

Cognisol



Accelerate Your
Modernization Efforts
with a Cloud-Native Strategy

How to put all the pieces together to
maximize the benefits of the cloud

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Executive summary

For most organizations across nearly every industry, the decision to adopt cloud is already in the rearview mirror. Ninety-three percent of enterprises already have a multi-cloud strategy, and 87 percent have a hybrid cloud strategy¹. But that doesn't mean every organization has figured out the secrets that make cloud work the way they expected. While you may have already realized some cloud benefits, including lower infrastructure costs and better business agility, you may be like many other businesses — struggling to optimize your cloud investment.



30%

of organizations' cloud spend is estimated to be wasted¹

55%

of organizations still have apps siloed on single clouds in their multi-cloud environments¹

33%

of organizations use multi-cloud management tools for infrastructure, security and governance¹

Optimizing your cloud-native environment can be tough, especially when you have strategic goals and deadlines to meet beyond modernization. And as trends change, new solutions emerge and more functionality moves into a services-based model, managing cloud optimization and adopting cloud-native development practices can feel more and more like unattainable stretch goals. However, with the right plan and an enabled, trained and empowered workforce, the goal of optimizing your cloud usage, becoming cloud-native and realizing outcomes well beyond cost savings is very much achievable and actionable.



The nine pieces of the cloud-native puzzle

Both established and startup organizations often begin their cloud journey with public or private cloud adoption, and then “lift and shift” certain functions of their operations or software delivery cycle to the cloud. While that’s not a bad way to start, it doesn’t deliver the powerful, strategy-altering impact of becoming completely cloud-native.

A cloud-native architecture includes up to nine key technologies and practices that help reduce costs, accelerate time to market, improve scalability and achieve new levels of business agility and competitive advantage. When fully leveraged and combined with robust automation, cloud-native architectures provide for better system resiliency and manageability, and allow your teams to make high-impact changes frequently and predictably while minimizing risk.





Not every organization adopts all the following cloud-native practices, but the more you implement, the more your cloud benefits will click into place, and the better your solution will perform. It's much like piecing together a puzzle. A single piece doesn't provide you with much in the way of clarity, but as you place each piece, the picture becomes clearer. The same can be said for cloud-native technologies, tools and practices. With the adoption of culture changes, development practices and cloud technologies, you create a holistic, cloud-native strategy that will help you become more agile, allowing your company to adapt to market changes and grow rapidly in line with demand.

CULTURE

DevOps culture

Test-driven development

Microservices architecture

PRACTICES

Agile methodologies

**Automated configuration
management**

Containerization

TECHNOLOGIES

DevOps tools

Public cloud vendors

Platform-as-a-service

DevOps culture

Becoming cloud-native starts with a culture shift, especially for an established organization. If your team is accustomed to owning monolithic applications, they'll find their roles and responsibilities changing under a cloud-native strategy. Developers will work closely with operations engineers, security and support staff, and each team becomes responsible for a small, well-defined aspect of your organization's products or services.





