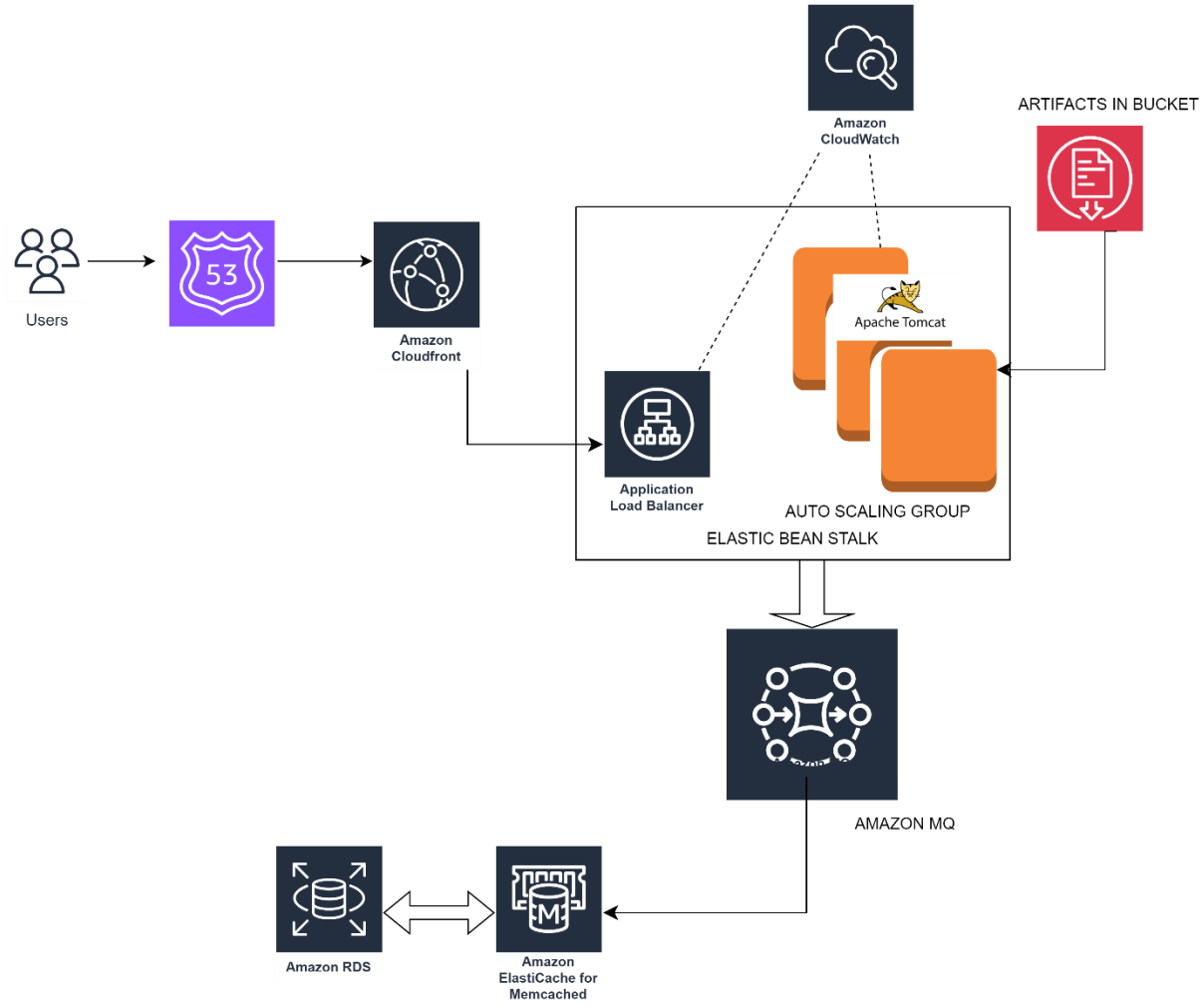
Multi-Tier Web Application Stack [VPROFILE] - AWS Cloud Re-Architecture



Objective:

- Build a flexible infrastructure.
- Eliminate upfront costs.
- Implement Infrastructure as Code (IaC), Platform as a Service (PaaS), and Software as a Service (SaaS).
- Optimize for agility, scalability, and business continuity.

Scenario:

- Current services run on Physical, Virtual, and Cloud machines.

- Challenges include operational overhead, scaling, uptime, and manual processes.

