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Migration to AWS
in Five Steps
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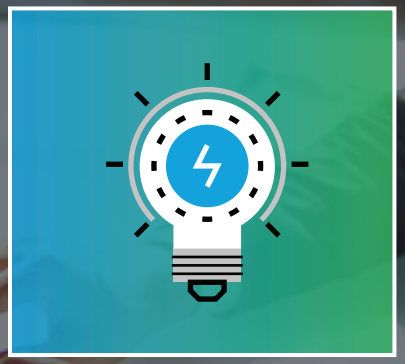

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INTRODUCTION

CLOUD ON THE RISE

Cloud computing has been gaining momentum for years. Many more enterprises see public cloud as their top priority, up from 29 percent in 2017 to 38 percent in 2018 according to the RightScale "State of the Cloud Report" published in 2018. As the technology leaves the early adopter phase and becomes mainstream, many organizations find themselves scrambling to overcome the challenges that come with a more distributed infrastructure. One of those difficulties is getting through a major cloud migration.

As customers decide on migrating applications to Amazon Web Services (AWS); or migrate the entire data center to AWS, many organizations scramble to overcome the challenges. Customers are committed but are very cautious in migrating applications – not sure about how the app will perform once it's migrated over. They seek have questions around:

- Dependency mapping: which components will impact others
- Asset visibility: understanding which ones they have
- Prioritization: which workloads to move first, and why
- Hybrid environments: only migrating the front end to the cloud, while leaving some dependencies (mainframe or database) in their data center.

As customers decide to migrate to the cloud, they tend to migrate at different maturity levels or phases. On their journey to the AWS cloud, enterprises typically follow this chronology:

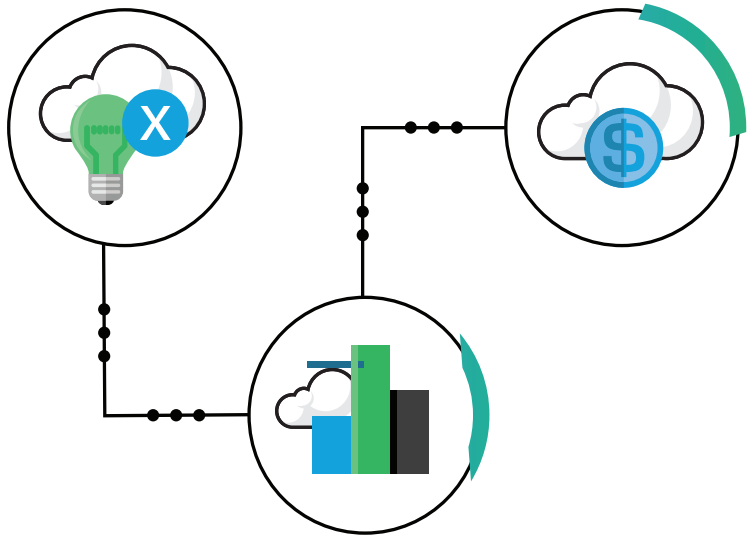
1. Development and Test
2. New Applications
3. Digital and CX
4. Analytics
5. Mobile
6. DC Migration
7. Mission Critical Apps
8. "All in"

It is one thing to roll out a few applications and cloud pilot projects, it is an entirely different challenge to start using the cloud across multiple lines of business at massive scale. That is the point that organizations are beginning to reach, and the time has come to take a serious look at cloud migration best practices.

PLANNING AHEAD OF MIGRATION IS ESSENTIAL

Performance challenges can add up quickly with a poorly configured cloud setup, and companies must get serious if they hope to transition to the cloud successfully. This focus on migration is key as:

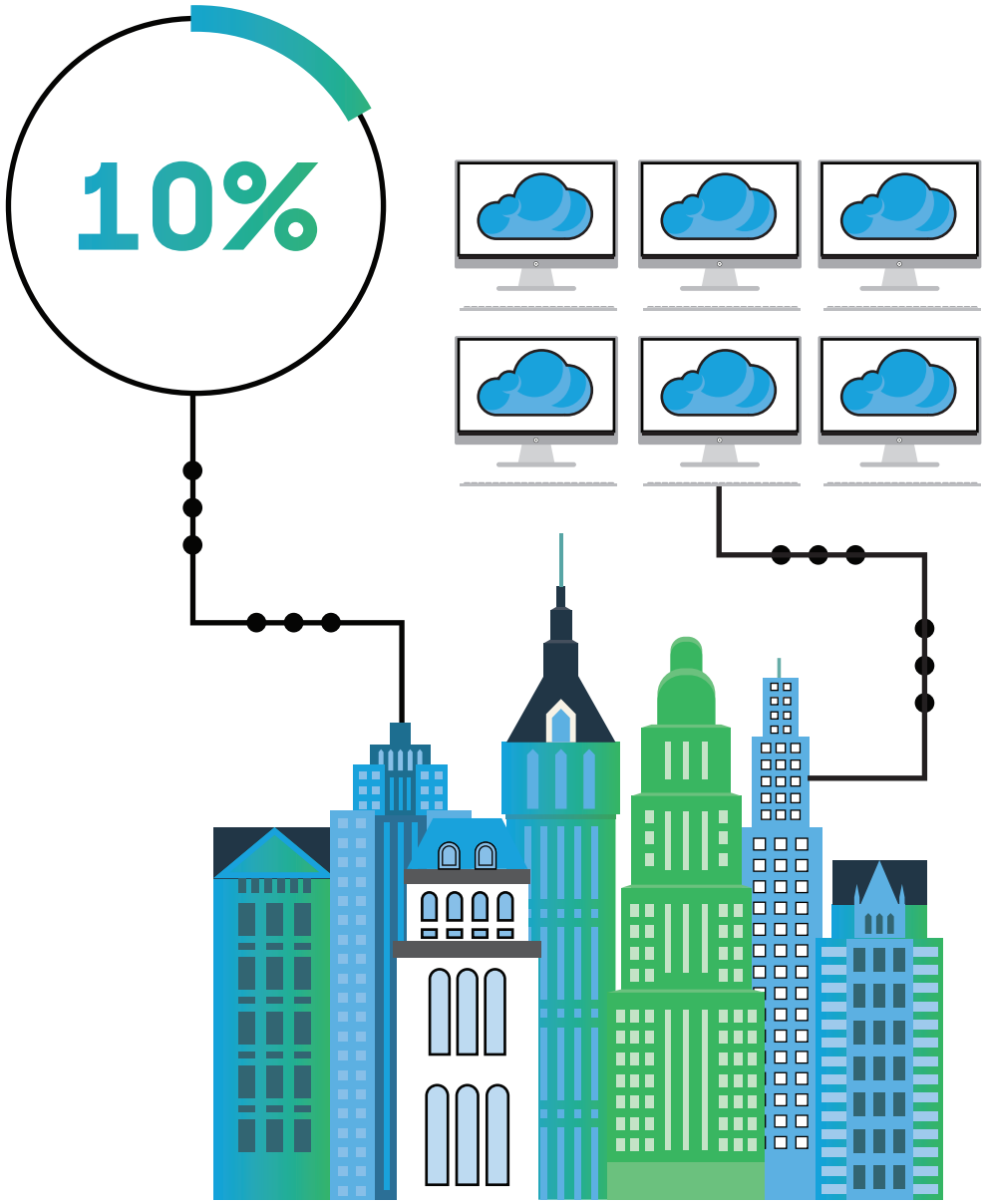
CLOUD INVESTMENTS REPRESENT APPROXIMATELY 60 PERCENT OF MARKET REVENUE GROWTH IN THE IT SECTOR [1]. FORTY-EIGHT OF THE FORTUNE 50 CORPORATIONS HAVE PLANS TO ADOPT THE CLOUD OR HAVE DONE SO ALREADY [1]. WHILE THE CLOUD IS GAINING MOMENTUM QUICKLY, 52 PERCENT OF IT LEADERS SAID THEY DON'T HAVE A FORMAL CLOUD STRATEGY IN PLACE[2].



1. http://www.bain.com/publications/articles/the-changing-faces-of-the-cloud.aspx
2 http://searchcio.techtarget.com/feature/State-of-cloud-infographic-Cloud-computing-stats-for-CIOs-IT-execs

ON TOP OF ALL THIS, APPROXIMATELY 10 PERCENT OF AWS CUSTOMERS IN A RECENT SURVEY HAD MORE THAN 1,000 VIRTUAL MACHINES RUNNING IN CLOUD ENVIRONMENTS AND THE AVERAGE BUSINESS HAS 4.8 SYSTEMS IN USE ACROSS PRODUCTION AND TEST SETTINGS[3].

Businesses may be turning to the cloud at a breakneck pace, but that speed is leaving many without a clear plan as to how they want to reach their end destination.