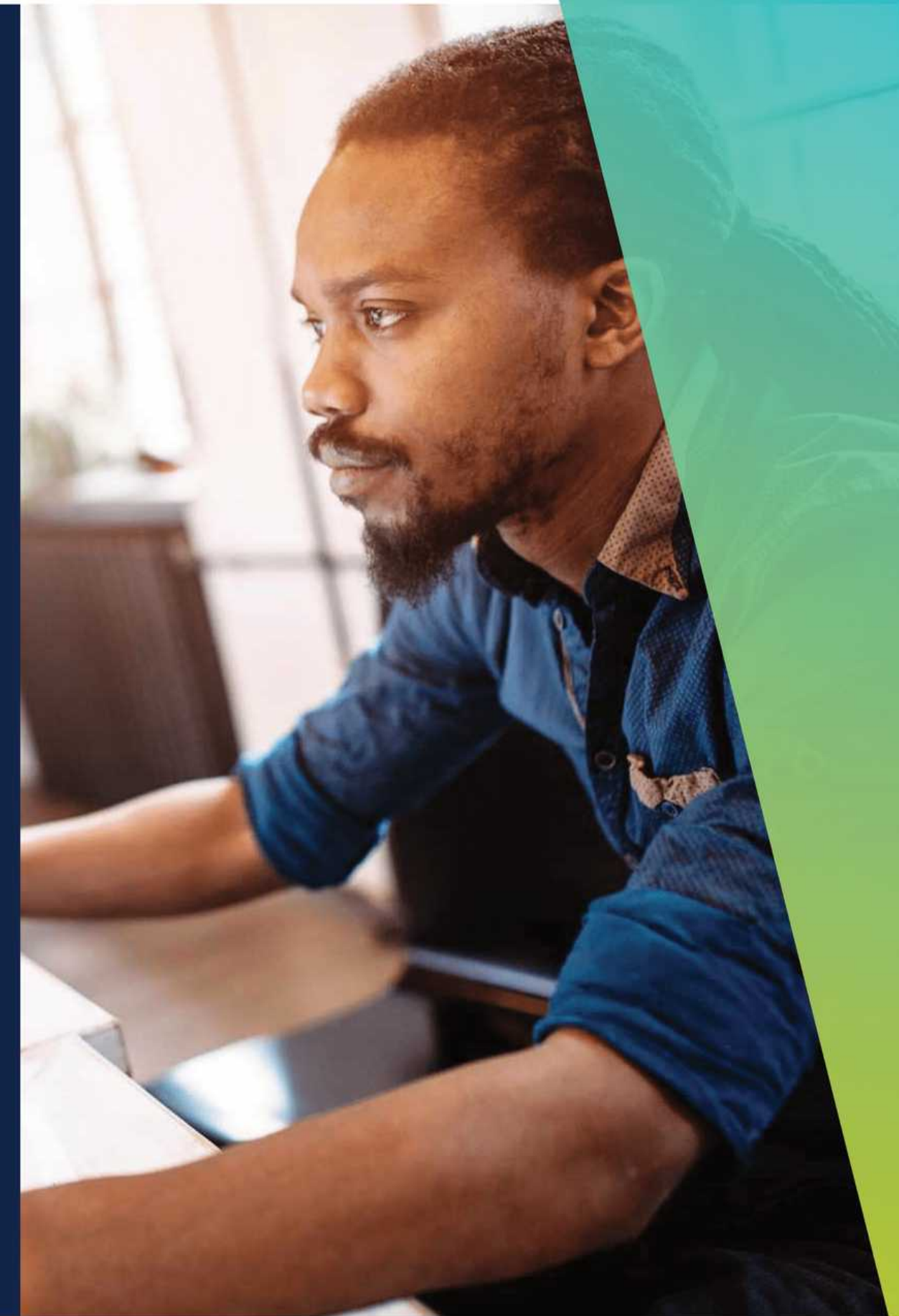
Agile methodologies

Agile development and deployment methodologies aim to produce code quickly in an iterative fashion that allows teams to build on ideas without breaking existing features. These practices also enhance cross-organizational communication and improve the accuracy of development pipelines. An agile development team is flexible, adaptable and able to move quickly in the face of change. As agile methodologies have matured alongside cloud environments, they have become the critical enabler for producing interoperable, distributed applications.



DevOps tools (Git, Jenkins)

When used across the entire organization, common project management and version control tools help to simplify, streamline and, most importantly, automate development tasks and practices. These tools allow developers to work in isolated branches and iterate on small, clearly defined deliverables. Once code is production-ready, it gets merged into an automated continuous integration and continuous delivery (CI/CD) pipeline that moves the changes through testing, validation and delivery, often without hands-on involvement.



