Case Study:

Knotch

1. Overview

Knotch, a leading digital intelligence platform, enables businesses to gain actionable insights through customer journey maps and interaction reports. As their user base grew, Knotch faced challenges with scaling, automating deployments, and maintaining performance. To manage increasing complexity, they required a secure, scalable architecture that could handle large data volumes while ensuring global availability.

R Systems designed a cloud-native AWS architecture that automated processes, improved scalability, and accelerated feature delivery. This solution boosted Knotch's platform performance and responsiveness, ensuring confidence from stakeholders and clients.

2. Architecture Overview

Knotch's infrastructure is engineered for high performance and resilience, tailored to meet diverse operational demands. The backend application is hosted on Amazon EKS, ensuring scalability and robust container orchestration, while the frontend resources are securely managed on Amazon S3. Complex data processing is powered by AWS Redshift and RDS, enabling seamless analytics and database management. Spread across multiple Availability Zones in the AWS US East (N. Virginia) Region, the architecture ensures high availability, fault tolerance, and uninterrupted service, reinforcing Knotch's commitment to reliability and excellence.

Key Components of Knotch's Architecture:

Frontend Hosting and Delivery:

- **Amazon S3 & CloudFront**: Knotch’s frontend is hosted on Amazon S3, providing secure and scalable storage for static assets like HTML, CSS, and JavaScript. Combined with Amazon CloudFront’s powerful Content Delivery Network (CDN), users worldwide enjoy low-latency, high-speed access to the application with enhanced security.
- **Amazon Route 53:** Integrated with CloudFront, Route 53 ensures fast and reliable DNS resolution, directing users to the optimal edge location for seamless content delivery.

Backend Infrastructure and Content Delivery:

- **Amazon EKS & ALB:** Knotch’s backend infrastructure is powered by Amazon Elastic Kubernetes Service (EKS), efficiently managing containerized applications. An Application Load Balancer (ALB) distributes traffic across EKS pods, optimizing resource utilization and performance. By connecting the ALB with CloudFront, Knotch ensures smooth and efficient traffic management between the frontend and backend services.
- **Request Switching in CloudFront:** A smart, dual-origin CloudFront setup routes requests between the frontend (S3) and backend (EKS ALB) based on request type, streamlining interactions and ensuring a cohesive user experience.

Data Pipeline:

- **Amazon Redshift & PostgreSQL:** Knotch's advanced data pipeline leverages Amazon Redshift for data warehousing and PostgreSQL for relational data management. With Redshift's federated queries, Knotch integrates both operational and analytical data for efficient processing and real-time insights.
- **Data Communication:** The backend seamlessly communicates with Redshift and PostgreSQL to power customer journey mapping and interaction reporting, enabling precise tracking and analysis of user behaviors.

Monitoring & Logging:

- Amazon CloudWatch, AWS CloudTrail, & AWS Config: These services provide continuous monitoring, auditing, and logging, granting Knotch real-time visibility into system performance and security.
- Amazon GuardDuty: Adds an extra layer of security by actively monitoring for suspicious activities and potential threats, ensuring robust protection.

Application Use Case:

- **Customer Journey & Interaction Reports:** Knotch's platform enables users to build comprehensive customer journey maps and interaction reports, providing critical insights into customer behavior that inform business strategies.
- **Data Analysis:** Powered by Redshift's processing capabilities and RDS's relational strengths, Knotch's platform transforms data into actionable insights, enhancing the value delivered to clients.

CI/CD Pipeline:

- **ArgoCD-Powered GitOps:** Knotch uses ArgoCD to automate deployments with GitOps practices. This system enables continuous monitoring of deployment repositories, detecting changes and automatically deploying updates to Kubernetes clusters. The pipeline can trigger additional tasks such as testing, migrations, or further automation steps, ensuring a smooth and scalable deployment process.
- **Development, Staging, & Production Phases:** ArgoCD manages deployments across development, staging, and production environments. Whether it's continuous integration or requiring manual approvals for production, Knotch's deployment pipeline is tailored for flexibility, speed, and precision, pushing towards full continuous deployment.

Networking and Security:

- **Internet Gateway (IGW) & NAT Gateway:** The architecture leverages an IGW for public-facing components and NAT Gateways for secure outbound traffic from private subnets, ensuring safe and controlled data access.
- **AWS Network Firewall & AWS WAF:** Knotch secures its infrastructure with AWS Network Firewall and Web Application Firewall (WAF), safeguarding data pipelines and applications from external threats and ensuring resilience.

This robust and scalable architecture ensures Knotch remains at the forefront of digital intelligence, delivering exceptional performance, reliability, and security for its global users.