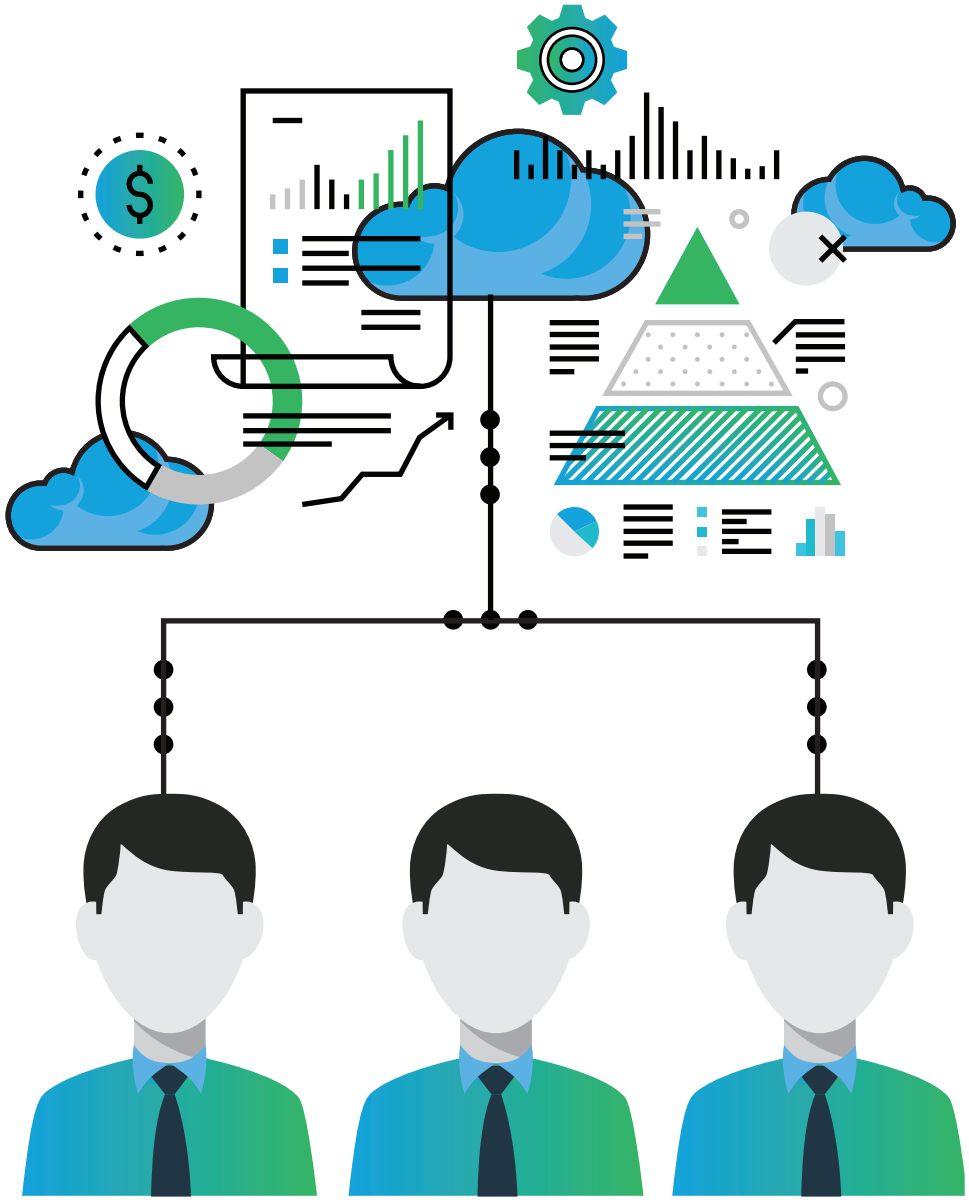
3. https://www.rightscale.com/blog/cloud-industry-insights/cloud-computing-trends-2018-state-cloud-survey

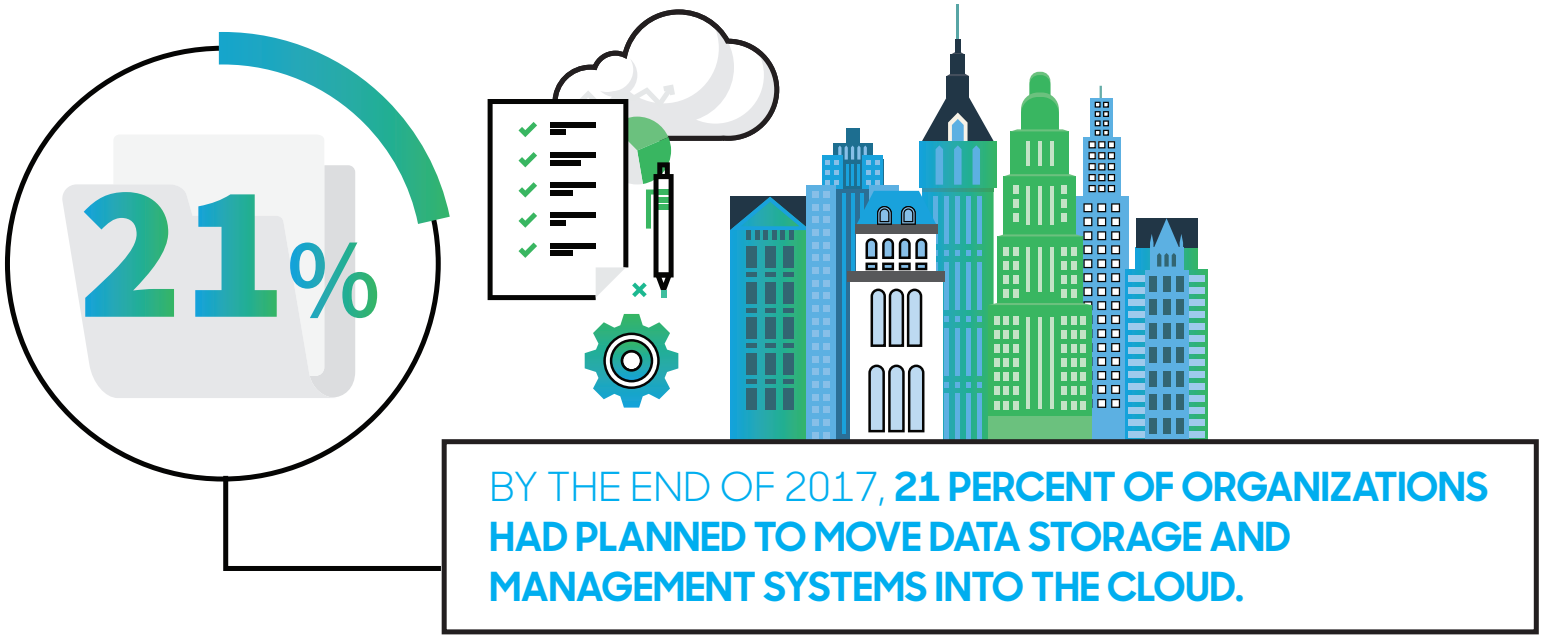
UNDERSTANDING THE MIGRATION CHALLENGE

While the challenges that come with the cloud act as a caution, the good news is that an effective cloud migration can overcome many of the issues that are inherent with the technology.

THE CLOUD INDUSTRY HAS MATURED TO THE POINT THAT ADVANCED TECHNOLOGIES MITIGATE MANY OF THE UNDERLYING CHALLENGES ASSOCIATED WITH THE CLOUD. THE KEY HERE IS TO UNDERSTAND EXACTLY WHAT YOUR BUSINESS NEEDS FROM THE CLOUD AND FIGURE OUT HOW TO MEASURE PERFORMANCE BASED ON THOSE REQUIREMENTS.

Taking a strategic, intentional approach to cloud migration can alleviate many of the technology's core challenges, and following these five steps can help your company navigate the transition successfully.





STEP 1: WHY MIGRATE AT ALL?

WHY ARE BUSINESSES MOVING TO THE CLOUD?

Businesses move to the cloud for a variety of reasons, but looking at why organizations migrate to the cloud is an extremely revealing way to explore their core motivations.

COMPANIES ARE GETTING MORE MATURE ABOUT WHAT THEY MOVE TO THE CLOUD:

- By the end of 2017, 21 percent of organizations had planned to move data storage and management systems into the cloud. Twenty-two percent of businesses planned to do so in the next one to three years. In comparison, 29 percent of organizations currently have cloud systems handling data storage and management[4].
- 22 percent of companies are moving analytics systems into the cloud in 2018 with 21 percent doing so in the next one to two years. The move toward using the cloud for robust data storage and management, not to mention analytics, highlights maturation in the industry.

Email, messaging, collaboration and le sharing represent some of the cloud's low-hanging fruit that have long dominated the market. Businesses are moving beyond this initial deployment phase to get deeper into the cloud.

As they do so, there is a growing move away from traditional cost-focused cloud adoption models. While the cloud can offer lower costs than traditional systems, and certainly offers a lower entry point, businesses are increasingly aware that the cloud cost model is complex and requires careful management[5].

4. https://www.forbes.com/sites/louiscolumbus/2016/11/20/analytics-data-storage-will-lead-cloud-adoption-in-2017/#120bfe647e7a
5. http://www.cio.com/article/3137946/cloud-computing/6-trends-that-will-shape-cloud-computing-in-2017.html

The transition toward more sophisticated, potentially expensive cloud systems highlights that meeting business demands is becoming more important than simply reducing costs when it comes time to move into the cloud.

WHY IS YOUR BUSINESS MIGRATING TO AWS?

This is the first question you need to ask prior to a cloud migration. As we've seen, the business world is going beyond the simple issues like cost reduction. With that in mind, companies must get past that entry point and take a more introspective look at why the cloud matters for them.

