













The Ibexlabs Solution

AWS Services Used

Amazon Virtual Private Cloud (VPC)	AWS (IAM)	Elastic Container Service
AWS CloudTrail	SecurityHub	Elastic Container Register
AWS Systems Manager <ul style="list-style-type: none">• SSM Session Manager• SSM Patch Manager• SSM Maintenance Window• SSM Parameter store• SSM Inventory	Amazon GuardDuty	 RDS
	AWS Config and Config Rules	 Amazon S3
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Third-Party Services

 DataDog	 Terraform	 DashSDK
 Okta	 CircleCI	) %
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Architecture Diagrams of the specific customer deployment

How the solution was deployed to meet the challenge

DevOps engineers at Ibexlabs reviewed and analyzed the client's requirements, that the infrastructure be orchestrated within a few minutes and that it should be cloud-agnostic. Engineers at Ibexlabs used Terraform to codify the provisioning of infrastructure onto the public cloud and enabled the automated provisioning of this architecture. By automating manual configurations, the possibility of human error was greatly reduced, and in many areas, completely eliminated. .

The solution also automated backup of the database in the case of catastrophic failure, assuring that Spire's users never experienced service disruptions when they needed it most.

Ibexlabs also automated Spire's application deployment process by integrating the third-party CircleCI service. This greatly improved software development and accelerated software delivery. As a result, Spire's application could be brought up in no time and without human intervention.

Using this solution, Spire is now able to test their application and deploy it on the production environment without downtime. The client's time to market is significantly reduced, and the solution provides the flexibility they need to orchestrate the infrastructure when they need it.

Third-party applications or solutions used



Datadog:

DataDog is able to adopt Spire Health's dynamic environments and ensure new resources are automatically detected and monitored based on tagging criteria. It also has dynamic alerting that scales with infrastructure and monitors Spire's infrastructure across multiple accounts. Instead of monitoring fixed metrics, Datadog was also set up to identify metrics based on percentiles and provide alerting based on metrics over time.

AIOps, a feature of Datadog, provides watchdog events which display recent trends in a metric and automatically aggregate performance statistics. Datadog also provides predictive analytics and machine learning capabilities which predicts metric growth in future and also identifies anomalies and outliers which cannot be manually detected.



Okta

Ibexlabs used Okta to provide Single Sign-On (SSO) access to the AWS Account. Users can sign into Okta and can launch any of the web apps without having to re-enter credentials. Okta establishes a secure connection with a users browser and then authenticates the user to Okta-managed apps using SSO integration methods like Federated (supporting SAML or another proprietary federated authentication protocol.) In addition, Ibexlabs used Okta to acquire temporary AWS credentials for AWS CLI.



Terraform

Terraform is a software that enables engineers to define the whole infrastructure using code, in a process often referred to as Infrastructure-as-Code (IaC). It makes it possible to build new infrastructure, make changes and improvements, version the code to be shared and reviewed amongst team members, and even reproduce the code to be used in the future. Ibexlabs used Terraform with CI/CD (CircleCI) to deploy AWS resources in and across different environments with reusable modules.



DashSdk

Ibexlabs enabled Dash SDK to get a full inventory of compliance controls across HIPAA, SOC 2, NIST 800-53 and other cybersecurity standards. This allowed for a clear view of how individual compliance standards were addressed by Dash administrative policies and whether they passed particular security checks.



CircleCI

For Continuous Integration and Continuous deployment (CI/CD) Ibexlabs used a SAAS-based application CircleCI. We choose CircleCI because jobs run fast and builds can be optimized for speed. CircleCI can be configured to run very complex pipelines efficiently with sophisticated caching, docker layer caching, resource classes for running on faster machines, and performance pricing.

AWS Services used as part of the solution

Core Platform



Amazon Virtual Private Cloud (VPC)

To launch instances on a private, isolated network with multiple subnets, route tables, Internet and Nat gateways including NACLs and gain the benefits of AWS' scalable infrastructure and automatic failover from the provisioned virtual private gateway. Provides network packet logging with VPC flow logs.



Elastic Container Service (ECS)

ECS handles orchestration of containers by allowing engineers to run and maintain a specified number of tasks in the service of an Amazon ECS cluster. Ibexlabs used ECS with Fargate that runs containers without having to manage servers or clusters of Amazon EC2 instances. With this, engineers no longer have to provision, configure, or scale clusters of virtual machines to run containers. This removes the need to choose server types, decide when to scale your clusters or optimize cluster packing. It automatically handles the details of capacity provisioning, load balancing, scaling, and application health monitoring.



Elastic Container Register (ECR)

Ibexlabs used ECR to maintain Docker images in a secure, highly Available, and fully Managed fashion. ECR eliminates the need to operate and scale the infrastructure required to power the container registry. There is no software to install. Container images are pushed to Amazon ECR, which are pulled when they're ready to be deployed. By using IAM roles and policies Ibexlabs was able to maintain Docker images in a secure way.



