



CLIENT:

**ibet**

CASE STUDY

## iBet using AWS Container Services

Helped **iBet** improve claim outcomes, deliver an exceptional **end-user experience** & achieve ease of doing business with clients & partners using **AWS** technologies.

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# Client Overview

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The Canada-based client facilitates an online betting platform for all the interested users across Europe. They invested in technology & innovation to improve claim outcomes and enhance ease of doing business for clients and distribution partners.

## Business Need

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The client wanted to move their production as well as every other environment into the cloud. So, R Systems was engaged to create an infrastructure using AWS Services like EKS to orchestrate the containers deployed within the AWS architecture. We developed a highly available, elastic, stable, secured, and cost-effective solution for the client. Our knowledge of Amazon Web Services & enterprise cloud components helped iBet build a best-in-class, high-performance design with a cost-efficient footprint.

## Problem Statement

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The client had on-prem infrastructure running on traditional servers and the infrastructure was not scalable & there were cost-related challenges. It consisted of multiple user's login interfaces like the member, employer, provider, and others as the legacy system. The client has a betting site that provides various betting options on multiple games. They expect massive growth in incoming traffic with occasional spikes in near future and thus there was a need for a very elastic solution. Due to the legacy system, there were only limited end users handling with minimum hardware and software support and costly maintenance of these applications. As client aimed to rapidly scale their digital efforts, information flows, and data markets and restructure themselves for the new digital realities with modern technologies, opportunities, and next steps for business transformation, they needed a highly available & cost-effective solution that enables iBet to an exceptional experience for end-users.

## Why AWS

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Amazon Web Services is a pioneer in providing leading technology services:

- AWS provides Elastic Container Services & EKS with open source Kubernetes support for Container orchestration
- EC2 (worker nodes) utilization and dependency mapping of on-premises data for better understanding of workloads
- API Gateway is very useful for Serverless architecture
- Client wanted near real-time DR, hence having multiple availability zones was a perfect fit
- Application Discovery service used to gather information about the on-premises infrastructure.
- Performance testing before production deployment using EC2 instances
- Logging services like CloudTrail for audit purposes
- Enhanced security with IAM, Encryption, etc.
- CloudFormation for the deployment of infrastructure
- Well-Architected framework as guidance for resilient architecture

## Solution Approach

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R Systems delivered solution using various AWS services e.g. EKS, Cloud Formation, EC2, ELB, RDS, API Gateway, Cognito, Lambda Function, S3, Route 53, and Cloud Front, etc. for planning, migration, and cost optimization. API Gateway was chosen because it's a serverless service and it's cost-efficient in this role. It integrates well with the Microservices deployed at the backend.

**EKS Services:** EKS from AWS provides an excellent platform for application deployment & infrastructure running on containers.