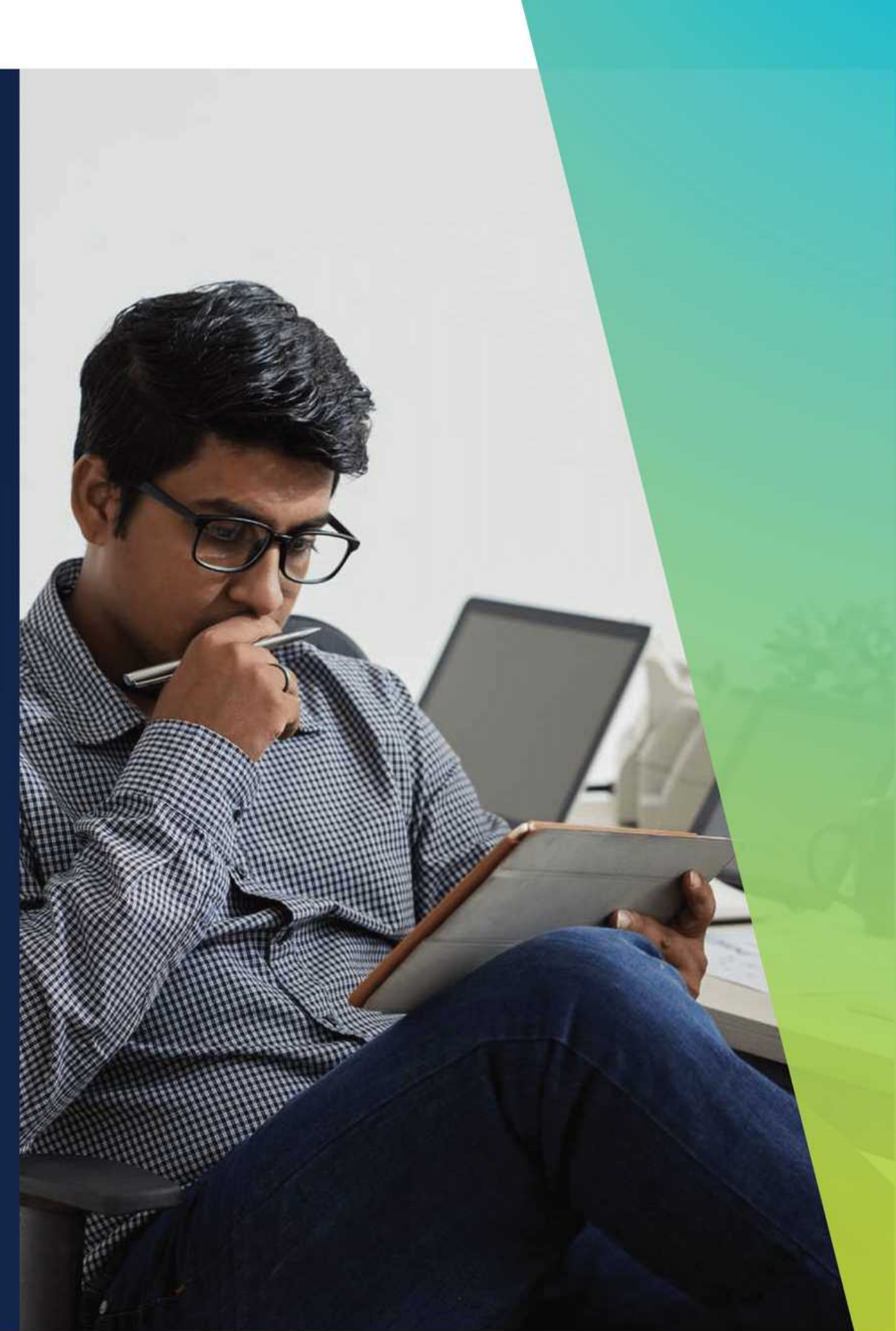


Test-driven development

Automated testing is a cornerstone of DevOps and CI/CD. By developing tests alongside each feature and feeding those tests into the automated CI/CD pipeline, your teams produce a reliable regression system that catches potential errors early in the pipeline. These tests can rapidly pinpoint the introduction of errors, allowing developers to quickly find and fix issues before they cause problems in production.