Teams Required before Re-Architecture:

- Cloud Computing Team
- Virtualization Team
- Data Center Operations Team
- Monitoring Team
- System Administrators

AWS Services Used:

- Elastic Beanstalk (Application hosting and management)
- EC2 (Virtual Machines for Tomcat Application Server)
- NGINX/ELB (Load Balancer replacement)
- Auto Scaling (Automating VM scaling)
- S3/EFS (Storage)
- RDS (Relational Database Service)
- Elastic Cache (In-memory caching)
- Active MQ (Message broker)
- Route 53 (DNS)
- CloudFront (Content Delivery Network)

Step-by-Step Project Execution:

1. Initial Setup:

1. Login to your AWS account.
2. Create a key pair for Elastic Beanstalk instance login.
3. Create security groups for:
    - Elastic Cache
    - RDS
    - Active MQ

2. Database Initialization:

1. Launch an EC2 instance for database initialization.
2. Login to the instance and initialize the RDS database.

3. Elastic Beanstalk Configuration:

1. Create an Elastic Beanstalk environment.
2. Update security group settings:
    - Allow traffic from the Beanstalk security group to the backend.
    - Enable internal traffic among backend services.

4. Load Balancer and Health Checks:

1. Change the health check on Elastic Beanstalk to "/login."
2. Add an HTTPS listener on port 443 for the Elastic Load Balancer (ELB).

5. Build and Deploy Application Artifact:

1. Build the application artifact with backend information.
2. Deploy the artifact to Elastic Beanstalk.

6. CDN and DNS Configuration:

1. Create a CloudFront distribution with an SSL certificate.
2. Update entries in GoDaddy DNS zones to point to the CloudFront URL.

7. Testing:

Test the application URL to ensure it is working as expected.

AWS Architecture for the Project:

- **Compute:** EC2 instances, Auto Scaling, Elastic Beanstalk
- **Storage:** EFS/S3
- **Database:** RDS (MySQL), Elastic Cache (Memcached)

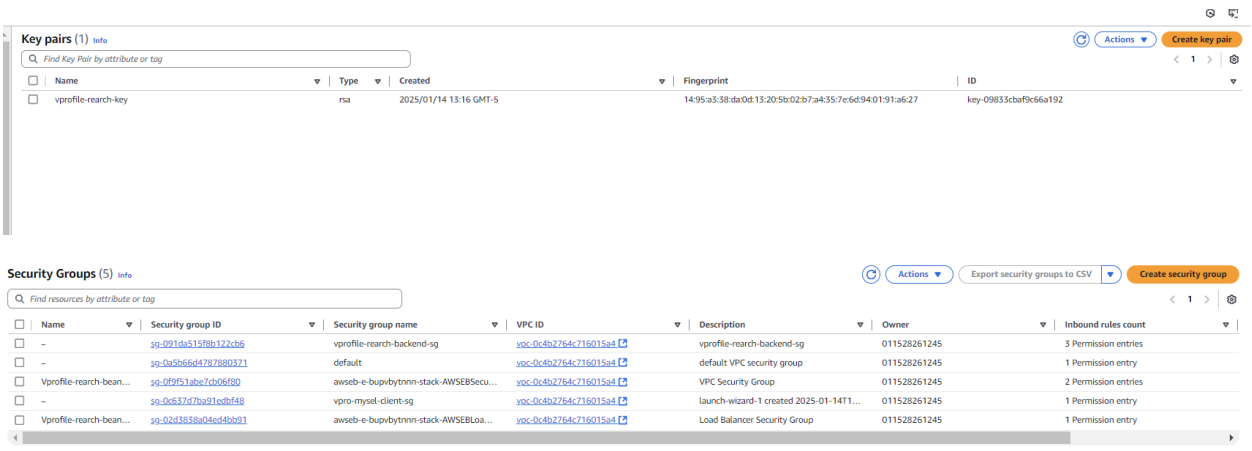
- **Message Broker:** Active MQ
- **Networking:** Route 53 (DNS), CloudFront (CDN)
- **Load Balancing:** ELB/NGINX

Comparison:

Component	Existing Setup	AWS Setup
Load Balancer	NGINX	ELB in Beanstalk
Scaling	Manual	Auto Scaling
Storage	NFS	EFS/S3
Database	MySQL on VM/EC2	RDS
Caching	Memcached on VM/EC2	Elastic Cache
Messaging	RabbitMQ on VM/EC2	Active MQ
DNS	GoDaddy or Local DNS	Route 53
CDN	None	CloudFront