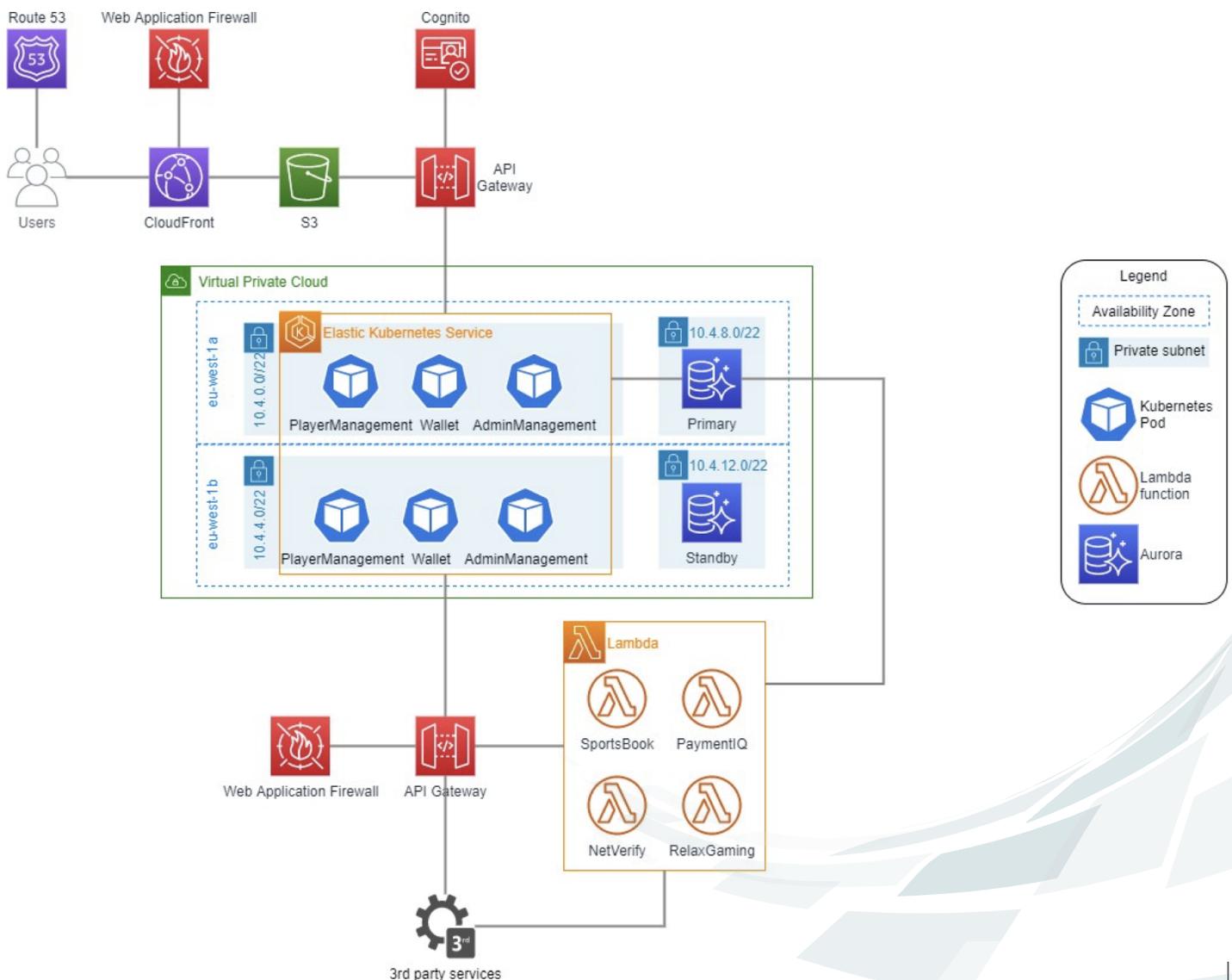
**Planned Vs Actual RPO and RTO:** We used the Aurora for Database as it is a managed service, so RPO & RTO is minimum (within 1 or 2 min) in case of Database and take care of by AWS.

**Downtime:** Downtime was minimum as we did the complete testing for each application before the Actual Cutover. We also tested many point-in-time replicas and scheduled the last replication before cutover.

**Monitoring:** We used Cloud Watch to monitor our AWS Services like API, Lambda Function, Cloud Front, SQS, and EC2 for any spike or suspicious activity that happens within our infra.

### Deployment Highlights:

- Applications deployed as Microservices on EKS containers
- Re-architected and deployed legacy applications to run in AWS
- Used EC2 as worker nodes with EKS for deploying the Website
- Used Aurora for scalable DB operations
- Used AutoScaling groups that reduce the operational complexity of running and managing applications
- Configured required services: IAM, Elastic load balancer, Route 53, SNS, etc.
- Notification & alerting configured on AWS SQS & SNS
- Used Cloud Front for static content of the Application



