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Modernize today with containers on AWS

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Introduction

Companies worldwide are undergoing digital transformations. By modernizing their applications, they can deliver better service to customers, and keep pace in a competitive landscape. In many cases, AWS has helped companies modernize by implementing containers—and initiating cultural shifts—to streamline development. In this eBook, we discuss best practices in containerization and how you can get started today with containers on AWS.

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It's all about survival

Companies of all sizes are finding new ways to leverage technology to boost their agility and better respond to demands from customers. Fueling this fire is the need to survive in a changing environment. These days it's digital or bust.

You don't have to look too far to find examples of cloud-native companies disrupting industries while leaving legacy businesses in the dust.

For many companies, an initial step toward digital transformation is modernizing their applications and taking advantage of automated environments in the cloud. Modernization empowers companies with:

ELASTICITY:
the ability to respond to spikes in customer demand

AVAILABILITY:
the ability to serve customers' requests wherever and whenever

AGILITY:
the ability to quickly fix a problem or deploy new functionality that customers want

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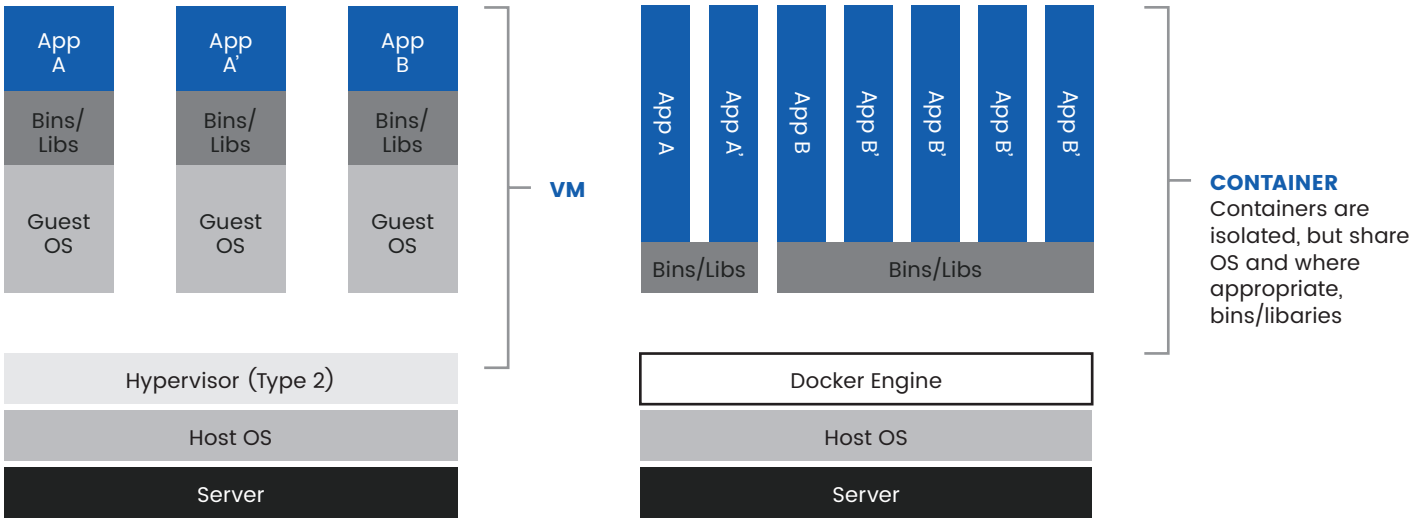
Containers vs. VMs

Containers can get you there

A digital transformation takes time, but in the end, the gains in productivity make the business case. While there are many tools out there to help companies modernize, containers are gaining steam as the go-to solution for developers to more efficiently package and deploy applications. In the past few years we've seen a great adoption of Amazon Elastic Container Service— with active users up by more than 450% since 2016. We are now managing containers across millions of instances each month.



Containers streamline development

Containers provide a portable, consistent and lightweight software environment for applications to easily run and scale anywhere. Throughout its lifecycle, an application will operate in many different environments, whether it's moving from test and production early on, or from virtual machines to the cloud during a migration. Before containers, IT teams had to consider the compatibility restrictions of each new environment and write additional code to ensure the application would function. Then containers were developed to package the application with its dependencies, configuration files, and interfaces—allowing developers to use a single image that moves seamlessly between different hosts. For developers, containers allow them to focus on building the application—whether they're adding new features or the latest security—instead of spending time managing the compatibility requirements of different environments.