Automated configuration management (Ansible, Puppet, Chef)

Automated configuration management tools allow your operations teams or full-stack developers to produce production-like environments without error, every time. These tools also provide seamless elasticity across your production environment to handle spikes in demand without requiring human involvement.





Public cloud vendors (Amazon Web Services, Azure, Google Cloud)

The draws of public cloud include the promise of infinite scalability and managed total cost of ownership (TCO). However, the physical architecture provided through the public cloud is just the tip of the iceberg. Now in their mature state, these providers offer rich platforms of services and resources that can rapidly accelerate your move toward cloud-native development practices. They simplify microservices and container management, provide a host of data management options and offer expert tools for next-generation technologies, including automation, artificial intelligence (AI), big data analytics, automation and more.



Microservices architecture

In a cloud-native environment, developers learn to architect code so that each feature is distilled down to its smallest working components. Each of these microservices runs independently in self-contained environments so that it can use best-fit technologies for compute, memory, storage and data management. And because each microservice is self-contained and small, changes are less likely to introduce regression errors across your overall solution.



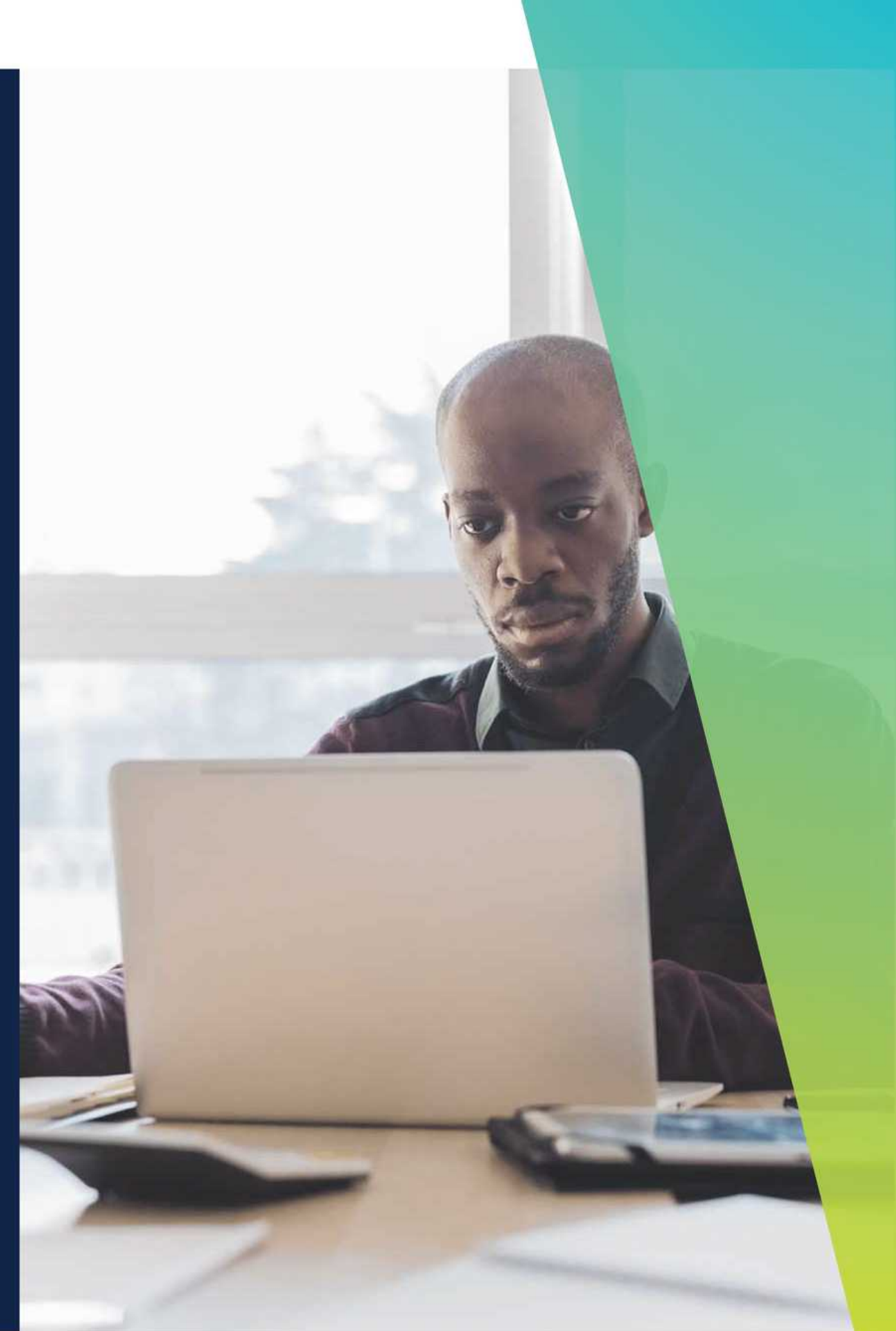


Containerization (Docker, Kubernetes)

While microservices development accelerates cloud-native development, containers hold the secret to unlocking the full potential of distributed delivery. By exposing the microservice through a defined API and wrapping a piece of functionality with the full infrastructure stack needed to make it operate at its maximum level of efficiency, you can then deploy the service wherever it's needed. That includes deploying to multiple public and private clouds, and securely opening the API for access for consumption by your internal teams, business partners or the general public.

Platform-as-a-service (PaaS) frameworks (OpenShift, Cloud Foundry)

As you produce a library of containerized microservices, your operations and support teams could quickly become overwhelmed with management tasks. That's where PaaS frameworks like OpenShift and Cloud Foundry come into play. These systems help automate deployment and management across your multicloud architecture and provide detailed analytics to help optimize your operational environments. They simplify even the most complex cloud environments and empower a small staff to manage and maintain environments without the burden of administrative tasks.