A FEW QUESTIONS TO CONSIDER ARE:

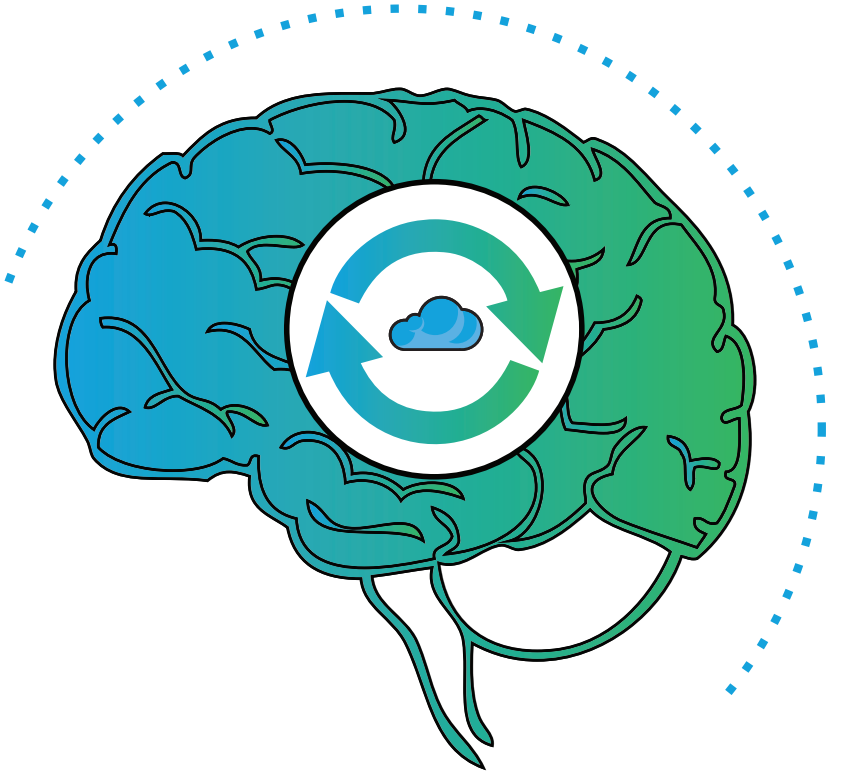
1. What technology problems are you trying to solve with the cloud?

2. How will the cloud support your short and long-term business goals?

3. How does a move to the cloud impact your competitiveness in the marketplace?

4. What cultural and operational changes are you trying to support by moving to the cloud?

The list of reasons for migrating to cloud systems could go on and on. The reality is that cloud computing is so mainstream in so many sectors that the valid reasons for transitioning are nearly endless. This is why it is so important to be able to concretely and concisely identify exactly why each of your cloud projects are in place.



CLOUD SPRAWL IS A MAJOR ISSUE FOR CLOUD-FOCUSED ENTERPRISES. APPROXIMATELY 64 PERCENT OF BUSINESSES ARE CONCERNED ABOUT GAINING COMPLETE VISIBILITY INTO THEIR CLOUD CONFIGURATION. ANOTHER 63 PERCENT SAY THEY WORK TO PREDICT THE COST OF CLOUD COMPUTING[6].

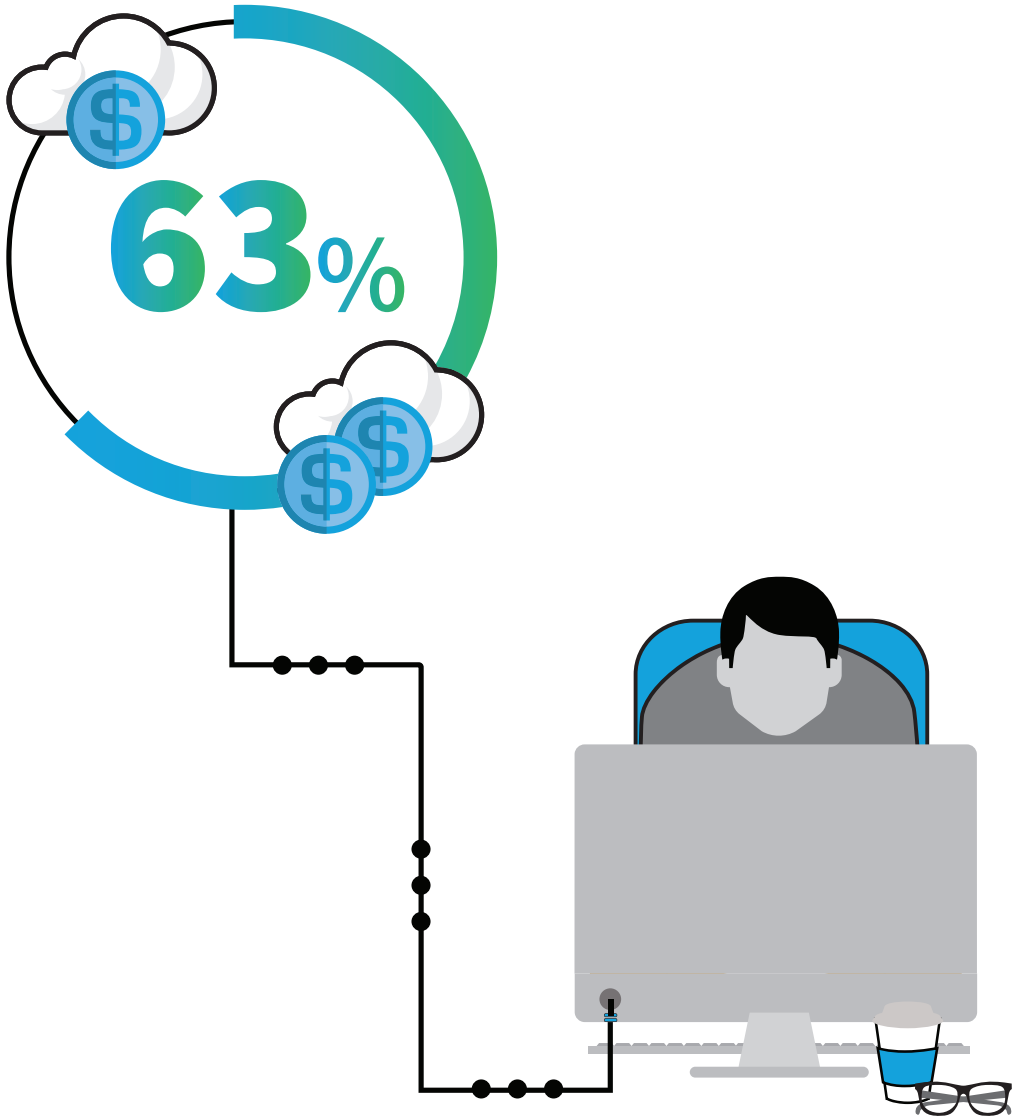
Furthermore, cloud plans have escalated to the point that many businesses don't understand the full scope of their configurations[7]. Avoiding this type of cloud sprawl depends on having a clear, intentional reason behind every phase of the cloud migration.

BRINGING DISCERNMENT TO THE INITIAL DECISION

As you consider why you are moving to the cloud, avoid doing so for reactionary reasons. Responding to the marketplace is critical, but simply reacting to a few key events can lead to a rushed cloud move that you aren't ready for.

Instead of being pressured into a cloud migration, take the time to figure out all of the motivating factors behind the move. Gaining a full understanding of the organizational issues behind the move to the cloud is key to maximizing the value of technology. Otherwise, companies may solve some isolated problems without gaining major operational advantages.

This type of discernment can protect your organization from a harried move to the cloud that doesn't get the results you want.



6. http://www.businesswire.com/news/home/20161027005475/en/ServiceNow-Survey%C2%A052-Enterprises-Choose-Cloud-Default-Projects
7. https://www.forbes.com/sites/joemckendrick/2017/01/22/cloud-computing-spins-out-of-control-but-maybe-thats-not-such-a-bad-thing/#498adbd2273d

HOW ARE YOU MIGRATING TO THE CLOUD?

Once you have an understanding of why you are entering the cloud space, you must look at the "how" part of the process. In particular, be aware of:

- Which legacy applications and services won't be able to function properly in cloud environments.
- How you will segregate different data types once they are moving between cloud and in-house environments.
- What training will be necessary to get employees comfortable with new applications and services.
- How the shift to the cloud will impact network behavior.

These questions tie directly back to the big-picture issues. If your cloud plan emphasizes customer-facing systems, then you'll know you may not need to update your WAN as much. However, you will need to train your customer service representatives, so they'll be ready to troubleshoot with clients during the transition. These core technical questions are a key consideration when asking the big questions about how you should migrate to the cloud.

CLOUD MIGRATION STRATEGIES

There is no single path to cloud nirvana. The choices of public cloud, hybrid cloud, Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and build or buy, can inflict analysis paralysis on even the best decision makers. Instead of going all in on a single strategy, enterprises should employ a variety of approaches to successfully move their IT environments to the cloud.

