Persistent

Biotechnology Product Development Company -

Risk Analytics Management Platform utilizing DevOps
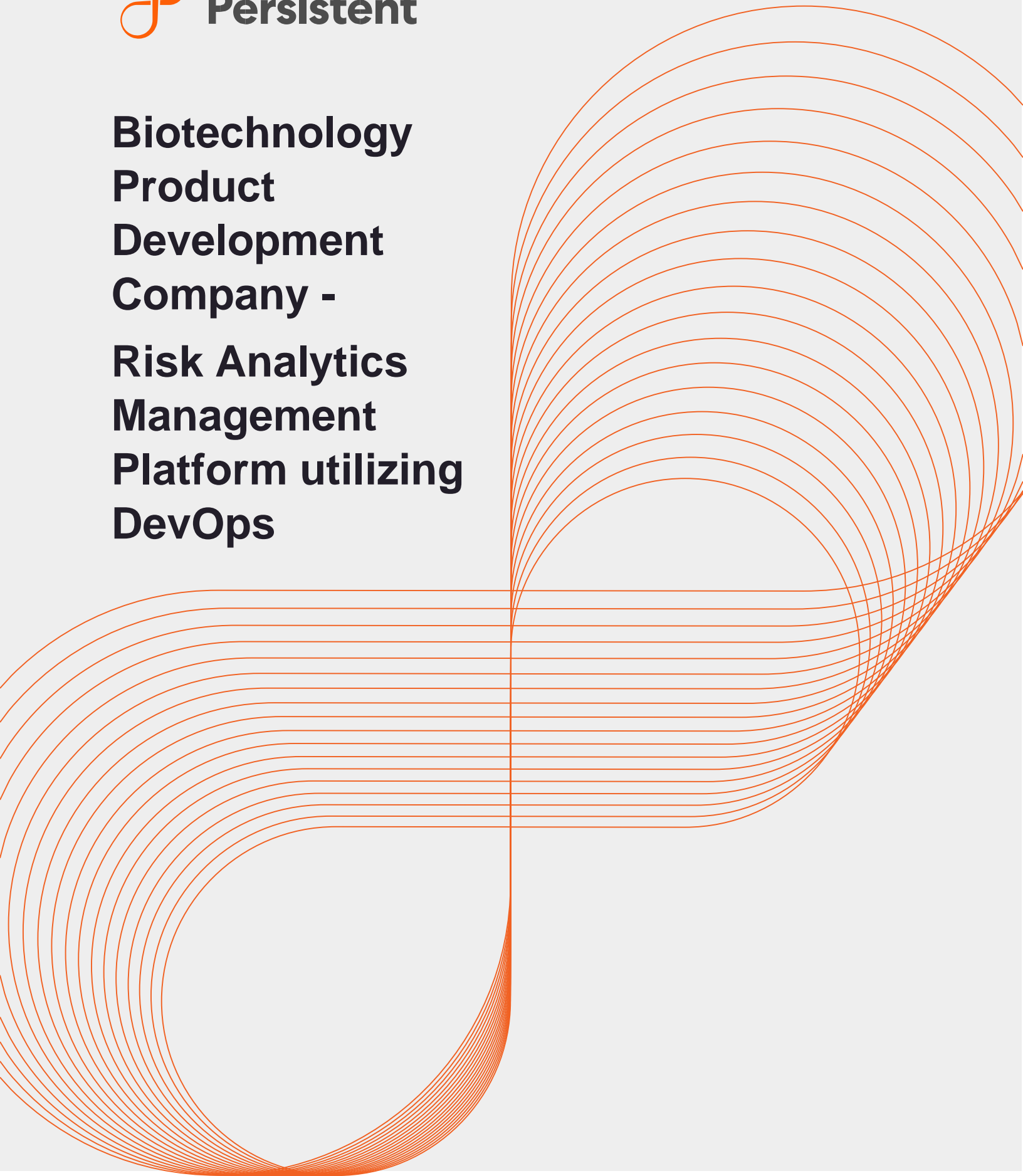
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About the Client

The customer is a US-based provisioner of scientific instrumentation, reagents and consumables, software and services to healthcare, life science, and other laboratories in academia, government including biotechnology and pharmaceutical sectors.