Making the shift to cloud-native thinking

After gaining an understanding of all the elements that go into becoming cloud-native, you might see that you already have some of the puzzle pieces in place. Most organizations have adopted some form of cloud architecture, and a significant number of software development shops have used agile methodologies for many years. Yet, if your organization simply rehosted business-critical applications to the cloud (commonly known as a “lift and shift”), you’re likely to find that you’re overspending on cloud architecture — without realizing many of the benefits.

Becoming cloud-native requires a paradigm shift. Outdated cultures and ownership silos prevent teams from moving toward microservices development while decision paralysis hinders movement toward cloud optimization. Cloud-native organizations are often experimental and innovative with teams participating in open information sharing and widespread collaboration.

Unlocking a cloud-native strategy often starts with understanding the necessary changes first. By upskilling your team at every level — management, directors and even your C-suite team — you can approach your company’s roadblocks with a common language. With DevOps training, management teams can start to form cohesive teams that break down information silos, and with training on various cloud platforms, you can choose which solutions work for your strategic goals.

Culture check: How integrated are your teams?

The more you learn about going cloud-native, the more you'll hear about DevOps culture. Cloud-native is a significant departure from traditional software development practices and pipelines. Developers and operations engineers who have worked in the field have become accustomed to long-lasting ownership over specific applications, functional areas, systems or components.

In traditional models, engineering teams are comprised of groups of similarly skilled people who work toward a siloed outcome. Often, teams have little to no working knowledge of the applications or systems managed by other groups. Requests made across various organizations end up delayed due to a lack of understanding and incongruent prioritization — what's essential to the development team may not be seen as a priority to operations, and vice versa. Also, many roles in traditional development pipelines include tedious and repetitive tasks that compete for time that could be spent on strategic work. Tasks such as manual software builds, test scripts, environment provisioning, etc. can cause delays, hinder productivity and introduce avoidable errors.

