific spending expected to grow at more than six times the rate of general IT spending through 2020.[1] While large organizations have successfully implemented specific software-as-a-service (SaaS) solutions or adopted a cloud-first strategy for new systems, many are struggling to get the full value of moving the bulk of their enterprise systems to the cloud.

This is because companies tend to fall into the trap of confusing simply moving IT systems to the cloud with the transformational strategy needed to get the full value of the cloud. Just taking legacy applications and moving them to the cloud—"lift-and-shift"—will not automatically yield the benefits that cloud infrastructure and systems can provide. In fact, in some cases, that approach can result in IT architectures that are more complex, cumbersome, and costly than before.

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[1] IDC, "The Salesforce Economy," September 2016, salesforce.com.

The full value of cloud comes from approaching these options not as one-off tactical decisions but as part of a holistic strategy to pursue digital transformation. Such a strategy is enabled by the standardization and automation of the IT environment through an open API model, adopting a modern security posture, working in an automated agile operating model, and leveraging new capabilities to drive innovative business solutions. While cloud is not a prerequisite for any of these features, it does act as a force multiplier. Companies that view cloud capabilities in this way can create a next-generation IT capable of enabling business growth and innovation in the rapidly evolving digital era.

Lift-and-shift is not enough

Cloud services such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud appeal to many organizations because of their stated features: pay-per-use, ability to scale up or down based on usage, high resiliency, self-service, etc. All these benefits are expected to lead to much lower IT costs, faster time-to-market and better service quality compared with traditional IT offerings.

However, traditional enterprises run into two major issues when moving to cloud:

- The existing business applications were created using the traditional IT paradigm. As a result, these applications are typically monolithic and configured for fixed/static capacity in a few data centers. Simply moving them to the cloud will not magically endow them with all the dynamic features of the cloud.

- The typical technology workforce of an enterprise is well versed in developing business applications in the traditional IT framework. Most of them need to be reskilled or upskilled for the cloud environment.

IT security is a good example. Most traditional IT environments adopt a perimeter-based "castles and moats" approach to security, whereas cloud environments are more like modern hotels, where a keycard allows access to certain floors and rooms. Unless the legacy applications that have been developed and deployed for a castles-and-moats security model are reconfigured for the new security model, migrating to the cloud may have an adverse impact on cybersecurity.[2]

Enterprises have been successful in adopting SaaS solutions mainly because SaaS addresses these constraints in a simple fashion: they replace the existing business applications and leave the development of new features to the SaaS provider. SaaS solutions have therefore become very popular for business functions such as marketing and sales, back office (HR), and communication and collaboration. However, in most sectors, there are no mature SaaS solutions for core business functions such as billing for the utilities sector and core/online banking for financial services.

As a result, despite overall increased cloud investment, enterprise cloud adoption is maturing slowly.[3] Many enterprises are stuck supporting both their inefficient traditional data-center environments and inadequately planned cloud implementations that may not be as easy

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[2] Forrester, "Benchmark Your Enterprise Cloud Adoption," January 3, 2017, reprints.forrester.com.