3. How R Systems Made a Difference

- **Optimized Infrastructure Scalability:** R Systems implemented Amazon EKS for container orchestration, allowing Knotch's backend services to scale seamlessly across multiple Availability Zones, ensuring high availability and fault tolerance.
- **Efficient Frontend Delivery:** By hosting the front end on Amazon S3 and leveraging Amazon CloudFront for global content delivery, R Systems ensured low latency access and faster load times, improving the overall user experience.
- **Sophisticated Data Pipelines:** Implemented a robust data pipeline using Amazon Redshift and PostgreSQL to handle Knotch's real-time data analysis, enabling the generation of detailed customer journey maps and interaction reports.
- **Enhanced Security and Compliance:** The architecture was fortified with AWS Network Firewall, WAF, and GuardDuty, ensuring protection from external threats while complying with data protection standards.
- **Automated CI/CD Pipelines:** R Systems introduced ArgoCD for continuous deployment, automating the entire CI/CD process from code updates to infrastructure provisioning. This improved Knotch's ability to roll out new features quickly and with minimal manual intervention.
- **Seamless Integration Between Frontend and Backend:** The intelligent request switching within CloudFront between Amazon S3 (frontend) and EKS (backend) ensured smooth operation and consistent user experience across regions.

4. Conclusion

R Systems transformed Knotch's infrastructure by implementing a highly scalable and secure cloud-native solution on AWS. The new architecture empowered Knotch to handle high user demands, automate its deployment processes, and improve its data analysis capabilities. Through advanced monitoring, seamless frontend-backend integration, and robust security measures, Knotch is now well-equipped to continue delivering cutting-edge digital intelligence solutions to its clients. The partnership between Knotch and R Systems is a testament to the value of a well-architected solution in driving operational excellence and long-term success.