Case study: The fastest way to change culture is through widespread training

The situation: When a leading financial services firm wanted to embrace cloud-native development, they knew it meant a major cultural transition for hundreds of developers, managers and administrators.

The solution: By choosing a single-source training provider and implementing a company-wide training initiative, the firm was able to upskill its IT professionals across a range of cloud and microservices competencies within an expedited timeframe.

The outcome: This relevant, widespread training produced an IT team that was ready to take on new assignments, work in new ways and embrace a cloud-native strategy.



Alternatively, in a DevOps environment, multi-functional teams include development, operations, test, maintenance and support. With automation taking over administrative tasks, work becomes a deliberate, strategic effort toward creating a feature or set of features that includes both code and infrastructure. Each team works toward shared goals and is therefore invested in each other's success, which can eliminate many of the traditional bottlenecks experienced in traditional development pipelines. In a DevOps culture, each team must understand what other groups produce at the API level — at minimum — so that they can work together to form a fully functional product. The DevOps culture encourages more in-depth understanding and communication between not just development and operations, but also across the organization as a whole.

Moving to a DevOps culture starts at the top and requires training throughout the entire organization. With leadership's understanding and buy-in of a DevOps culture, you can begin to effect change and improve agility, communication and innovative potential across your organization — first by reconstructing teams, and then by adopting cloud-native development practices. Leadership trained in cloud-native practices and DevOps culture can provide a multi-cloud strategy and foundation, and teams who understand the methods and tools available to them will be better equipped to architect solutions using best-fit technologies.

Cloud-native optimization can revolutionize your business

Many people associate cloud computing with lower total cost of ownership (TCO). While it's true that infrastructure-as-a-service (IaaS) and software-as-a-service (SaaS) offer flexible, subscription-based pricing structures, metered IT costs and strategic growth opportunities, there is more to the puzzle than TCO. A fully cloud-native organization realizes many additional benefits of cloud that become apparent over time. Though many of these "hidden" benefits are difficult to quantify, they can give your organization a significant advantage, and they represent the power of becoming cloud-native.



Think small to grow big

As mentioned earlier, microservices development and containerization allow for rapid code development and change at the feature level. This style of development alleviates code complexity, avoids long regression cycles and reduces the likelihood of introducing system-wide defects. Additionally, there are benefits to microservices development that become clear once you're working in that type of environment.

Each microservice is self-contained, which means each code component can use best-fit architecture and tools, and can scale independently to dial in costs. For example, if a piece of code requires significant, high-end GPU usage, but that code is only used occasionally or only by a small subset

of your users, you can isolate that functionality away from the bulk of your architecture. When that service gets called, it can spin up the resources it needs, use them for as long as required and then shut down again. Rather than always having a bank of high-cost GPU resources available, you end up using (and paying for) only what you need, right when you need it.

You can also choose to deploy your microservices on a variety of different architectures through the use of cloud orchestration platforms like Docker and Kubernetes. Often, you can deploy to multiple different environments or make use of different databases and storage solutions without changing the underlying code. This allows you to

deploy across a multi-cloud environment and take advantage of new technologies — without the long development lead-up times or added operational complexities.

Additionally, microservices can open you up to business partnerships and public consumption of your technology solutions. Typically, microservices APIs remain constant, which means you can share them out to your broader ecosystem or even make them available for public consumption. Because you control the API, you can maintain security, and due to the encapsulated nature of a microservice, you can change the entire codebase to make use of new and better technology without affecting those who use your services.

Foster a culture of experimentation and innovation

Cloud-native environments offer nearly unlimited available resources at a low cost. Often, public cloud vendors offer idle resources at a steep discount, so your developers can test their ideas without contending for development resources. This isolated environment can be provisioned from well-defined standards to perfectly mimic your production environment, or they can be configured to a developer or operations team's specifications so your teams can test theories and try new tactics.