[3] The overall cloud security model is more complicated than the above analogy—we are simply making the point on why lift-and-shift is not likely a good strategy for cloud adoption.
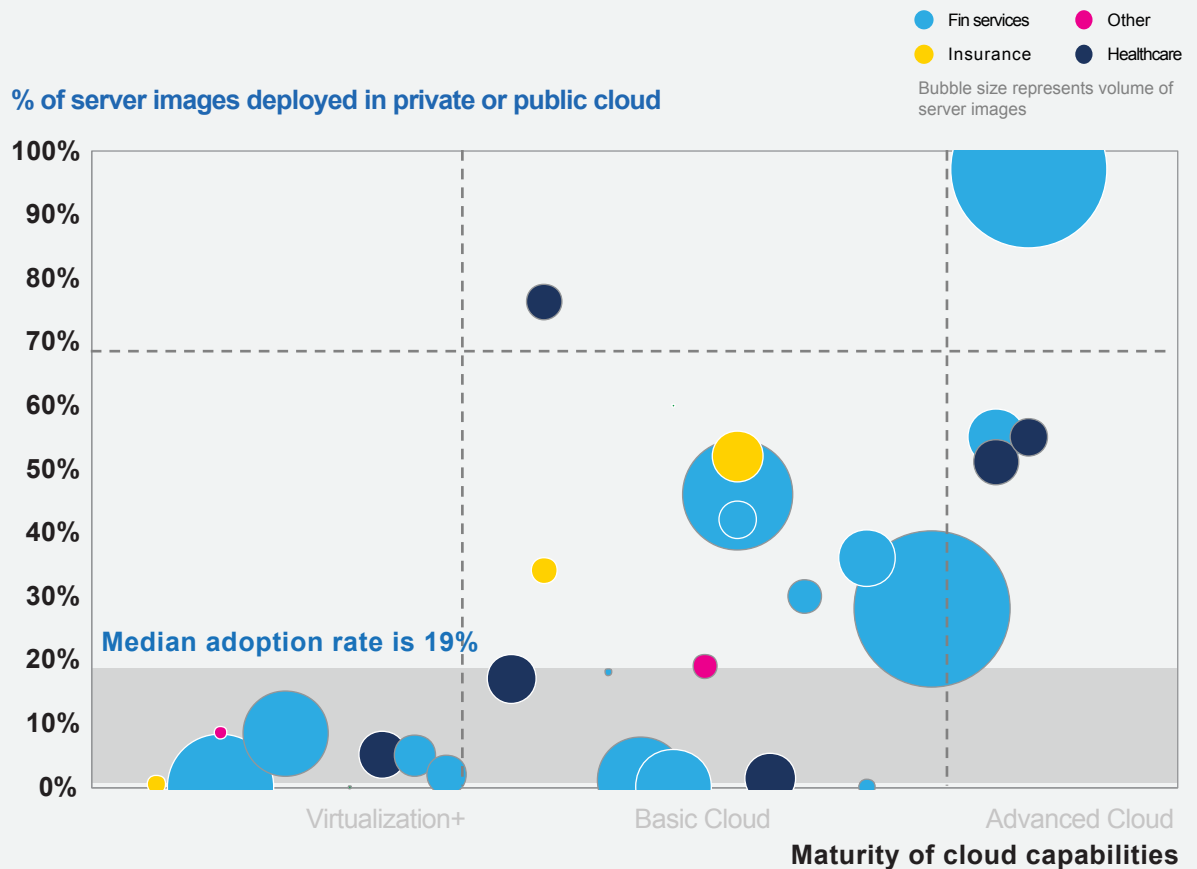
to manage or as affordable as they imagined. While some forward-thinking companies have been able to pursue advanced enterprise cloud implementations, the average enterprise has achieved less than 20 percent public or private cloud adoption (Exhibit 1).

Benefits of automating IT processes through the cloud

Historically, enterprise business applications have been designed to run on custom-configured IT systems, each application requiring its own heavily customized configuration of computer storage and network resources. As a result, IT needed armies of administrators just to keep systems updated and running, to manually add new capacity when demand is high, or apply quick fixes for issues such as low performance. As the number of IT solutions has increased, so has the overhead necessary for testing, integration, and maintenance. In a typical enterprise, just a fraction of IT personnel is focused on designing and developing the market-differentiating solutions the business cares about; the rest are working simply to keep the lights on.

EXHIBIT 1 **Maturity of cloud adoption**

- Fin services
- Other
- Insurance
- Healthcare

Bubble size represents volume of server images

% of server images deployed in private or public cloud

Median adoption rate is 19%

Virtualization+   Basic Cloud   Advanced Cloud

Maturity of cloud capabilities

SOURCE: McKinsey Enterprise Cloud Infrastructure Survey v2016

Standardizing system configurations and automating IT support processes can reverse that ratio. By enabling enterprises to better manage their infrastructures, companies can not only save on costs but also shorten times to market and improve service levels.