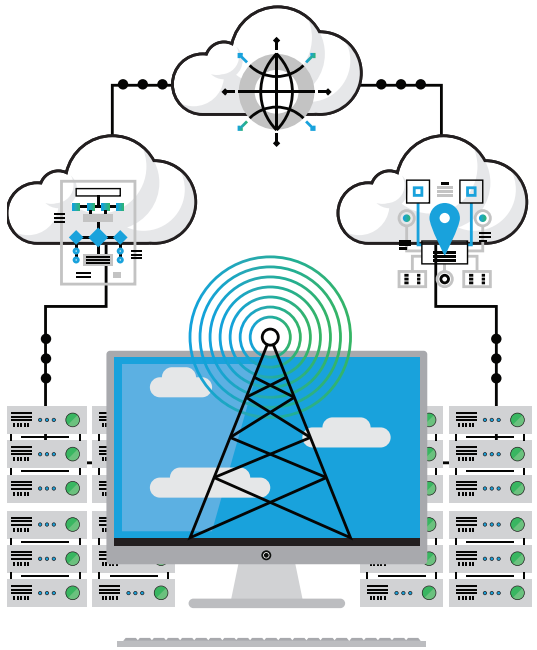
Here are some of the most common strategies for enterprise cloud migrations.

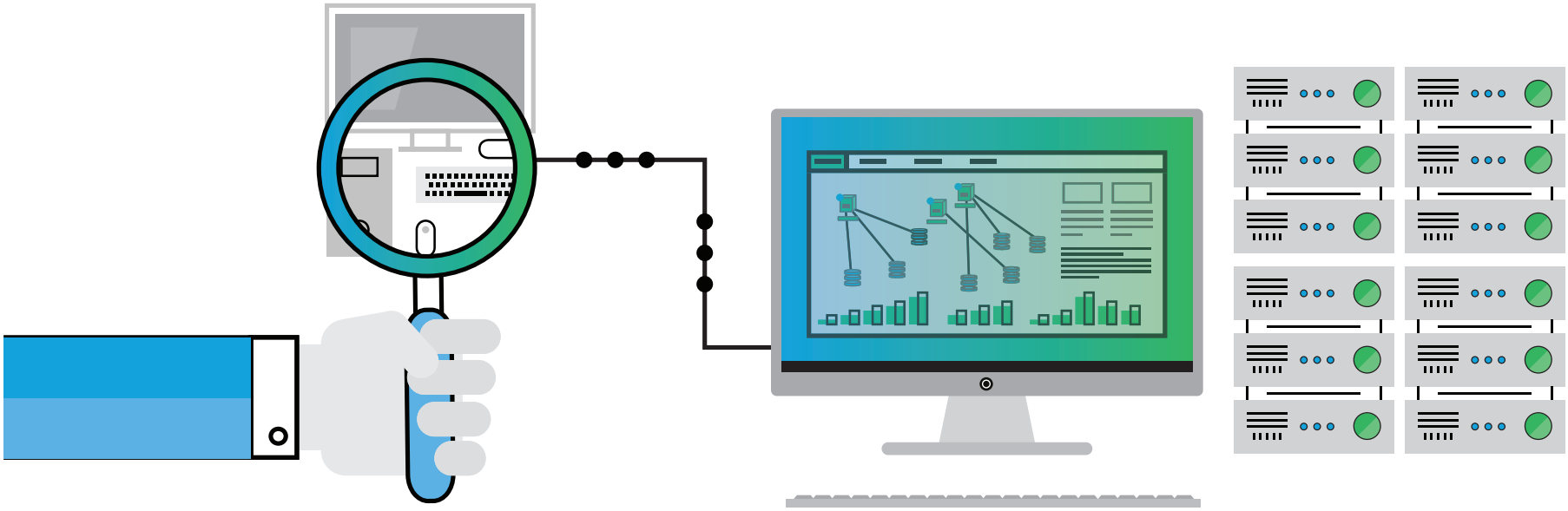
- Lift-and-shift: Provision, import, and deploy applications and infrastructure resources to match existing, on-premises architecture without modification.

- Re-architect and Refactor: Update application components and middleware to utilize cloud services and patterns such as unlimited blob storage, distributed message queues, auto scaling, and managed databases.

- Cloud Native: Completely rewrite applications to make intelligent and efficient use of cloud services in a way that can't be accomplished with traditional paradigms.

- Reconsider: For some applications, the cloud does not offer significant advantages; sometimes it makes the most business sense to leave those running in the corporate data center or even sunset them.





STEP 2: ASSESS YOUR ENVIRONMENT AND CHOOSE WORKLOADS

GETTING INTO THE MECHANICS

The introspection doesn't end when you understand why you are migrating to the cloud. Once you have clear goals and purposes, you must look at your existing configuration through that new lens. Accomplishing this requires a close analysis of your entire application environment and the underlying systems that support those applications.

As you complete these processes, don't neglect the way that the move to the cloud will also alter user behaviors and accommodate those shifts as you plan your migration.

ANALYZE APPLICATION TOPOLOGIES

The data workflows that intersect your various applications and services are critical to the performance of your business.

If you have applications that serve as data bottlenecks, those applications can quickly derail operations. This is especially true if those applications use legacy methodologies that create management and maintenance overhead.

Understanding precisely how your applications interact with and depend on one another can guide your cloud implementation by providing visibility into:

WHERE YOU MAY NEED NETWORK UPDATES

Which applications should be prioritized during the transition
Which performance metrics will be needed to evaluate cloud solutions aimed at resolving existing problems.

DON'T MOVE TO THE CLOUD WITHOUT FIRST UNDERSTANDING THE NUANCES OF YOUR EXISTING APPLICATION CLIMATE. OTHERWISE, PRE-EXISTING PROBLEMS OR LIMITATIONS MAY UNDERMINE THE TRANSITION.

IDENTIFY THE BEST WORKLOADS FOR MIGRATION

Every application is going to behave a bit differently in various IT configurations, and you must assess which workloads can make a transition to the cloud smoothly. A few issues to keep in mind include whether applications:

- Interact with data that is considered too sensitive for the public cloud.
- Handle data that is regulated in such a way that trusting a third-party service provider isn't viable.
- Feature legacy programming code or architectures that will react poorly to a virtualized environment.
- Depend on such diverse data sources that moving them off-site would create excess latency as they communicate with databases. These are just a few key issues to keep in mind as you plan which applications will be best suited to your initial migration to the cloud and which can wait until you are more established with the technology.

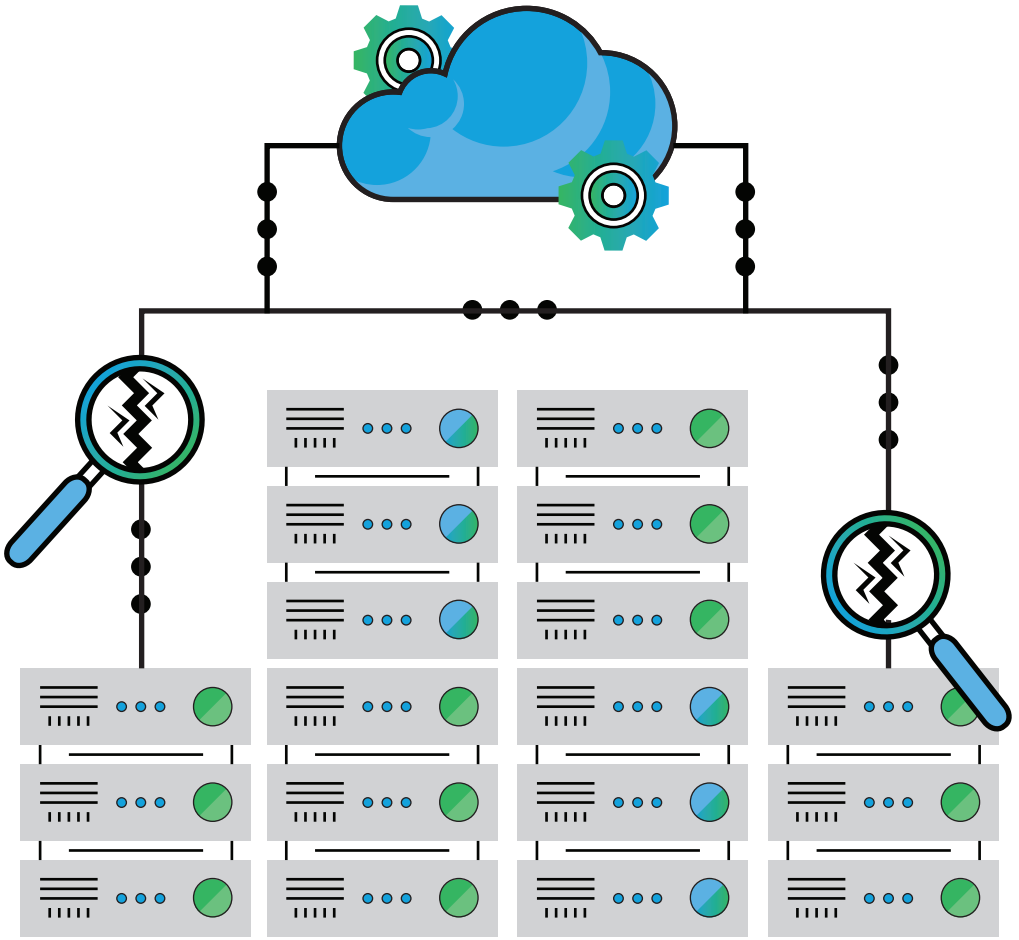
EVALUATE PERFORMANCE-SENSITIVE APPLICATIONS

Performance results in virtualized environments can vary significantly based on the specific architectures used by the virtual machines, creating a degree of unpredictability with a cloud migration.