Once empowered with the necessary resources, your engineers will be better equipped to create market-disrupting opportunities or reinvent your business to keep pace with the latest consumer and technology trends. Many “born in the cloud” businesses have reaped the benefits of a cloud-native environment and the culture of innovation that it creates. Companies like Netflix and Airbnb have continually reinvented themselves to capitalize

on — and even create — market changes.

Without the efficiency, agility and experimentation capabilities cloud delivers, these companies might not have been as successful in pivoting to meet customer demands.

Accomplish more with less

A cloud-native environment is built on the principles of agility and speed. By making small changes rapidly, you're able to produce more on a faster scale with fewer errors. Once up and operating, the CI/CD pipeline allows your teams to respond in near real time to customer demands and pivot in response to market trends. And because many of your administrative tasks become automated, you'll have the opportunity to take on more strategic efforts without increasing the size of your workforce.

With access to public cloud resources, your test teams can work in parallel without resource

contention, and they can complete their tasks in production-perfect environments. The result is faster, more accurate test results without making any team wait for resources. By accelerating testing and improving accuracy, you can speed up your entire delivery pipeline while introducing fewer errors into production.

Your cloud-native environment also empowers the evolution of your engineers to become full-stack developers, which means you'll need fewer specialized engineers. By letting developers and operations counterparts work together, they can share knowledge and determine the best-fit

infrastructure, databases, tools and techniques for each deliverable. And because a cloud-native environment provides easy access to a wider variety of technologies, every engineer can gain working knowledge that empowers them to work faster and smarter with each project iteration.

Automate as much as possible

Though it can be hard to quantify monetarily, automation is one of the greatest advantages of becoming cloud-native. Automation reduces the potential for human error, produces repeatable processes with known outcomes and provides a vehicle for self-service — both for your employees and your customers. Every process you automate also reduces the amount of “busy work” required of your staff, which frees them to focus on strategic goals.

What are your biggest opportunities for automation?



Infrastructure as code



Backup and recovery



CI/CD pipelines, including code merging and builds



Unit and regression testing



Self-service environment and application provisioning for employees



Self-service options for customers



AI-driven helpdesk



Security, including access management, threat detection, data loss prevention, etc.



Governance and compliance

Putting the pieces together

Training to accelerate your cloud-native optimization

Your employees understand your products, customers and company goals. They are invested in your success and are your best resource for determining your cloud optimization strategy. But choosing the next steps toward becoming cloud-native requires a team that has at least a general understanding of the technologies and practices involved. Without adequate training, organizational leadership can get stuck in decision paralysis.





Train first, choose second

It might seem counterintuitive to train employees on technologies that you don't have in place yet, but as the saying goes, "You don't know what you don't know." Cloud optimization starts with an expanse of understanding across a rapidly changing technology landscape. By leading with training, you build a team of subject matter experts (SMEs) who understand where you are presently on your cloud journey and what can help set you on the right path. By giving your SMEs upfront training, they can help choose the right technology and tools, and offer support through planning, budgeting and implementation. You'll also be able to save money and time by purposefully and deliberately choosing best-fit cloud solutions and implementing them based on proven methodologies.



Remember: Technology is only part of your cloud-native optimization strategy

Technical training is critical, but essential *non*-technical training for your move to cloud should include:



Leadership training in [DevOps](#) and business transformation



Team lead training in [agile methodologies](#)



Financial team training in PaaS and IaaS pricing models



Company-wide training in [cloud computing essentials](#)

Encourage a culture of learning

Training is considered a necessity by two-thirds of U.S. hiring managersⁱⁱ, yet many organizations are slow to implement learning programs to reskill their workforces. Cloud computing is an evolving discipline that requires continued learning across your organization. After you have chosen your new, cloud-native direction, solution or process, your teams must understand why each was chosen and how it applies to their jobs. Just remember, a cloud-native organization is built on a foundation of open communication and understanding. By providing a broad overview for all employees as well as individual training and certification paths for team leads, developers and other individual contributors, you help your team understand and buy into your cloud-native vision. Through comprehensive understanding and with a singular vision on strategic focus, you foster a DevOps culture that leads to accelerated cloud optimization.