## AWS services used as a part of the solution:

- Aurora Database
- S3 – Scalable storage in the cloud (To store flat files – like snapshots, images, videos, etc.) Route 53 – Scalable DNS and Domain name registration
- SQS – Email sending and receiving services
- Network Load Balancer – Distribute Load to servers in multiple AZs.
- CloudWatch – Monitor resources and applications (logging)
- SNS – Managed message topics for pub/sub
- EKS- AWS Kubernetes services to serve applications behind NLB
- CloudFormation- Service to model and provision the resources
- Lambda – Services for automating
- VPC – Service private network
- Cognito – User Authentication
- API Gateway – This Service is used for Serverless architecture
- IAM – Manage User Access and Encryption Keys
- CloudTrail- To log all the activities in the AWS account to S3 bucket

## OS & Database:

Sl. No.	Database
1	Aurora

## Operational Excellence

Monitoring tools such as AWS CloudWatch were used. Actionable alerts were generated from monitoring tools which were responded to by the IT team. CloudWatch dashboard was created for the IT team to monitor the real-time status of AWS resources.

## Security

Utmost care was taken to provide security inside/outside the AWS perimeter & at multiple layers

- Users were authenticated using AWS Cognito as this helps to provide user authentication service in a scalable manner
- All the administrators were having access to AWS console and resources through their individual IAM users. Multi-factor authentication (MFA) was made compulsory
- Applications on EKS were configured to use IAM roles
- Secured IAM user was created with appropriate granular permissions which disabled
- MFA was enabled for the root account. Programmatic access was disabled for the root account
- Separate subnets were configured for each layer (Web, Application, Database) for network-level isolation
- VPC flow logs were configured to monitor the incoming/outgoing traffic at the ENI level and logs were stored in S3 bucket for audit purposes. Logs were stored in S3 bucket for 90 days and then archived to Glacier using Life cycle policies
- Security groups & NACLs were configured with the least permissive rules
- CloudTrail was configured to record the API activity of AWS services and logs stored in S3 bucket for audit purposes
- Enabled Amazon S3 server-side encryption (AES-256) to encrypt data at rest

# Reliability

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R Systems deployed solution in single AWS region leveraging AWS Well-Architected Framework which includes using two availability zones (AZs) to ensure all applications are always available.

AWS Life Cycle was configured to take periodic backups of the tagged EBS volumes. Thus, ensuring the availability of snapshots of EBS volumes for recovery.

AWS managed database service (Aurora) was used to ensure the high availability of Databases.

AWS EKS was used to deploy applications on Containers in Multi-AZ architecture. Both Primary & Standby database remained in sync & automated backups were configured to minimize RPO & RTO.

# Cost Optimization

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- AutoScaling was configured for the worker nodes to automatically vary the underlying EC2 machines across all layers (Web, Application) based on incoming traffic.
- Using managed services e.g. Aurora, AWS Cognito helped to reduce operational costs.
- M5 family instances were selected and 1-year RI (reserved instance) was purchased to reduce bills.

# Project Outcomes & Success Metrics

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- Provided high availability system with negligible downtimes
- Utilized AutoScaling for better handling of traffic spikes
- Enabled advanced monitoring through AWS CloudWatch on API Gateway, Lambda, and CloudFront, etc.
- Implemented disaster recovery feature by utilizing Multi-AZ architecture, automated backups
- Enhanced audit capabilities using CloudTrail
- Secured solution using IAM, EBS volume encryption, etc.
- Provided dynamic benefit design that rewards individuals for high-value care and adherence
- Enhanced accountability of providers & individuals
- Reduced complexity of business processes
- Delivered a fantastic experience to iBet

# About R Systems

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R Systems is an AWS Advanced Consulting partner and Microsoft Gold partner. We are a global digital transformation leader that provides AI-driven solutions to clients across industries, through a broad range of technology & AI/analytics services. We continue to empower organizations for over 26+ years, with 16 delivery centers, 25+ offices worldwide, and a workforce of 2700+ professionals.