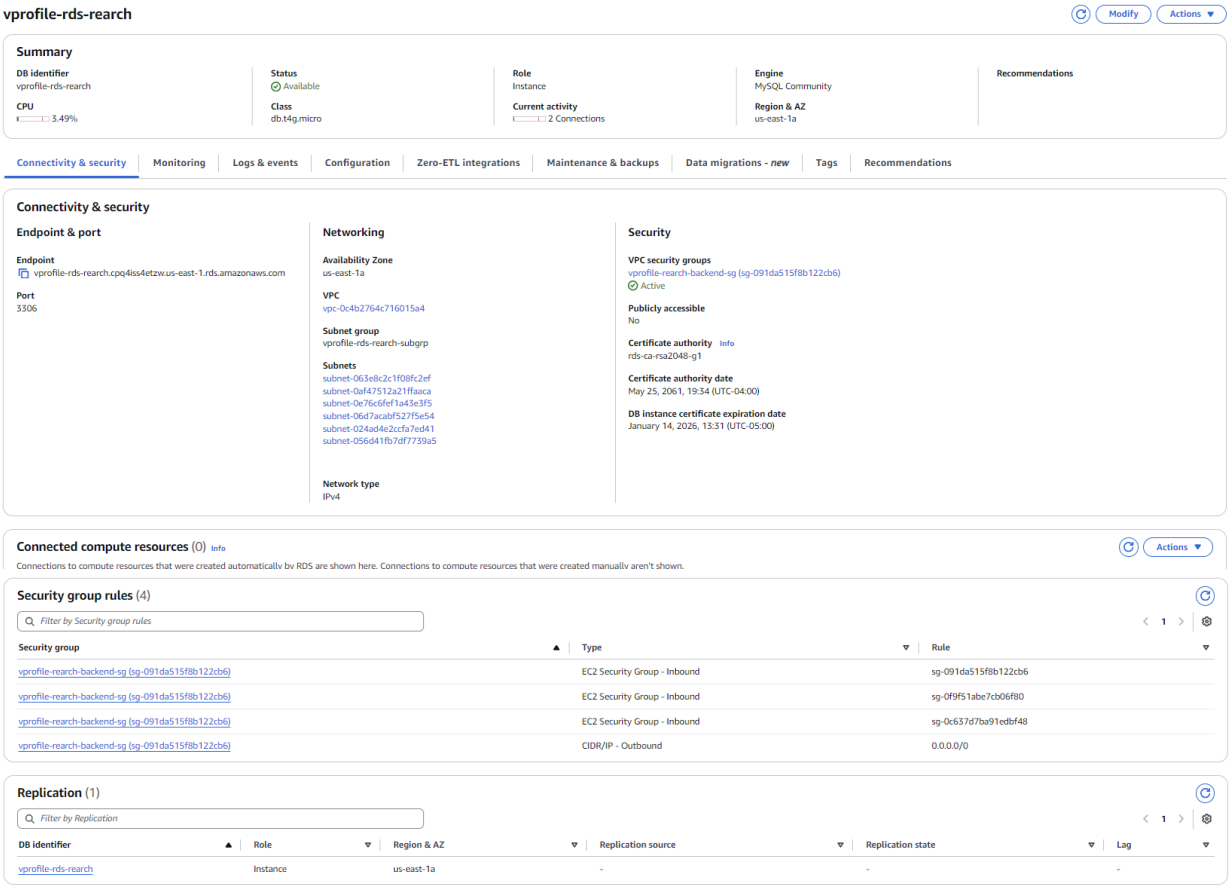
Execution Flow Summary:

1. Login to AWS.
2. Setup key pairs and security groups.

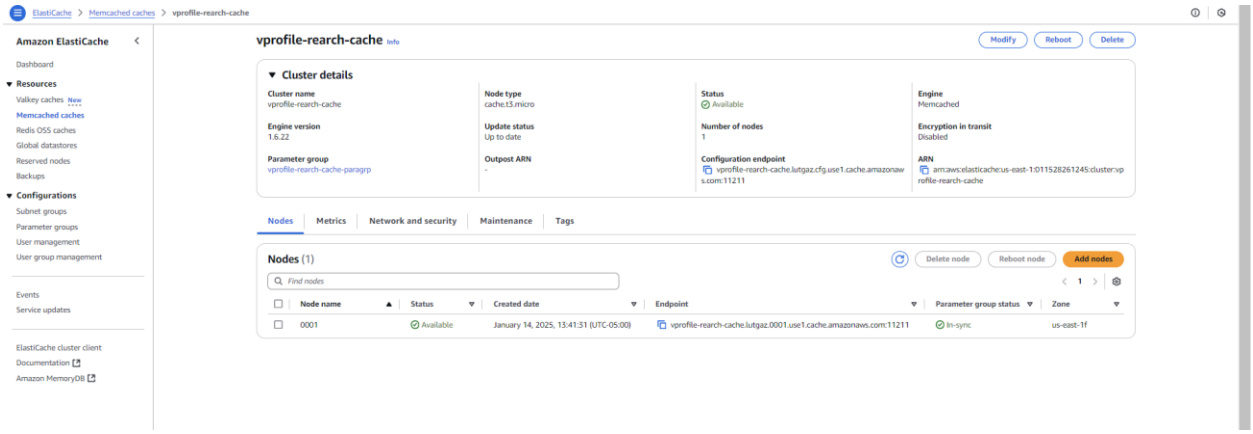


3. Configure RDS, Elastic Cache, and Active MQ.

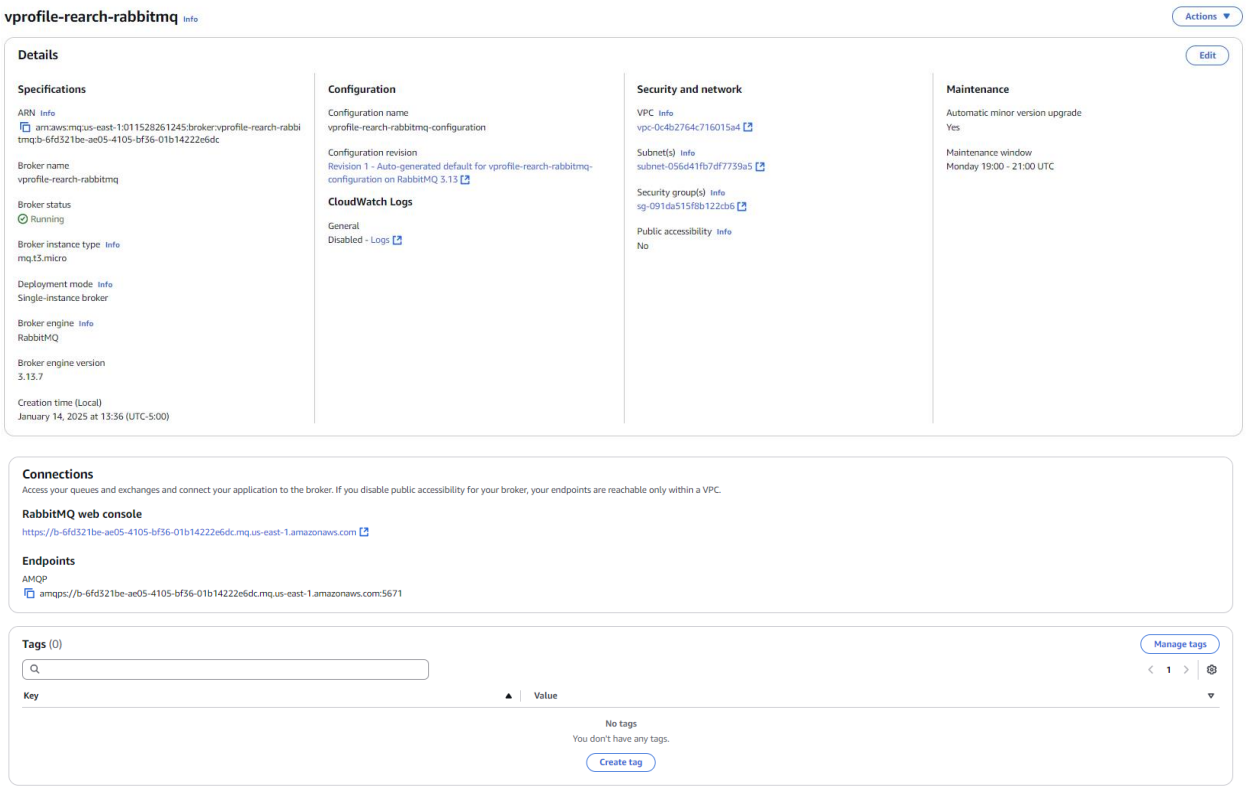
RDS



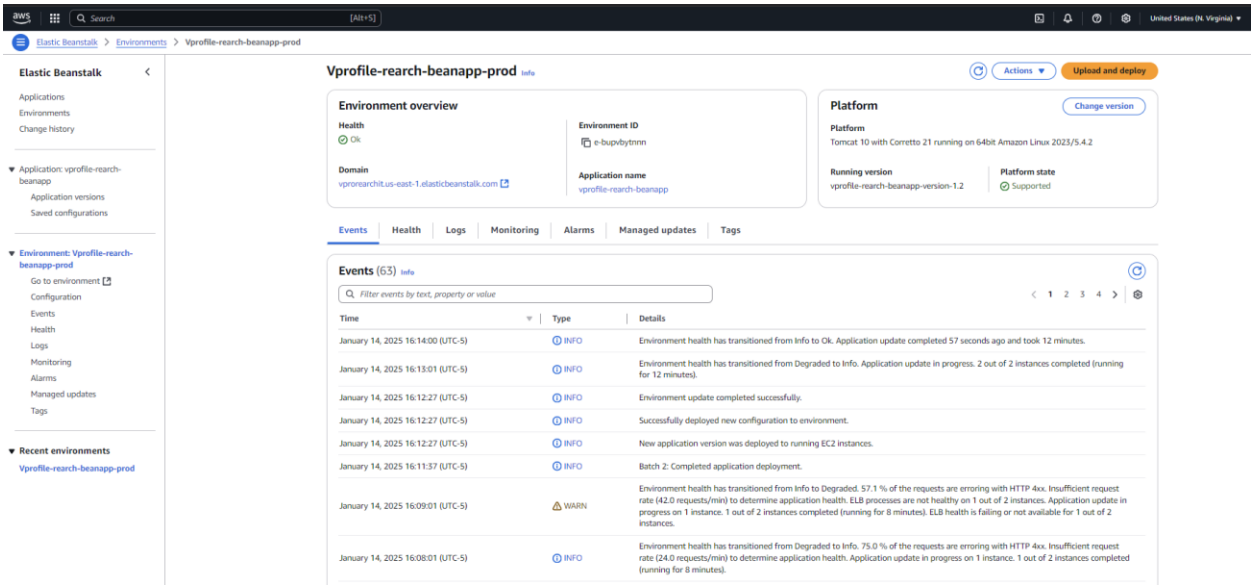
Elasticache



RABBIT MQ



4. Launch Elastic Beanstalk environment.



January 14, 2025 16:06:49 (UTC-5)	INFO	Batch 2: Registering instance(s) with the load balancer and waiting for them to be healthy.
January 14, 2025 16:06:48 (UTC-5)	INFO	Command execution completed on 2 of 2 instances in environment.
January 14, 2025 16:06:48 (UTC-5)	INFO	Batch 2: Completed application deployment command execution.
January 14, 2025 16:06:48 (UTC-5)	INFO	Instance deployment completed successfully.
January 14, 2025 16:06:39 (UTC-5)	INFO	Batch 2: Starting application deployment command execution.
January 14, 2025 16:06:17 (UTC-5)	INFO	Batch 2: Starting application deployment on instance(s) [i-0c741ef1d96844f58].
January 14, 2025 16:06:16 (UTC-5)	INFO	Batch 1: Completed application deployment.
January 14, 2025 16:06:01 (UTC-5)	WARN	Environment health has transitioned from Severe to Degraded. ELB processes are not healthy on 1 out of 2 instances. Application update in progress on 1 instance. 0 out of 2 instances completed (running for 5 minutes). ELB health is failing or not available for 1 out of 2 instances.
January 14, 2025 16:05:01 (UTC-5)	WARN	Environment health has transitioned from Degraded to Severe. 95.2 % of the requests are erroring with HTTP 4xx. ELB processes are not healthy on 1 out of 2 instances. Application update in progress on 1 instance. 0 out of 2 instances completed (running for 4 minutes). ELB health is failing or not available for 1 out of 2 instances.
January 14, 2025 16:03:01 (UTC-5)	WARN	Environment health has transitioned from Info to Degraded. 60.0 % of the requests are erroring with HTTP 4xx. Insufficient request rate (30.0 requests/min) to determine application health. ELB processes are not healthy on 1 out of 2 instances. Application update in progress on 1 instance. 0 out of 2 instances completed (running for 2 minutes). ELB health is failing or not available for 1 out of 2 instances.
January 14, 2025 16:02:02 (UTC-5)	INFO	Environment health has transitioned from Degraded to Info. 60.0 % of the requests are erroring with HTTP 4xx. Insufficient request rate (30.0 requests/min) to determine application health. Application update in progress on 1 instance. 0 out of 2 instances completed (running for 2 minutes).
January 14, 2025 16:01:10 (UTC-5)	INFO	Batch 1: Registering instance(s) with the load balancer and waiting for them to be healthy.