At the same time, delivering data over the internet to cloud applications adds another layer of latency on top of possible delays created by virtualization.

Because of this, businesses must monitor application performance in their existing configuration, identify how much disruption is considered acceptable for performance-sensitive solutions and consider a strategic migration for those solutions.

The cloud's scalability can make the technology ideal for some data-rich applications and services, but neglecting performance assessments can leave organizations making compromises their users can't afford.



CONSIDER HUMAN FACTORS

These technical issues are the foundation for a successful cloud migration, but don't neglect the ways users interact with your systems as you make plans.

Key considerations here include:

- Users accessing applications on a wider range of devices.
- Data being delivered to a more varied array of internal and external sources.
- Increased dependence on wireless networks as users leveraging mobile devices to access cloud applications.

Cloud application performance is incredibly dependent on underlying network and data-sharing systems. As such, looking at the different ways users will access these services is critical in preparing your configuration for a move.

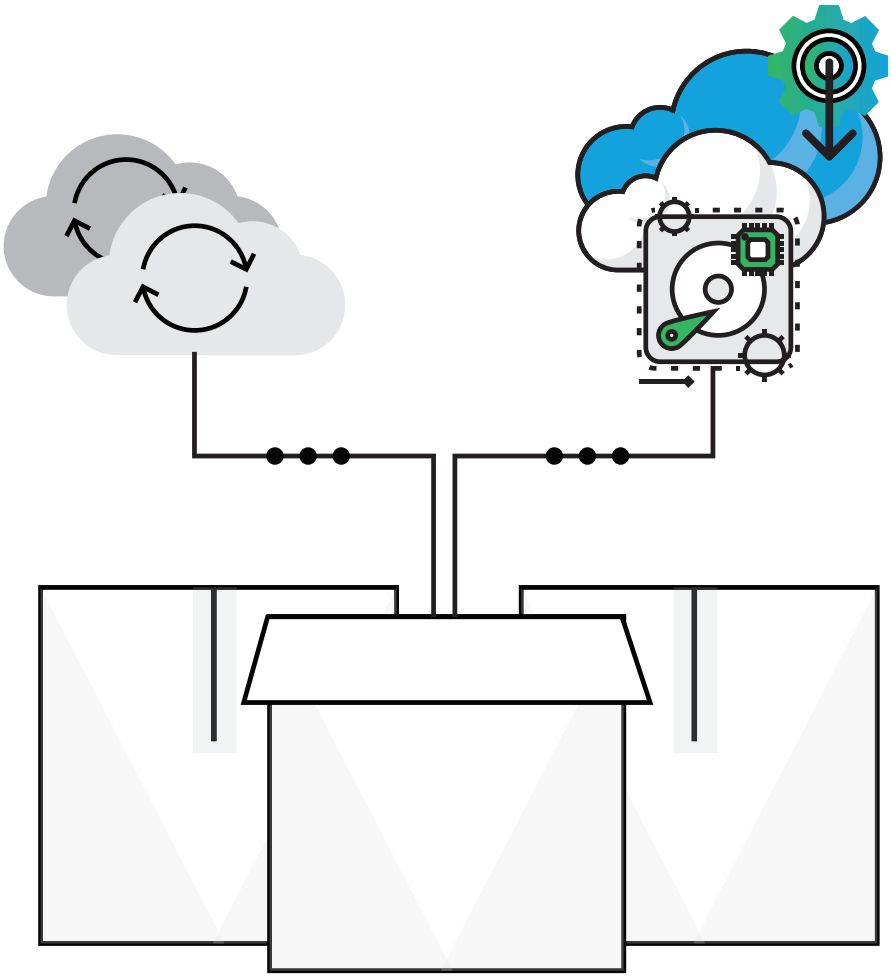
STEP 3: MIGRATION TIME

PROACTIVELY CHECK USER EXPERIENCE DURING THE PILOT

During the early phases of migration, it's vital to not impact your customers with performance or availability issues.
This can derail migration activity and dent executive confidence. Put simply, your users should have no idea the application moved to a new environment. You should also demonstrate success early in the process, to inspire the belief and enthusiasm required to propel a cloud migration of enterprise magnitude forward.

Whether intermittent connectivity, sluggish response times, or outright bugs— nothing stalls cloud migration efforts more dramatically than a poor user experience.

So skip the endless meetings, headaches, and skepticism by monitoring user experience in real-time and simulating user interactions for key journeys. One modern technique to keep tabs on user experience is synthetic monitoring, in which you continuously test your app's key transactions from multiple locations around the world to ensure your software and services are truly performant in all corners of the globe.



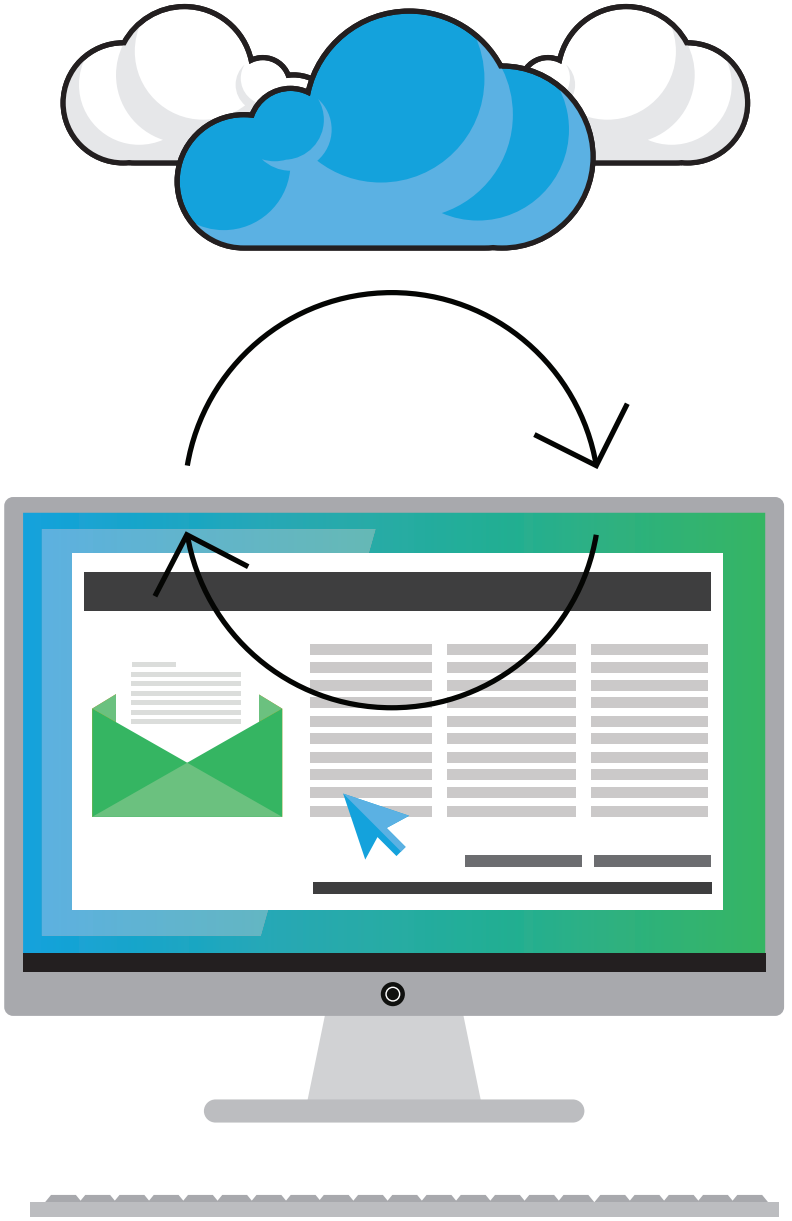
Basic applications may be better off in a set-it-and-forget-it environment. AWS as a technology partner enables you to collaborate for more performance-sensitive applications. Either way, understanding exactly who does what in the relationship is critical.

ADJUSTING THE INTERNAL CONFIGURATION

Cloud computing tends to have an interesting side-effect on IT expectations. As users get accustomed to anytime, anywhere access to data and services, they start to demand the same from internal applications.

What's more, the streamlined data sharing and integration within cloud environments tends to push businesses to ramp up similar processes internally. Throw in the need to divert management resources to govern cloud systems, and organizations are left needing to revisit how they manage their traditional configurations alongside the cloud.

THE IDEA OF CLOUDIFYING NON-CLOUD SYSTEMS ISN'T NEW, BUT IT IS BECOMING MORE IMPORTANT AS COMPANIES DIG DEEPER INTO CLOUD USE ACROSS VARIED LINES OF BUSINESS.