Adopting the cloud is a massive enabler of the necessary standardization and automation. With the cloud, companies can:

- Reduce IT overhead costs by 30 to 40 percent

- Help scale IT processes up and down as needed, optimizing IT asset usage

- Improve the overall flexibility of IT in meeting business needs such as more frequent releases of business features; cloud providers are increasingly offering much more sophisticated solutions than basic computing and storage, such as big-data and machine-learning services

- Increase the quality of service through the "self-healing" nature of the standard solutions (for example, automatically allocating more storage to a database). We have seen enterprises reduce IT incidents by 70 percent by using cloud computing as an opportunity to rethink their IT operations

Capturing these benefits from cloud adoption requires more than just lift-and-shift when the business-application system configurations are heavily customized and IT processes are mostly manual. It requires a certain level of remediation to make IT systems more cloud-oriented.

Netflix is one of the most public examples of this kind of commitment to and investment in cloud-enabled, next-generation infrastructure. It spent seven years on its transformation,

adopting a cloud-native approach, rebuilding all its technology, and restructuring the way it operated. It employed application program interfaces (APIs) to reduce its monolithic legacy applications into smaller components, make them more flexible, and *then* move them to AWS. As a result, service availability has increased, nearing the company's stated goal of 99.99 percent of uptime. And Netflix has seen IT costs for streaming fall to a fraction of what they were in its own data center.

Recently, many established companies have made aggressive moves to adopt public cloud solutions. Capital One is running the bank's mobile app on AWS; GE Oil & Gas is migrating most of its computing and storage capacity to the public cloud; Maersk is migrating its legacy systems to reduce cost and operational risk while enabling advanced analytics to streamline operations.

Pioneer organizations are also actively seeking ways to leverage the new services on cloud to create innovative business solutions. Progressive Insurance deployed its Flo chatbot on public cloud; NASCAR is leveraging machine-learning solutions on cloud to analyze real-time and historical race car data to improve performance and simulate scenarios.

Even "born digital" companies that initially chose, for strategic reasons, to have their own IT infrastructure and systems are now opting to move to cloud to leverage the scalability and the higher order functionality it offers. Spotify is a prime example.

How to approach the cloud transformation

Fully embracing cloud can have a significant upside but also requires substantial upfront investments in what is often a multiyear journey. For this reason, an all-in transformation

approach needs active commitment and a clear mandate from the CEO and board over the long term (see sidebar, "A tale of all-in transformation").

Specifically, there are four key topics companies should address for successful cloud adoption at scale:

1. **Decide on sourcing.** It's difficult for most companies to build their own cloud technology stack and even harder to maintain it. Partnering with public cloud providers to build and manage the cloud stack is the more typical approach. In most cases, the pragmatic way to start is with a single cloud service provider while adopting the necessary guiding principles to avoid being locked into one provider. After achieving a certain scale and level of maturity—in our experience, a good rule of thumb is to plan for an annual run rate of $30 million with the primary cloud service provider—an enterprise can explore a second or third service provider for scaling up.

A tale of an all-in transformation

A Fortune 100 company with a $2.2 billion annual IT spend ($800 million on infrastructure costs alone), was struggling with the cost and complexity of its legacy IT environment. Its IT department was supporting 8,000 applications (including 150 instances of SAP) and 20,000 workloads. Not surprisingly, provisioning was slow. It took more than 45 days to set up a server, and the company knew this was not sustainable.

Consequently, the company invested more than $200 million in aggressive digital transformation. It was a significant effort, but the company achieved a return on its investment in less than four years.

The company first defined its cloud sourcing strategy, grounding it in an aggressive move to a hybrid (public and private) cloud model as public cloud options were still maturing in late 2013. It opted for a single strategic partner for each cloud and recently added a second public cloud partner. It then created a cloud operating model, setting up a new 100-person team working within an agile operations framework.

Then, beginning in 2015, the company began its legacy-remediation work, moving all its applications to a private cloud, heavily incentivizing its application teams. It took an opportunistic approach to upskilling IT: every application team that wanted to use cloud had to go through an in-house training program.

Within the first six months, the company had moved its complex SAP environment to private cloud and adopted a cloud-first policy for all new applications. It replaced expensive colocated contracts and moved its systems to a software-defined data center.