Problem Statement

The customer wanted to launch an application that will have a user interface to allow analysts to capture various risks and solutions to associate with their divisions and to apply metrics to analyze risk. They also wanted to create effective reporting and analytical dashboards for performance management and have an interactive visual representation of relationships between various entities.

What We Implemented

Utilizing AWS DevOps tools and best practices, the Persistent Systems team built a three-tier architecture for an analytics application using IaaS and serverless services on AWS. The application implements analytics over customer data using Angular by leveraging graph analytics. Some of the AWS services used were EC2, EBS, RDS, Neptune, MemcacheD, Cognito, S3, API Gateway, and Lambda. Persistent implemented security and compliance on the AWS infrastructure using VPC, IAM, GuardDuty, ACM, KMS and AWS Systems Manager.

DevOps

Infrastructure as code (IaC) and Automation: The infrastructure necessary for the analytics application platform is provisioned through infrastructure-as-code using AWS CloudFormation to automate the resource creation and deployment. The automated process builds the infrastructure and applications in a repeatable and consistent manner and saves a significant amount of manual provisioning time.

The CloudFormation stack creation is automated using AWS CodeBuild for all the application resources such as EC2, RDS, Neptune, and serverless resources like API Gateway and Lambda. The serverless resources required for the application are provisioned using AWS SAM which provides reliable deployment capabilities of AWS CloudFormation. The AWS CI/CD

resources like CodeBuild, CodeDeploy, CodePipeline used for application build and deployment are also provisioned using CloudFormation.

CI/CD and Source control: Github is used to store all of the source code. The code release pipeline is created using a combination of CodePipeline that includes stages for Github as source, CodeBuild Project as build, CodeDeploy Application as deploy stage. The application build is backed up in an S3 bucket with semantic versioning using CodeBuild Number. The code repository is created in the development environment and is the single source of truth for all code. A regular code commit process is used by the development team.

Management

Persistent manages the development and deployment of the analytics application using various CodeBuild and CodePipeline jobs to deploy the front-end, middle layer and backend resources. AWS CloudFormation is used to setup the infrastructure required for the application. Patch management of EC2 instances is automated by creating patch resources in Systems Manager and the same is provisioned using CloudFormation. The deployment jobs are automated for easy management of various builds.

Storage

Appropriate storage options are used for different use cases. Relational databases, such as MySQL, are created using RDS where the application data is stored. AWS S3 is used to manage backup of builds and application files. Amazon Neptune is used for graph analytics to work with highly connected datasets.

Security

Persistent Systems is also responsible for the security and compliance on the AWS infrastructure using VPC, IAM, GuardDuty, Inspector, and KMS. All of the AWS resources required for the application are provisioned within the VPC and IAM policies are used to restrict access of various resources. API gateways are deployed with VPC endpoint to avoid having external URL's to meet customer requirements and all traffic is within VPC. There are also no components which have an external URL or IP for security and protection.

Logging and monitoring

VPC flow logs and CloudTrail events are setup to have network logs and AWS Account logs. Application specific logs are stored in CloudWatch log groups to monitor the user access or any Rest API access issues.

Cost optimization

The application backend is completely configured using Lambda and API gateways to save on EC2 instance cost. In the initial phases, the development team started with small instances and when the team met performance or load issues, the instance types were scaled up to meet the resource requirements. Due to fully automated provisioning pipelines, environments can be created very quickly so there is no need to keep idle environments running for testing, performance, staging, or demo. The resource configuration and counts are selected in a way to meet the business requirements without over provisioning. A daily and weekly billing report is reviewed by customer to ensure the cost is within budget.

Outcomes and Benefits

The customer now has offerings with this application that have various analytics on risks and solutions. They have the ability to create effective reporting and analytical dashboards for performance management with an interactive and visual representation of relationships between entities. The CI/CD pipeline for automated deployment using AWS Services has enabled faster deployment and release management of the application saving an entire day for creating any new test environment and 2-3 hours for continuous deployments. This has also saved significant cost of man effort and AWS resources with utilizing infrastructure-as-code and having jobs for every infrastructure configuration.

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About Persistent Systems

Persistent Systems is a global company specializing in solutions, software products, and technology development services. Persistent Systems builds innovation that drives the business of our customer's enterprises with software at the core of their digital transformation. To learn more, visit http://www.persistent.com

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