GETTING USERS ON BOARD

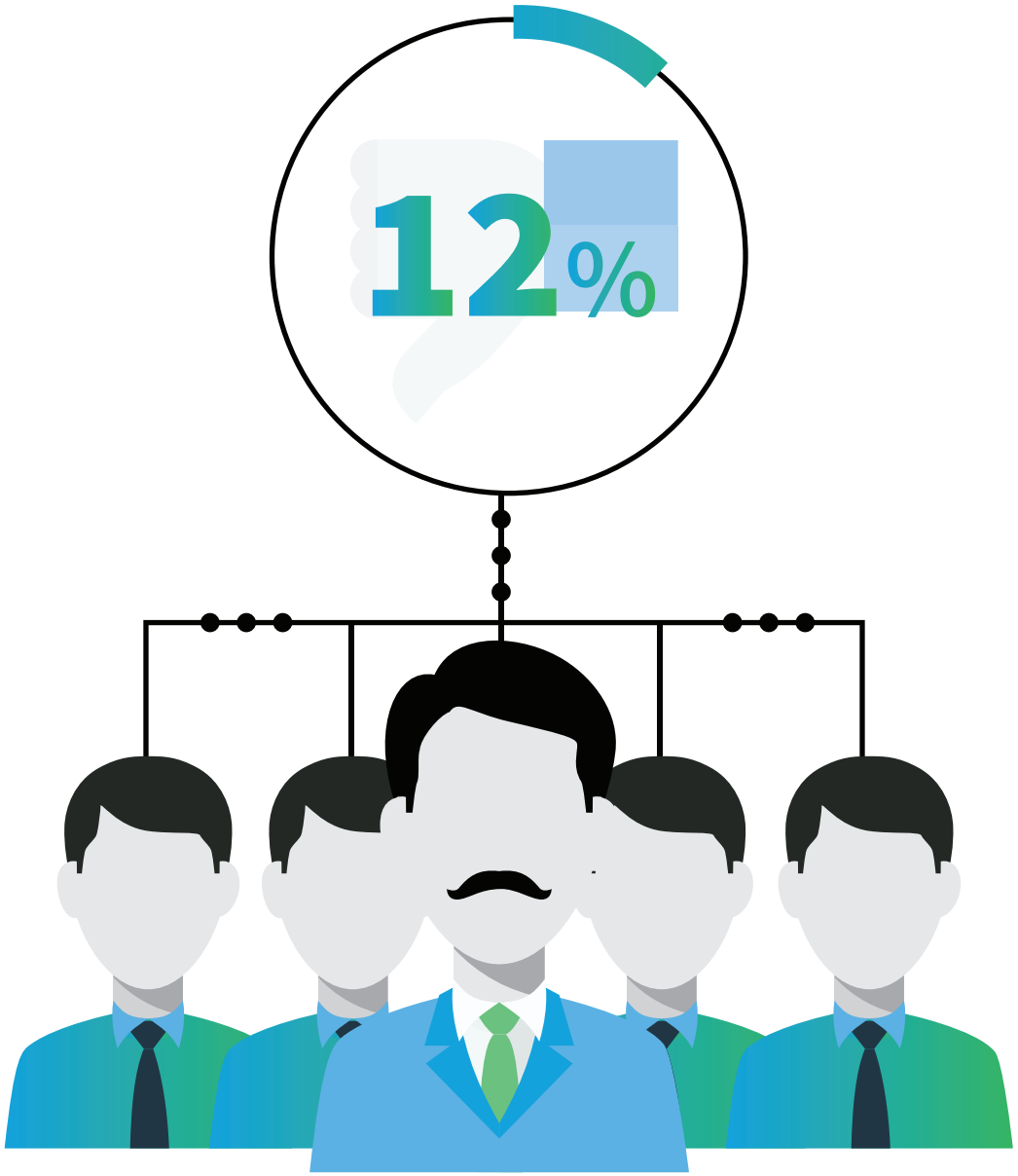
All of the technical advances in the world won't make much of a difference unless employees are comfortable with the technology and on board with the change.

APPROXIMATELY 12 PERCENT OF IT LEADERS MENTIONED POOR EMPLOYEE TRAINING AS THE GREATEST DIFFICULTY THEY FACED DURING THEIR CLOUD MIGRATIONS[9]. THAT MADE TRAINING THE MOST FREQUENTLY CITED AMONG OTHER ISSUES, SUCH AS:

- Poor integration (10 percent).
- Poor technical support (9 percent).
- Wrong security settings (5 percent).

The technical barriers to successful cloud migration are significant, but don't let those issues distract you from just how important the human factor is any cloud transition.

Take the time to train IT and business users on how the cloud will affect them, so they are ready to work on day one.



9 https://www.accenture.com/t20161018T205201__w__/us-en/_acnmedia/PDF-35/Accenture-Cloud-First-White-Paper.pdf

STEP 4: MEASURE MIGRATION SUCCESS FROM DAY ONE

THE IMPORTANCE OF MEASUREMENT

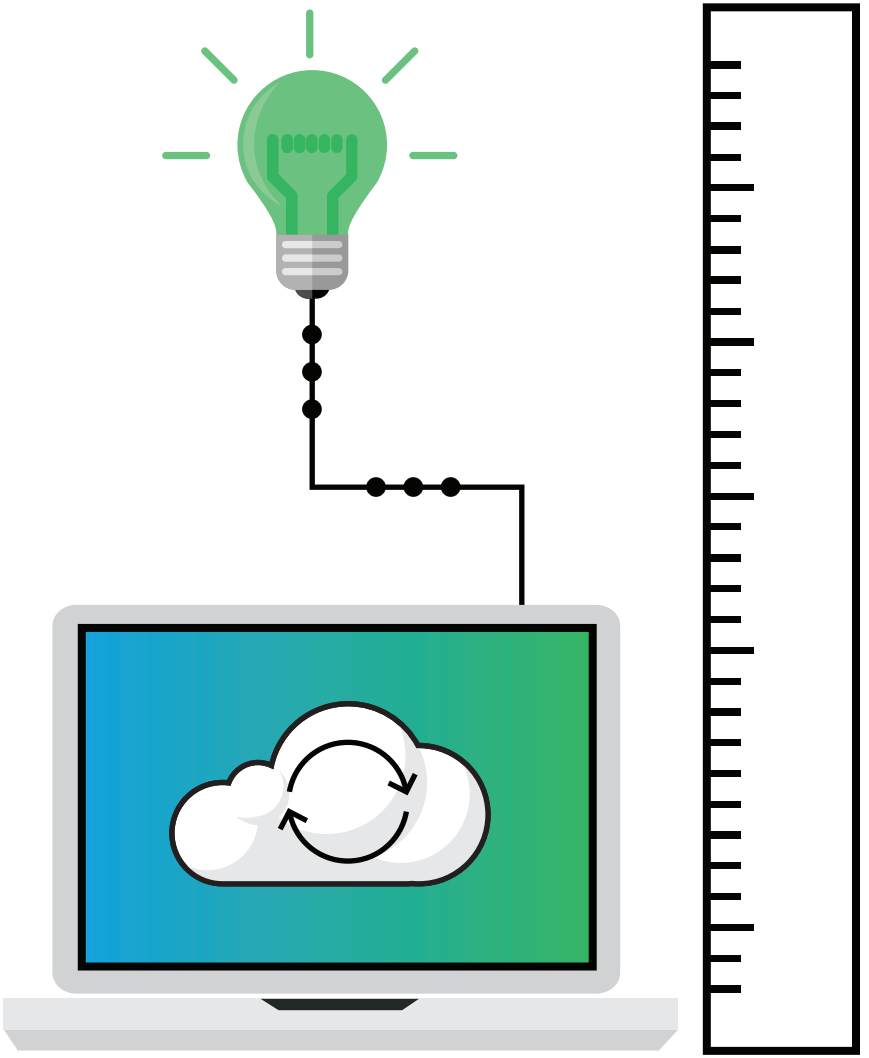
The days of IT operations residing in the background, supporting the business, but being treated as cost sinks, are disappearing.

Instead, IT teams face a new operational climate. On one hand, they have an opportunity to glean bigger budgets from executives because technology is an empowering tool, not just support. On the other, this emphasis on technology creates pressure to demonstrate return on investment.

IT leaders can't afford to migrate to the cloud and hope it delivers value. Instead, they must measure and assess performance on an ongoing basis to prove that their time and money deliver direct value to the business.

USING MEASUREMENT AS A TOOL FOR EXPANSION

Cloud computing typically only delivers value to the degree that a business commits to it. Moving a few apps to the cloud may not lead to much ROI, but a large-scale transition can lead to considerable value creation.



Essentially, the cloud is unable to deliver widespread value if it isn't used at a large enough scale to impact the business as a whole. However, demonstrating that cloud plans should advance hinges on demonstrating the value the cloud creates, so business leaders will be ready to take the next steps.