Geography

New York

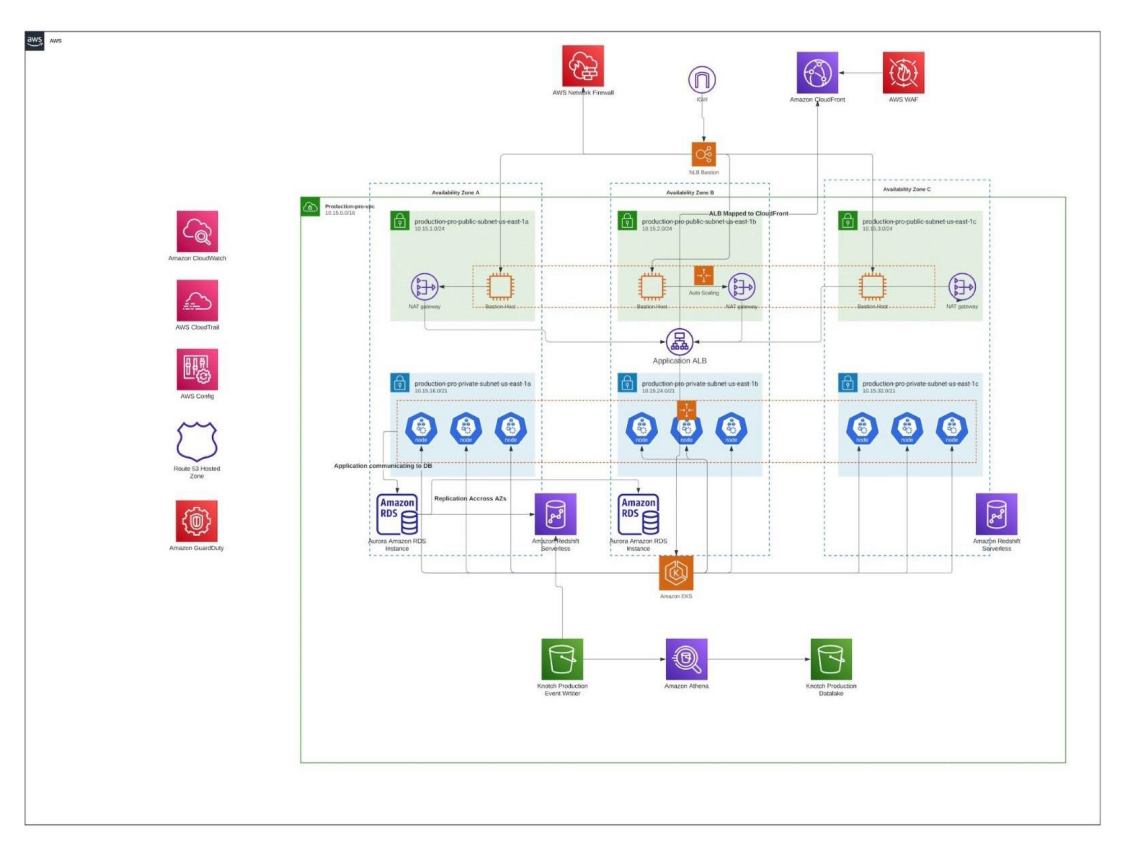
Vertical

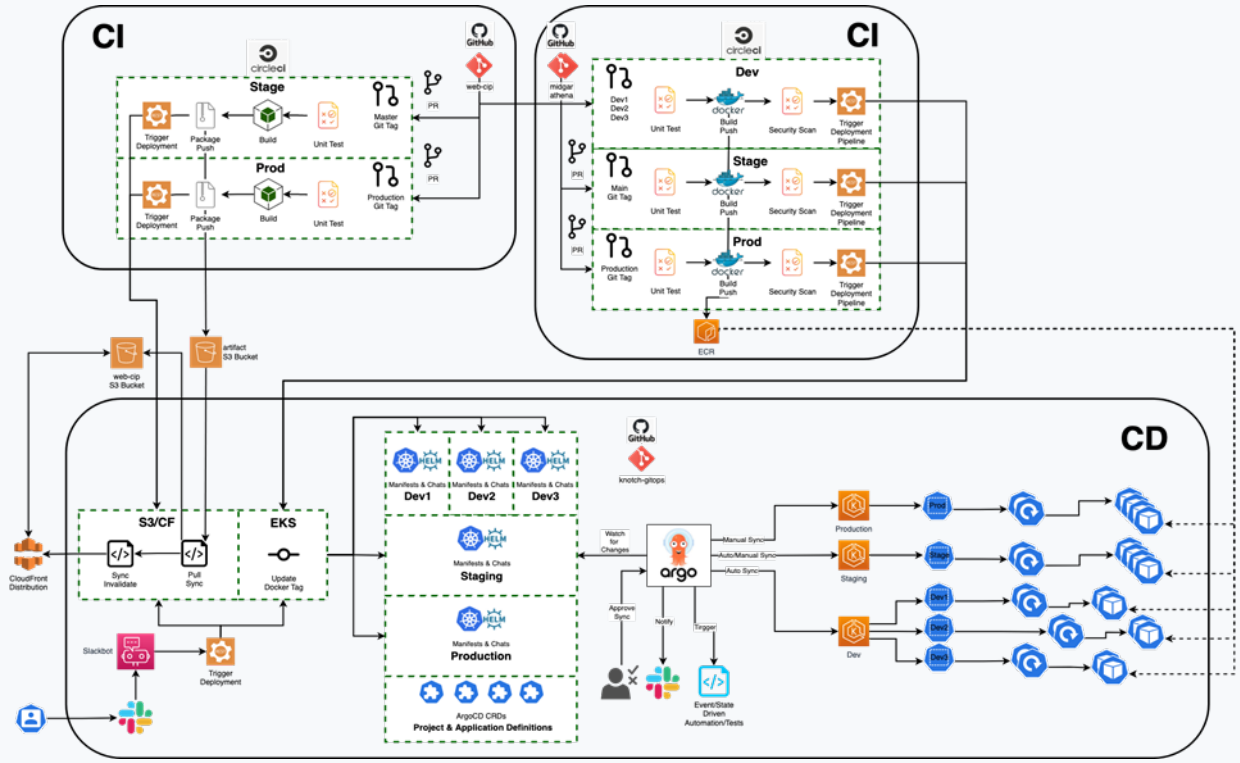
Content Intelligence Platform

Tools & Technologies

- Amazon web Services(AWS
- AWS EKS
- AWS EC2
- AWS Lambda
- AWS S3
- AWS Kinesis
- AWS Organization
- AWS WAF
- AWS ECR
- AWS CloudTrail
- AWS SQS
- AWS CloudFront
- AWS VPC
- AWS Certificate Mgr
- AWS Redshift
- AWS Elasticache
- AWS KMS
- AWS Route 53
- AWS SNS
- AWS RDS & Dinamodb

Workflow Overview





Partnering for Success

R Systems is a leading digital product engineering company that designs and builds next-gen products, platforms, and digital experiences empowering clients across various industries to overcome digital barriers, put their customers first, and achieve higher revenues as well as operational efficiency.
We constantly innovate and bring fresh perspectives to harness the power of the latest technologies like cloud, automation, AI, ML, analytics, Mixed Reality etc.

Contact Us

For more information about our solutions or to discuss how we can help your business, please contact us at:

aws-sales@rsystems.com
www.rsystems.com