Creating a culture of learning requires some foundational changes to how you view and implement training. Many organizations train employees in response to change. But an optimized, cloud-native organization offers ongoing training as part of their culture. The following four steps can help you build the type of proactive training environment that accelerates transformation:





1. Make training a goal with tangible rewards

It's human nature to gravitate toward familiarity. Your employees have deadlines, and no matter how beneficial the adoption of new technologies and practices might be, it can be seen as disruptive. Without some sort of incentive, you may experience pushback, reluctance and even outright refusal by employees who are asked to make a change.

By implementing a comprehensive training program as part of your cloud optimization strategy, you offer a path toward familiarization before expecting your employees to change the tools, technologies and practices they use daily. And remember, the *when* of offering your employees training is just as important as the training content itself. Make it a goal for your employees to learn new technology solutions *before* they're expected to use them. Then, help them understand the importance and value of ongoing training, and reward them for taking advantage of the training programs you offer. Whether through cash bonuses, public recognition or career progression, offering a structured and predictable reward system for meeting training goals will foster a culture of learning that keeps your entire organization moving forward on the path toward empowered and efficient cloud-native optimization.

2. Partner with a vendor-approved training provider

Often, cloud vendors offer training as part of the purchase package. And while that training can help, you end up spending upfront time learning a solution you already own without gaining the solution benefits. Depending on the complexity of your chosen solution, you could waste valuable time and money before realizing a return on your investment.

By partnering with a vendor-approved training partner and upskilling your workforce ahead of your purchase, you're better equipped to hit the ground running with each new technology and tool you roll out to your teams. Additionally, your skilled workforce can avoid common implementation mistakes if they're starting from a place of knowledge.





3. Train before you automate

Automation is one of the most significant benefits of a cloud-native environment, but it's also the one that is most feared by employees. Seventy-two percent of Americans worry about a future where robots and computers can perform many human jobsⁱⁱⁱ. Training is your best path toward alleviating fears and encouraging automation adoption.

Employees who perform repetitive, daily tasks may feel unsettled by the idea of automating their work. However, by opening the doors to training opportunities before you automate tasks, you can empower those employees to shift seamlessly into more impactful roles. Armed with exciting new skills and the confidence to take on challenging and more rewarding projects, your employees might even step up to lead the effort toward automation.

4. Focus on training for soft skills, too

Technology training shows your IT workers how to use the latest technology solutions, but often, those courses don't offer perspective on why those solutions are relevant or how they help meet strategic goals. Soft skills such as DevOps, agile methodologies and project management help your teams understand how everything works toward accomplishing your organizational and team goals. These training programs also cover the philosophy behind the cultural changes you're championing, and they help each individual see how they fit into the broader team.



Accelerate your cloud optimization strategy

If your company is still operating as a collection of silos, achieving cloud-native optimization may be more complicated than you realize. The modern demand for nonstop innovation doesn't leave any room for duplicated efforts or repetitive administrative tasks. With the right training, you can create a team that works purposefully and cooperatively toward your strategic goals.



Partner with Cognisol

Cognisol helps global organizations accelerate their cloud optimization strategies through comprehensive, customized training programs. With vendor-certified training for all major cloud vendors, we will help build your company's cloud IQ. Whether you are just starting or have already established some cloud practices, Cognisol helps you deliver better business outcomes while upskilling your teams as they learn from expert Cognisol instructors.

Upgrade your organization's skills and keep your teams and organization running at the speed of the modern enterprise with Cognisol. Talk to us about where you are on your journey and where you want to be, and we'll help you accelerate the optimization of your cloud-native environment.

Learn more at www.cognisolglobal.com