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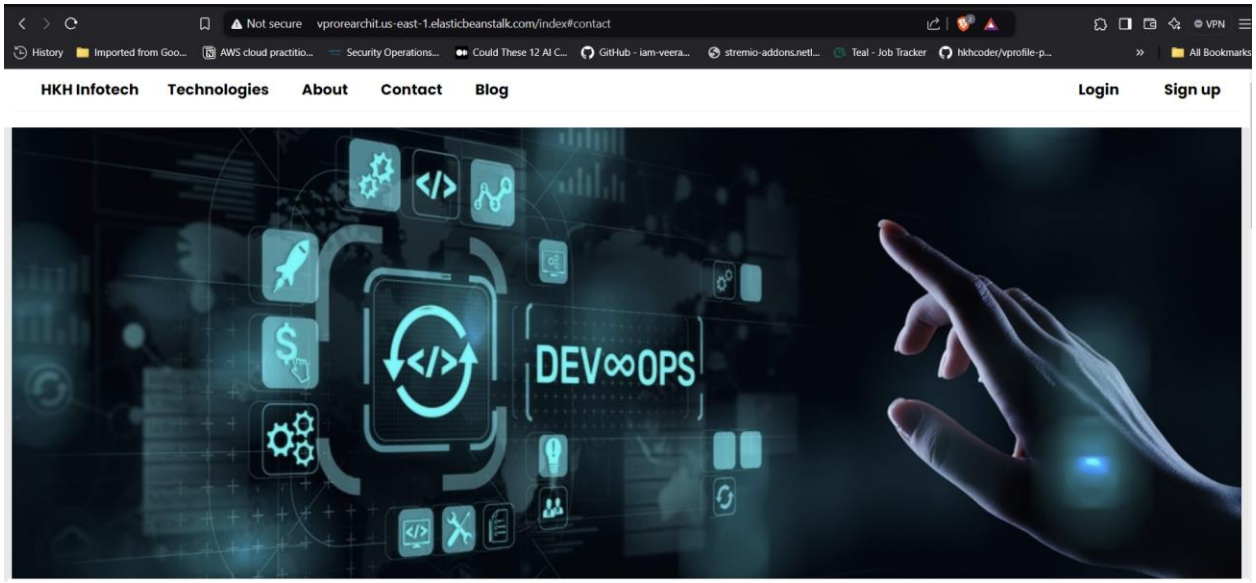
5. Update backend security groups.
6. Configure health checks and HTTPS listener.
7. Deploy application artifacts.
8. Setup CloudFront and DNS entries.
9. Test and verify application functionality.



TECHNOLOGIES

ABOUT

HKH Infotech is a dynamic software company dedicated to delivering innovative technology solutions. Founded with a mission to leverage cutting-edge technology and unparalleled expertise, we specialize in creating high-quality software solutions that drive business success.

Our team is led by seasoned DevOps experts with many years of industry experience. They bring a wealth of knowledge in automating and optimizing the software development lifecycle, ensuring that our projects are efficient, reliable, and scalable.

At HKH Infotech, we focus on understanding our clients' unique needs and providing tailored solutions that meet their objectives. Whether it's custom software development, system integration, or ongoing support, we are committed to excellence and client satisfaction.

With a commitment to staying ahead of technological trends and a passion for innovation, HKH Infotech is your trusted partner in navigating the digital landscape and achieving your business goals.

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CONTACT

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Name

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Subject

Comment

SEND MESSAGE

Outcome:

- Reduced operational overhead.
- Improved uptime and scalability.
- Eliminated upfront CapEx, with optimized OpEx.
- Automation of processes for seamless management.