Containers are also integral to breaking down traditional monolithic application architectures, and enable a transition to microservices for easier scale. With microservices, each application component runs as its own service, allowing developers to work independently on different aspects.

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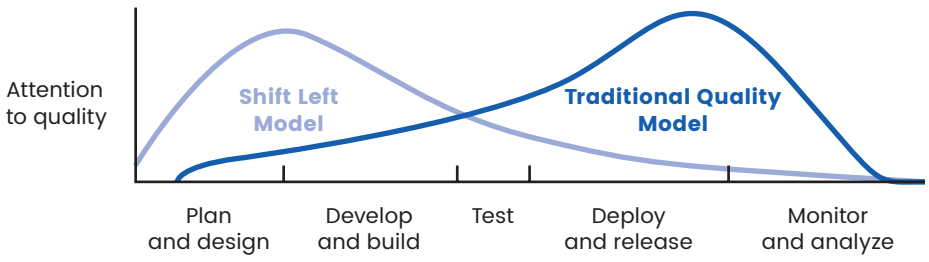
Cultural shifts make improvements stick

Containers are not only a tool to modernize your applications, they're also the instigators of improvements to your development practices. Containers disrupt the traditional development cycle because they push more quality control responsibility to developers. Where developers used to only be focused on building the application, with containers, now the success of packaging and deploying also shifts to them. This phenomenon is known as shift left, as quality control is now handled upfront, rather than farther down in the development process.

With developers empowered to own the implications of their work, the next step is a push to make failure acceptable. Failing is inevitable, so it's in a company's interest to fail fast and learn from mistakes. This enables quick iterations, adding to a company's overall agility.



Legacy companies can modernize

A large corporation that's been around for more than 100 years seized an opportunity to modernize its applications in one of its international markets. The company utilized containers and implemented cultural changes to bring its business platform to the cloud. Containers and the automated environment in AWS allowed the company's development team to iterate quickly, pushing the platform from concept to prototype to deployment in just six weeks.

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Get started today with containers on AWS

We've broken our container strategy into four main areas—orchestration, monitoring, automating and security—and included steps you can take today to advance your containerization journey, no matter what stage you're at.

AWS containers strategy

ORCHESTRATION

Run your containers in production

- Amazon Elastic Container Service (ECS)
- Amazon Elastic Container Service for Kubernetes (EKS)

MONITORING

Ensure your containers are healthy

- Healthcheck of Docker container images confirm your containers are running and your app is working

AUTOMATING

Deploy code automatically with Continuous Integration (CI) and Continuous Delivery (CD)

- AWS CodeCommit
- AWS CodePipeline
- AWS CodeBuild

SECURITY

Scan and detect vulnerabilities

- Image scanning solutions can detect vulnerabilities of container images or image dependencies

Orchestration

Once your application has been containerized, the next step is to run the containers in production. To scale out your architecture you'll want an orchestration tool. AWS offers two orchestration platforms to fit your needs: Amazon Elastic Container Service and Amazon Elastic Container Service for Kubernetes; as well as two launch types: Amazon EC2 and AWS Fargate.

Amazon Elastic Container Service

Amazon Elastic Container Service (Amazon ECS) supports Docker containers and allows you to easily run and scale containerized applications on AWS. Amazon ECS eliminates the need for you to install and operate your own container orchestration software, manage and scale a cluster of virtual machines, or schedule containers on those virtual machines. Amazon ECS provides an infinitely scalable control pane that's managed for you. This kind of orchestration tool works well for companies that use a proprietary operating system or want the ability to control their own infrastructure.