Less than three years in, the company has moved more than 2,000 workloads and two petabytes of data to the public cloud. The company reduced costs by $90 million at the two-year mark and is on track to cut another $60 million. Automation also significantly improved performance and agility. With the transformation on track to completion in 2018, the company is now one of the largest enterprises operating on cloud.

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2. **Create a public-cloud operating model.** Unlike traditional operating models, the public cloud requires IT to manage infrastructure as code. This requires software engineers who understand the compute, storage, and security protocols of public cloud (as opposed to network engineers or system administrators). For most enterprises, this translates to a massive upskilling of the infrastructure organization and the operating model in which they work. Specific teams need to be assigned to configure and manage the production environment.

3. **Legacy-application remediation.** Existing applications will need to be refactored at the infrastructure and application layers to align with the security and capacity requirements of the public cloud. Security must be baked into these applications, and they must work in a more automated fashion. This requires significant attention from application teams, which can be hard to get.

   Companies can address this hurdle by creating a clear business case for legacy-application modernization, aligning the migration schedule with major application upgrades or replacements, and adopting foundational solutions (such as API frameworks) to make the remediation easier.

4. **Cultivating the right skills.** Professionals must be able to develop applications on the cloud (specifically on the vendor's system) securely and quickly. To do this, companies will need to hire and train cloud experts and then introduce them into development teams, retrain or upskill the existing workforce, and set up digital-innovation labs as needed with an emphasis on cloud development.

This aggressive approach relies on true commitment from leadership in the form of money (one financial-services business is investing $300 million in a cloud transformation) and time (these programs can take two to three years). That's because, in executing a cloud transformation, multiple things need to happen at the same time. In many cases, for example, a core group of cloud engineers preps for the cloud migration by setting up the cloud environment, hardening it, looking at applications to move, and creating tools for migration. Meanwhile, the main IT team is being trained in how to work in an agile way. This approach has significant management challenges, but with strong leadership, it's the fastest path to transformation.

Many enterprises, however, are not yet ready to take the full plunge into cloud, perhaps because organizational buy-in is lacking, or there is a reluctance to invest the required resources in a multiyear effort, or in some cases due to regulatory constraints. These organizations can achieve significant benefits in the short-to-medium term, albeit on a smaller scale, by adopting the cloud's agile and automated operating model within their traditional IT. This approach builds important organizational capabilities and prepares the business for a cloud transformation when it is ready.

Companies have eagerly adopted agile methods for application development and are actively pursuing automation/DevOps (such as continuous integration and continuous delivery), but the same approach can have an even greater impact on IT operations and infrastructure. By organizing the infrastructure function into tribes of small cross-functional, self-directed squads with product owners to prioritize work and scrum masters responsible for removing barriers, IT can prioritize work in
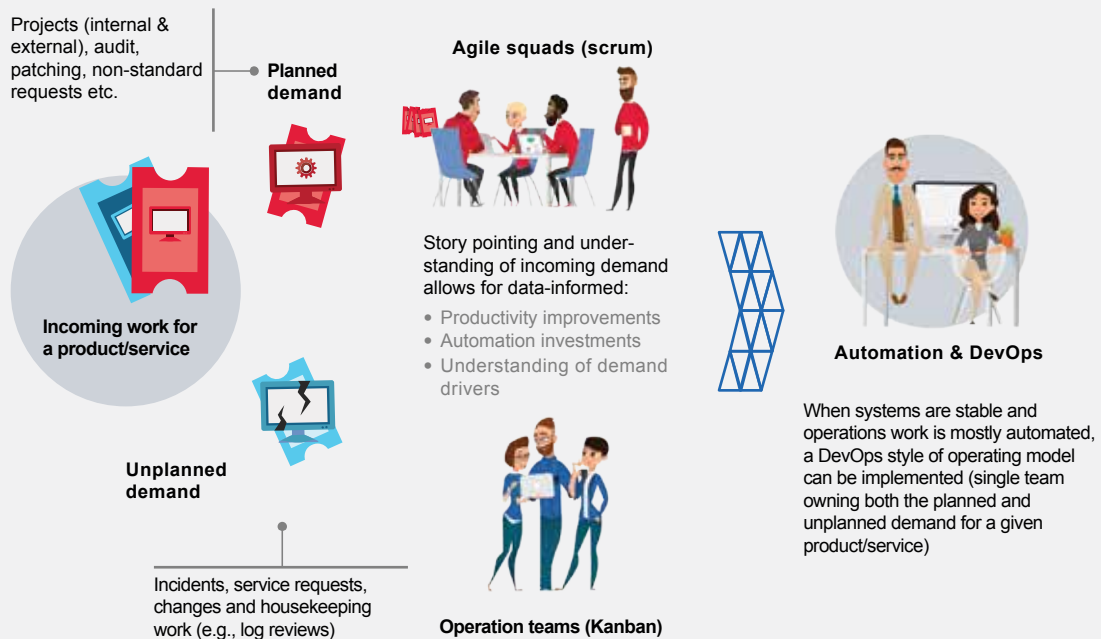
ways that increase productivity, quality, and speed. In addition, the continuous automation program, over time, can further infuse cloudlike capabilities into traditional IT, such as APIs for interactions between developers and infrastructure (Exhibit 2).