MEASURING CLOUD ROI

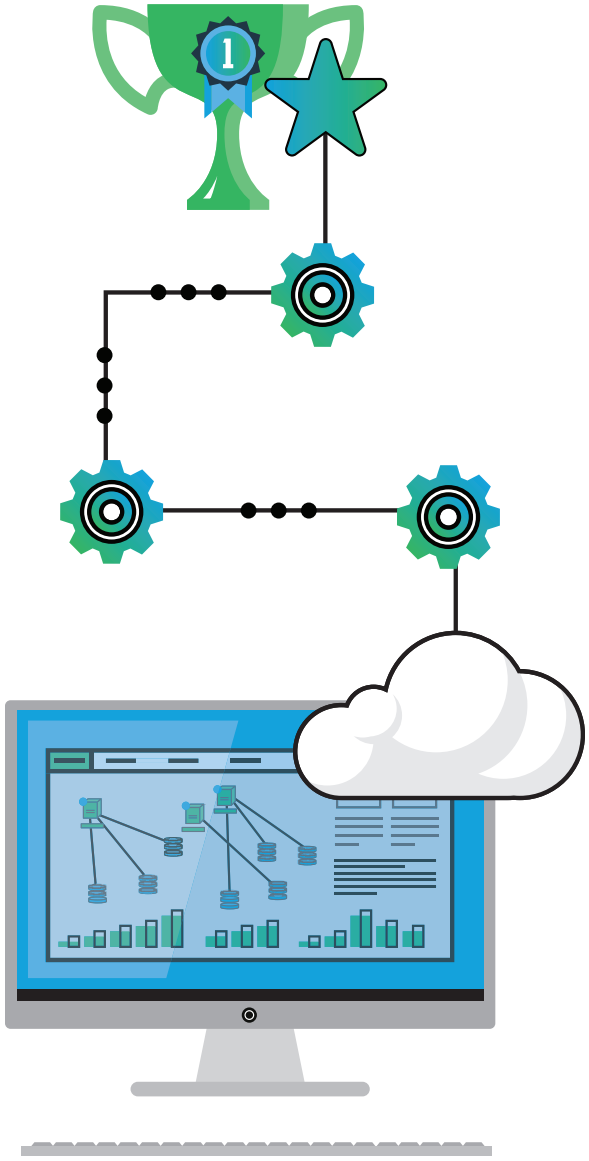
Cloud ROI is notoriously difficult to evaluate because the cloud can touch so many parts of the business. That said, it is not impossible to assess value creation. A few ways to build a foundation for cloud ROI measurement include:

- Setting clear goals that you can measure — this is one area where that initial process of figuring out why you want to migrate to the cloud can be valuable.
- Establishing goals across a wide variety of operations — the cloud has a far-reaching impact, so expand what you measure accordingly.
- Establishing a framework for evaluating abstract elements of the cloud plan — for example, if you want the cloud to improve employee satisfaction with technology, you'll probably need a survey ready.

PROVE THE MIGRATION WAS SUCCESSFUL

Even after your initial migration effort, and with no noticeable issues, it is important to plan ways to demonstrate the benefits of the cloud both pre- and post-move. From a technical perspective, show the new application architecture and that Service Level Agreements are being adhered to; how you can configure auto scaling to absorb unpredictable traffic spikes; how server response times remain unchanged or even improved; and how taking advantage of multiple regions around the world reduces latency and improves the user experience.

Be sure to also demonstrate the benefits from a business perspective, especially for customer-facing applications. Show how engagement and conversion improves along with response times for key customer journeys through the application.While the benefits of the cloud are obvious to you, business colleagues require more proof, so make sure you highlight what your company gains from cloud adoption early and often.



STEP 5: DON'T FORGET ABOUT FUTURE PLANS

CLOUD MIGRATION DOESN'T HAVE AN ENDPOINT

A transition to the cloud may come at one pivotal moment. For some companies, it is the decision to move a critical workload into the public cloud. For others, it may be the first move to put anything in the cloud.

Regardless of what type of cloud migration process you are in — even if you are working toward becoming an all-cloud enterprise— the transition doesn't end just because you have your new services running.

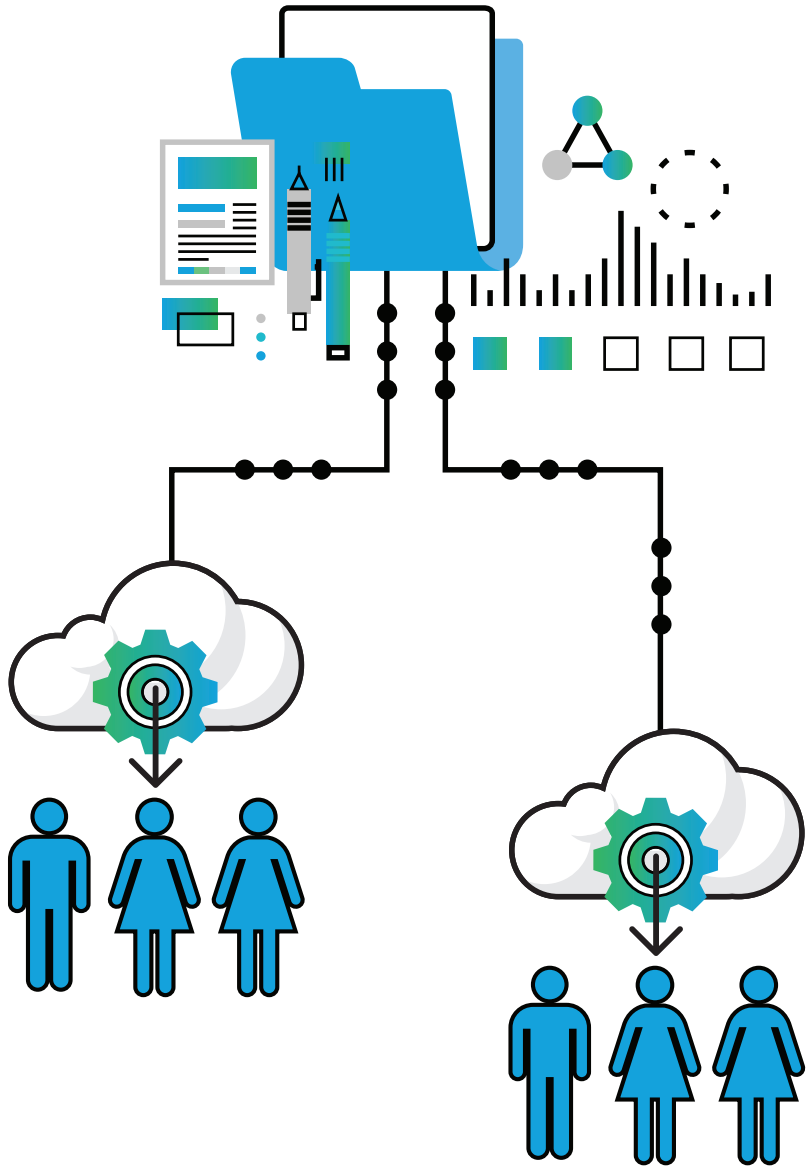
Some of the cloud's greatest benefits come from its flexibility and scalability. As such, any successful migration hinges on establishing a culture of continual improvement in line with future business plans.

IT-BUSINESS ALIGNMENT IS ESSENTIAL

In some ways, continually advancing in the cloud is similar to starting up again; finding success begins with self-analysis.

WITH BUSINESS TEAMS BECOMING MORE DEPENDENT ON TECHNOLOGY ALL THE TIME, ORGANIZATIONS MUST WORK TO ALIGN PRIORITIES ACROSS IT AND BUSINESS LINES WITHIN THE COMPANY. KEEPING THESE DIVISIONS FULLY SEGMENTED BECOMES INCREDIBLY DIFFICULT WHEN ORGANIZATIONS START TO OPERATE AT THE PACE SET BY CLOUD SYSTEMS.

Getting IT and business leaders on the same page about future strategies is critical to establishing long-term success after a cloud migration. Achieving an effective internal partnership makes it easier to align priorities and establish service road maps that will keep up with market demands.

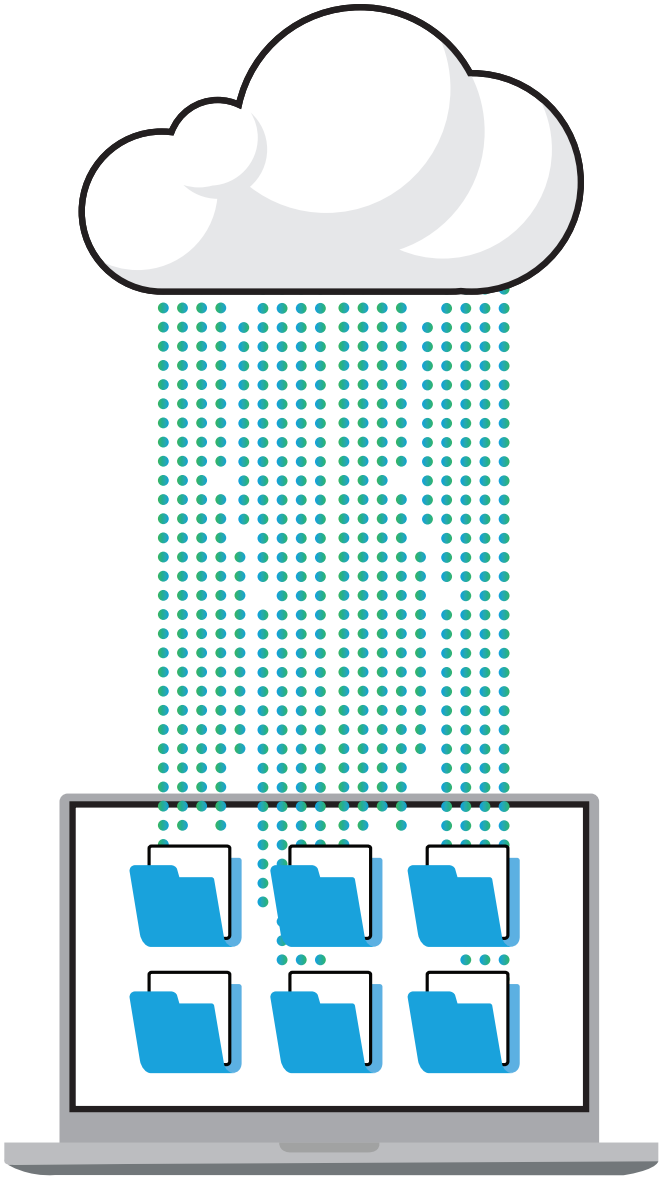


DON'T STOP EVALUATING

Executing long-term cloud strategies depends on understanding application and service performance at all times. It is not enough to measure initial results from a migration and call it a day.