Amazon Elastic Container Service for Kubernetes

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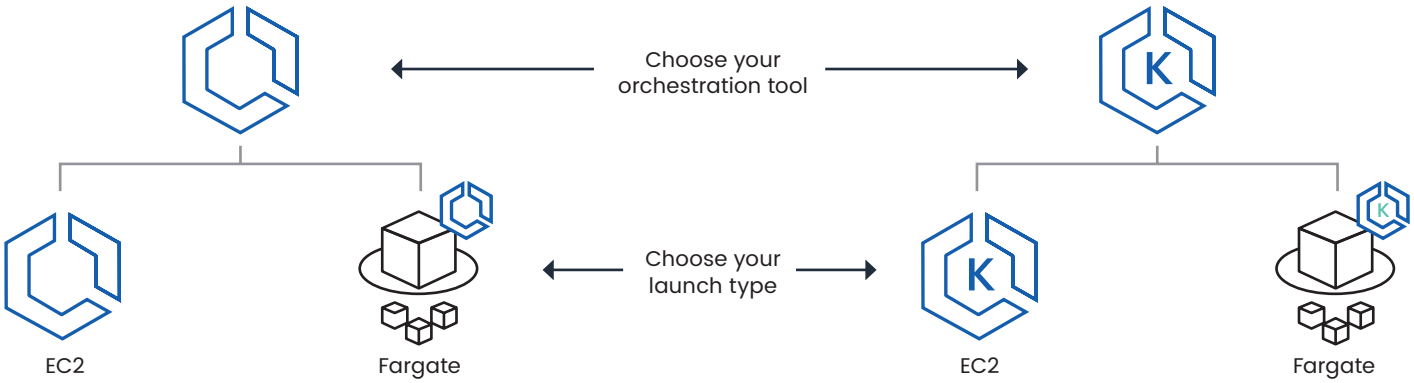


Monitoring

When it comes to monitoring, you not only need to ensure the container is running, you also need to confirm that the application is healthy and working as it should. Docker container images allow you to verify both. With a simple healthcheck command, a Dockerfile will check a container to confirm that it's still working. This process can detect when a web server is stuck in an infinite loop and unable to handle new connections, even though the server process is still running.

Automating

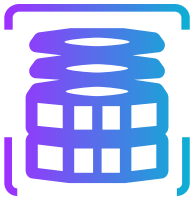
The automated environment removes the task of deploying code manually. When your infrastructure includes hundreds or thousands of containers, automating with CI/CD allows you to scale and react faster, while minimizing the risk of human error.

Three AWS services help you make the most out of automation.

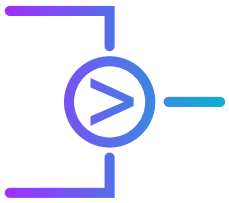
Launch types

AWS provides two launch types: Amazon EC2 and AWS Fargate. The main difference between the two is the amount of control you have over the infrastructure that runs your container applications.

- **AWS FARGATE:** With Fargate you can run your containers without having to manage servers or clusters. All you have to do is package your application in containers, specify the CPU and memory requirements, define networking and IAM policies, and launch the application.
- **Amazon (EC2):** The more traditional EC2 launch type allows you to bring instances to run containers, providing server- level, more granular control over the infrastructure that runs your container applications.



Create a source code repository using AWS CodeCommit



Configure a CI/CD pipeline using AWS CodePipeline

Deploy AWS CodeBuild to build your container image

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Security

Like quality control, security considerations have also shifted into the earlier stages of the development cycle. With more autonomy over quality control, developers can more readily adapt their code to address the latest security threats. However, for this to occur, security must first be prioritized across an organization. One way to support this cultural change is to make security efforts as transparent as possible. For starters, you can communicate and track security tasks just as you track development tasks.

More tactical security measures can ensure your application is protected throughout the development pipeline. Because of the nature of CI/CD—where development cycles rapidly move through build, test and release phases—the area for a potential security breach is wider than before. Developers and security teams should work together to diminish threats in the production system, as well as the build, testing and deployment environments.

Security teams and developers can work in tandem to code more securely, test their application for vulnerabilities and scan their code for malicious content. Using an image scanning solution, you can detect vulnerabilities of container images or image dependencies. Security teams can perform scans on these container images or image dependencies then publish pre-approved resources that developers can consume with confidence.

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Learn more

Learn how EPLEXITY and AWS can help provide the tools you need to get started— no matter what stage you're at.

To learn more, visit eplexity.com

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