RDS

By using RDS, Ibexlabs created a highly available, scalable, and secure database for applications running on ECS. Enabled the automated backups and manual backups in case of any DB terminations. With Multi-AZ Ibexlabs was able to maintain high availability and failover support for DB instances



AWS Identity and Access Management (IAM)

To maintain AWS resources in each environment in a secure and compliant manner, Ibexlabs used IAM. With this service, Ibexlabs was able to create users, roles, and policies for different AWS resources, with least privileges access.



AWS CloudTrail

AWS CloudTrail service that enables auditing of the entire AWS account. With CloudTrail, it is possible to log, monitor, and retain account activity related to actions across the AWS infrastructure. This service provides an event history of AWS account activity, such as actions taken through the AWS Management Console, command-line tools, and other AWS services.



AWS Systems Manager

AWS Systems Manager facilitates resource and application management, reduces the time to resolve and detect functional issues, and makes it simple to perform and handle the infrastructure firmly at scale. In Systems Manager, Ibexlabs used several services like Session Manager, Parameter stores, Maintenance window, Patch Manager, and Inventory.



Amazon GuardDuty

Amazon GuardDuty is a managed cloud security monitoring service that continuously detects threats through analyzing and processing data sources like VPC Flow Logs, AWS CloudTrail event logs, and DNS logs. It uses threat intelligence feeds, such as lists of malicious IP addresses and domains, and machine learning to identify unexpected and potentially unauthorized and malicious activity within the AWS environment. This can include issues like escalations of privileges, uses of exposed credentials, or communication with malicious IP addresses, URLs, or domains. This is the most cost-effective option for threat detection in the AWS Cloud.



Amazon S3

For a highly scalable, fast, and durable solution for object-level storage of any data type, Ibexlabs use S3 objects for log archiving, assets storage, and other uses.



Security Hub

AWS Security Hub gives us a complete view of security status in an AWS account. It aggregates, organizes, and prioritizes your security alerts, or findings, from multiple AWS services, such as Amazon GuardDuty, Amazon Inspector, and Amazon Macie, as well as from AWS Partner solutions. Based on AWS's best practices and industry standards that our organization follows the AWS Security hub continuously monitors our environment using automated compliance checks.



AWS Config

By using AWS Config Ibexlabs is able to perform assessing, monitoring, and auditing configuration changes by using various Config rules. It is a fully managed service, and works by continuously recording resource configurations to a chosen S3 bucket, then comparing them to the desired state. This allows for a deep look at detailed configuration histories, the review of configuration changes, and most importantly, a quick response to anything that does not match the predefined rules.

Ibexlabs enabled AWS Config in all accounts and Regions with a recording of configuration changes to all resource types and global resource types like IAM. To store the configuration history and snapshot files, there is an S3 bucket in the management account with minimal access. Ibexlabs used an AWS Cloudwatch event to check whether RDS backups were available for 15 days or not. If backups are not available for a defined number of days, an AWS SNS notification is automatically sent.

Security analysis

Data from AWS Config enables engineers to continuously monitor the configurations of resources and evaluate these configurations for potential security weaknesses. Changes to the resource configurations can trigger Amazon Simple Notification Service (SNS) notifications, which can be sent to the security team to review and take action.

Change management

Whenever resources are created, updated, or deleted, AWS Config streams these configuration changes to Amazon Simple Notification Service (SNS), so that engineers are notified of all the configuration changes.

Troubleshooting

Using AWS Config, we can quickly troubleshoot operational issues by identifying the recent configuration changes to your resources.

Continuous audit and compliance

AWS Config is designed to assess compliance with internal policies and regulatory standards by providing visibility into the configuration of AWS resources and evaluating resource configuration changes against desired configurations on a continuous basis.

Deployments

For infrastructure automation Ibexlabs used Terraform, To enable config and config rules Ibexlabs created Terraform files and deployed those resources in respective AWS accounts.

Workload

AWS Config delivers configuration items that are recorded to an Amazon S3 bucket. Ibexlabs created an S3 bucket on the management account, where all AWS Config snapshots are stored. The bucket policy includes the least privileges, so it can give access to authorized users or roles only.

Results

The combination of these best-practice methods and AWS services allow Spire's PHI privacy and security to move in tandem. Ibexlabs' innovative solution helps Spire meet increasing HIPAA compliance demands proactively and cost-effectively based on the latest AWS technologies. With the continuing weekly support and performance optimization from AWS Trusted Advisor, Ibexlabs is also able to address Spire evolving, complex cost optimization, reliability, and scalability needs. Furthermore, Ibexlabs' ongoing support team maintains Spire infrastructure to streamline their software processes in the management of policies, billing & rating, and claims through high availability and fault-tolerant performance. This process yielded a solution from Ibexlabs that is in full alignment with Spire's business objectives.



We're now operating as a HIPAA compliant business, and Ibexlabs is providing ongoing support to ensure that we remain compliant. We've successfully completed several audits and assessments. ”

Ben Yule
CTO, Spire Health



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