

Application migration from GCP to AWS EKS [KaaS]

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Executive Summary

This comprehensive case study details the successful implementation of application migration from Google Cloud Platform (GCP) to Amazon Elastic Kubernetes Service. The primary objective of this study is to provide an in-depth analysis of the migration process, including the identified challenges, scoping procedure, and strategic approach employed. Moreover, it highlights the innovative solutions devised, the implementation strategy executed, and the remarkable results achieved, emphasizing the significant impact on the organization. Additionally, this case study offers valuable insights and lessons learned throughout the migration journey, serving as a valuable resource for future endeavours.

Customer Challenge

When the customer approached us with the project of migrating their applications from GCP to AWS EKS [KaaS], they faced several challenges, the major challenge was the time constraint for delivering the applications on the AWS EKS [KaaS] platform. The applications needed to be available for developers to consume while maintaining dynamic scalability and high availability. To address the time constraint challenge and ensure dynamic scalability and high availability, we established a secure VPC tunnel between GCP and AWS, utilized AWS DMS for efficient data migration, implemented ArgoCD for automated application deployment, and created CI/CD pipelines in Jenkins. These DevOps practices streamlined the migration process, optimized deployment workflows, and facilitated prompt application delivery on the AWS EKS [KaaS] platform while maintaining scalability and availability.

Technology Solutions

Several technology solutions were utilized during the application migration to streamline the process and enhance collaboration and efficiency. These solutions included:

- **AWS Organizations:** By leveraging AWS Organizations, multiple AWS accounts were consolidated into an organization, allowing for centralized management. This enabled DevOps teams to have better control and governance over resources.
- **AWS EKS:** AWS Elastic Kubernetes Service was employed to run the workloads in Kubernetes clusters. EKS provided a scalable and managed platform for deploying and managing containerized applications, promoting DevOps practices.
- **AWS CloudTrail:** The integration of AWS CloudTrail facilitated operational and risk auditing, governance, and compliance. DevOps teams were able to gain visibility into account activities, enabling them to detect and respond to any security or operational issues promptly.

About Acquia



Acquia is a leading cloud-based digital experience platform that empowers organizations to create and manage exceptional digital experiences. With its comprehensive suite of tools and services, Acquia enables businesses to build, optimize, and personalize their websites and applications, driving customer engagement and growth. Acquia's platform combines content management, digital asset management, personalization, and cloud hosting capabilities to provide a seamless and scalable solution for delivering compelling digital experiences.

Trusted by organizations worldwide, Acquia helps businesses achieve their digital goals by providing the tools and expertise needed to succeed in today's digital landscape.

- **AWS Config:** AWS Config played a crucial role in assessing and evaluating the configurations of AWS resources. It enabled DevOps teams to maintain consistency and ensure compliance by monitoring and tracking changes made to resource configurations.
- **Centralized Terraform Tooling:** The adoption of centralized Terraform tooling empowered customer to provision AWS resources consistently and efficiently using Terraform templates. This streamlined the infrastructure provisioning process and promoted infrastructure as code principles.
- **Multi-account Environment using AWS Organizations:** By utilizing a multi-account environment with AWS Organizations, Customer achieved effective resource isolation and management. It allowed for better control over different environments, facilitating proper separation of development, testing, and production environments.
- **AWS DMS:** AWS Database Migration Service (DMS) expedited the migration process by securely moving database and analytics workloads to AWS with minimal downtime and zero data loss. This enabled customer to migrate data seamlessly while maintaining application availability.
- **Helm Charts:** Helm charts provided a standardized and declarative way to define and manage Kubernetes resources. Customer leveraged Helm charts to package and deploy applications consistently, ensuring reproducibility and simplifying the deployment process.
- **ArgoCD:** A GitOps tool, automated the deployment of applications on Kubernetes. It monitored the Git repository containing Helm charts and automatically deployed new versions based on changes detected. This streamlined the application deployment process, reducing manual effort.
- **JFrog Artifactory:** JFrog Artifactory served as a central repository for managing artifacts, binaries, and components. It facilitated artifact management, version control, and traceability throughout the software supply chain, enabling DevOps teams to have better control over their software dependencies.