With the goal of improving service levels and reducing costs, one major life insurance company adopted an agile approach within its 250-person IT operations groups. The company began by assessing the state of its current infrastructure—its core processes, organizational model, metrics and KPIs, and historical demand—and developed a hypothesis about what it might achieve with a more agile approach. It created a leadership

program appropriate to agile methods, adopted the necessary tools, and conducted an agile-for-infrastructure boot camp for stakeholders.

Within six weeks, the IT infrastructure group started planning for ongoing projects, conducted training sessions for senior leaders and infrastructure teams, and set a goal for what ongoing operations should look like. It fully leveraged scrum methodology for planned work such as projects, and Kanban, a methodology for managing the creation of products emphasizing continual delivery, for unplanned work such as incidents and service requests. By the end of the second month, the company had achieved the operational

EXHIBIT 2   **The agile/DevOps operating model is proving to be even more applicable in infrastructure than in application development.**

Projects (internal & external), audit, patching, non-standard requests etc.

Planned demand

Agile squads (scrum)

Incoming work for a product/service

Story pointing and under-standing of incoming demand allows for data-informed:
- Productivity improvements
- Automation investments
- Understanding of demand drivers

Automation & DevOps

When systems are stable and operations work is mostly automated, a DevOps style of operating model can be implemented (single team owning both the planned and unplanned demand for a given product/service)

Unplanned demand

Incidents, service requests, changes and housekeeping work (e.g., log reviews)

Operation teams (Kanban)

model it envisioned and was able to begin designing service-management processes and launching automation initiatives.

It completed the initial transformation in six months, cutting IT costs by more than 35 percent and doubling productivity. The insurer plans to automate up to 80 percent of its operations work, driving costs down even further and significantly improving its service levels. Today, it is well-positioned to move more aggressively to the cloud in the future.

The rules of the cloud game

There are many actions enterprises can take that have proved valuable to early adopters of cloud-enabled next-generation infrastructure. These include, but are not limited to:

- **Evaluating the current IT portfolio.** Before beginning any cloud development or migration, take a dispassionate look at the existing IT portfolio to determine what is suited for public cloud platforms or SaaS alternatives.

- **Choosing your transformation approach.** Involve all key stakeholders in determining whether your enterprise will be an aggressive or opportunistic transformer.

- **Articulating IT and business goals.**

Create a well-defined set of outcome-oriented aspirations for both the short and long term in line with your approach.

- **Securing buy-in.** Ensure commitment and investment from senior management, particularly finance leaders, who must support the transfer from capital to operations and maintenance investments/accounting.

- **Addressing change management.** A heavily automated agile operating model will require significant shifts in IT behaviors and mind-sets. Invest in both change management and the development of cross-functional skills across infrastructure, security, and application environments.

- **Adopting new KPIs.** Measure and reward your technology team for standardization and automation rather than, say, for availability.

By viewing cloud computing as a starting point for IT automation, companies may be able to have it all: scalability, agility, flexibility, efficiency, and cost savings. But that's only possible by building up both automation and cloud capabilities. ◆

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