CLOUD CONFIGURATIONS CHANGE FREQUENTLY AS STAKEHOLDERS TWEAK NETWORK AND DEVICE SETUPS. FURTHERMORE, PUTTING MORE DATA IN THE CLOUD CAN IMPACT NETWORK WORKLOADS AND CAUSE APPLICATIONS TO BECOME BOTTLENECKS AS USER BEHAVIORS CHANGE.

Continuous monitoring after migration within a strong DevOps culture is essential. Each release should be benchmarked with previous versions to compare the customer experience between them, and the impact they have on revenue. All told, making plans for your business' future in the cloud is incredibly dependent on knowing how the cloud has performed in the past and how it is doing at present. These metrics create a framework that allows organizations to define strategies moving ahead and ensure a smooth path for continued cloud improvement. .



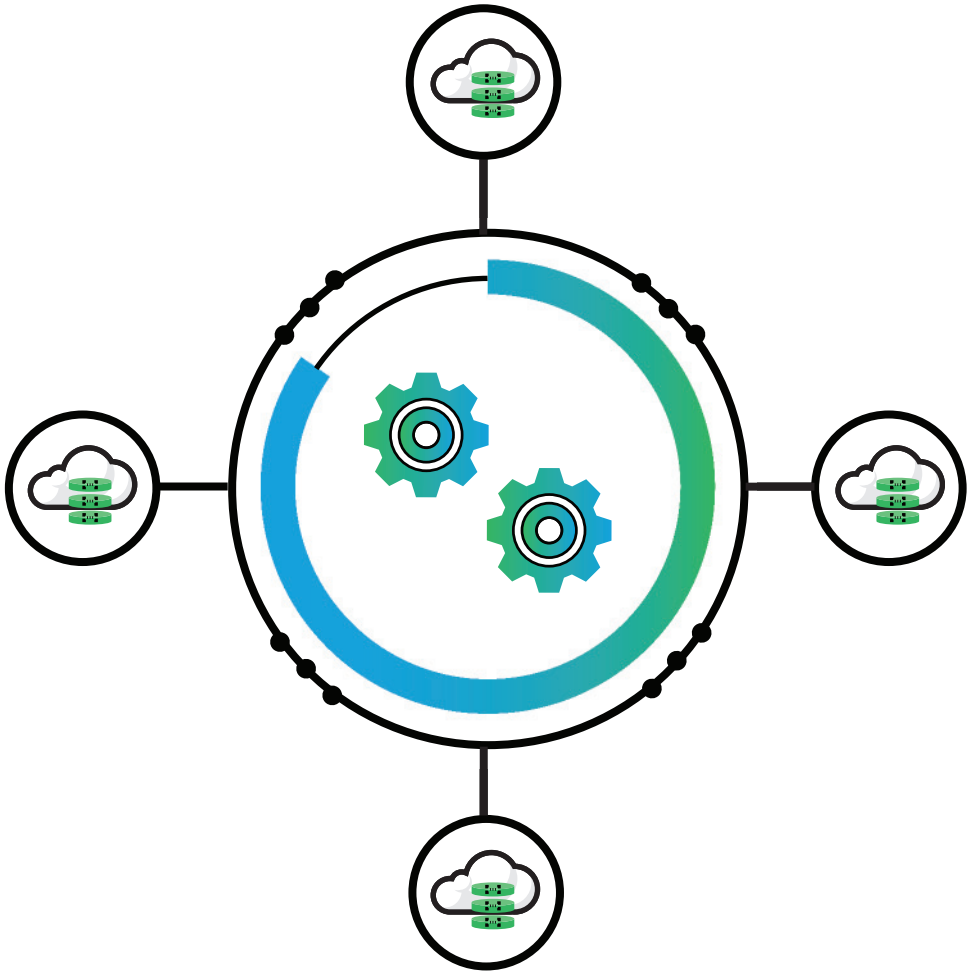
CONCLUSION

PERFORMANCE AT THE CENTER OF CLOUD MIGRATION

Application performance is at the heart of all of these steps. A successful cloud migration hinges on:

- Having a deep understanding of application performance prior to the move.
- Assessing performance throughout the migration to measure value.
- Maintaining key performance measurements to ensure the ongoing
  health and flexibility of the cloud configuration.
  Neglecting cloud performance management can undermine cloud migration efforts, especially as organizations face mounting complexity in their cloud configurations.

ORGANIZATIONS MUST BE PREPARED TO MEASURE PERFORMANCE OR RISK HAVING THEIR CLOUDS GET OUT OF CONTROL. BUSINESSES CONSIDERING A MOVE TO THE CLOUD MAY WANT TO BEGIN WITH PERFORMANCE ANALYSIS TO SET A FOUNDATION FOR LONG-TERM SUCCESS.



ABOUT APPDYNAMICS

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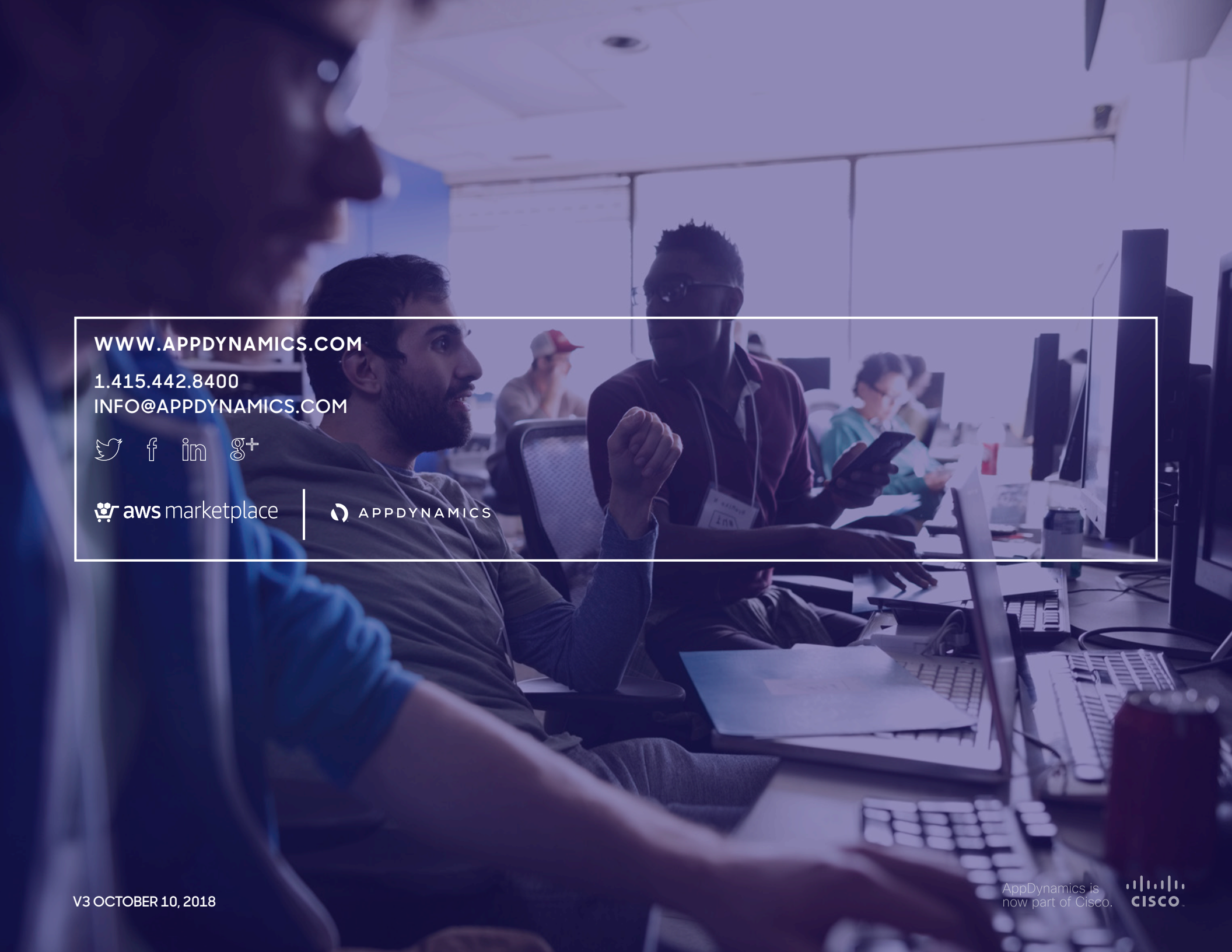

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