List of application which were targeted for migration

- Redis
- beanstalk
- kafka
- mautic application
- MySQL
- Postfix

Implementation Strategy

The following implementation strategy was employed during the application migration from GCP to AWS EKS [KaaS], focusing on DevOps principles:

- **VPC Tunnel:** A Virtual Private Cloud (VPC) tunnel was established between AWS and GCP to ensure secure communication and seamless data transfer between the two platforms.
- **AWS DMS for Data Migration:** AWS Database Migration Service (DMS) was utilized to migrate MySQL data from GCP to AWS Aurora, ensuring a quick and secure migration process with minimal downtime and zero data loss.

AWS Services

- AWS Organizations
- AWS EKS (Elastic Kubernetes Service)
- AWS CloudTrail
- AWS Config
- AWS SSO (Single Sign-On)
- AWS DMS (Database Migration Service)
- AWS Aurora
- AWS VPC (Virtual Private Cloud)
- AWS Terraform
- Amazon EC2
- AWS Backup
- AWS IAM (Identity and Access Management)
- AWS Auto Scaling

- **Git Repository for Helm Charts:** A Git repository was created to store Helm charts for the applications. This repository served as the source of truth for ArgoCD, enabling version control and simplified deployment management.
- **ArgoCD Configuration:** ArgoCD, a GitOps tool, was installed and configured in the AWS EKS [KaaS] cluster. It continuously monitored the Git repository for changes to the Helm charts and automatically deployed new versions of the application, ensuring streamlined and automated deployments.
- **Continuous Integration with Jenkins:** Pipelines were created in Jenkins to enable continuous integration. This allowed for automated building, testing, and validation of new code changes, promoting a DevOps approach to development.
- **Continuous Deployment with ArgoCD:** Pipelines were also created for continuous deployment, integrating with ArgoCD. This enabled automated and controlled deployment of applications based on the changes detected in the Git repository.
- **JFrog Artifactory for Image Storage:** JFrog Artifactory was utilized as a centralized repository to store images, artifacts, binaries, and components throughout the software supply chain. It facilitated efficient and reliable artifact management.
- **Vulnerability Scanning with SonarQube:** SonarQube was employed for vulnerability scanning of the code. It ensured code quality and security by identifying potential vulnerabilities and providing actionable insights for remediation.
- **Version Control with Git:** All code commits were done using Git, ensuring version control, collaboration, and traceability throughout the development and deployment process.

By following this implementation strategy, the migration process was optimized, promoting automation, version control, and secure deployment of applications on the AWS EKS [KaaS] platform, aligning with DevOps principles.

Results and Impact

- **Successful Migration Blueprint:** The customer achieved a successful implementation of the migration, which served as a blueprint for future migrations. The established methodology and best practices could be reused and applied to future projects, streamlining the migration process and reducing risks.
- **Cost Optimization:** The migration to AWS allowed the customer to leverage the benefits of cost optimization for certain services. By utilizing AWS services, such as AWS Organizations and AWS EKS, the customer could optimize resource usage, improve efficiency, and potentially reduce costs associated with infrastructure management.
- **Utilization of AWS Offerings:** The migration enabled the customer to fully utilize the offerings provided by AWS on the KaaS platform. AWS services like AWS CloudTrail, AWS Config, and AWS SSO enhanced operational efficiency, security, and governance capabilities. This allowed the customer to leverage the full potential of AWS infrastructure and services for their applications.

Conclusion

The successful implementation of the migration process demonstrated the importance of applying engineering principles, understanding the customer's business environment, and minimizing business risks. Migrations of this scale typically occur infrequently in the lifecycle of an organization, making it crucial to establish a solid foundation and leverage existing methodologies for future migrations. The customer's ability to realize the benefits of cost optimization and fully utilize AWS offerings on the KaaS platform highlights the effectiveness of the migration strategy and its positive impact on the organization.

About Intuitive Cloud

Intuitive Cloud is an AWS Advanced Consulting Partner that specializes in providing cloud migration, infrastructure design, and DevOps services to help companies optimize their AWS environment. The company's team of certified AWS experts has extensive experience in designing and deploying AWS solutions for businesses of all sizes and industries. Intuitive Cloud is committed to delivering high-quality services that drive innovation and efficiency while providing exceptional customer satisfaction.



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