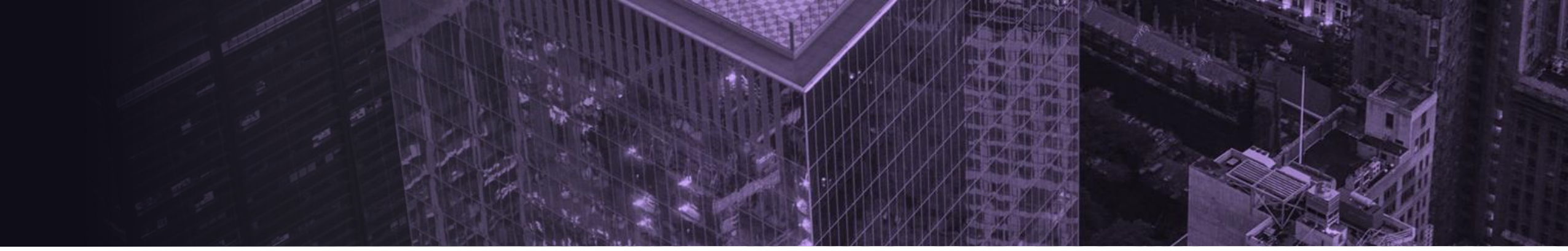

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CASE STUDY

Agentic AI Platform for Digital Banking

Executive summary

Customer: Islami Bank Bangladesh PLC (IBBL)
Partner: Graaho Technologies LLC
Industry: Financial Services & Banking
Location: Bangladesh

Challenge: IBBL needed to modernize customer engagement with an intelligent, scalable conversational AI platform while reducing operational costs and maintaining enterprise-grade security and compliance.

Solution: Graaho Technologies deployed Graaho Agentic AI, a serverless SaaS platform built on Amazon Bedrock, enabling intelligent multi-tenant conversational agents with automated DevOps pipelines.

Results:

- Sub-500ms response times for customer interactions
- 99.9% platform uptime SLA achievement
- 65% reduction in operational costs
- Support for 1,000+ concurrent AI agents
- 75% faster deployment cycles through automated CI/CD
- 70% improvement in release velocity
- Enhanced customer satisfaction and digital banking experience

Business Challenges

IBBL faced several critical challenges in modernizing their customer engagement infrastructure:

Operational Challenges

- **Limited Scalability:** Legacy systems couldn't handle peak customer interaction volumes
- **High Operational Costs:** Traditional infrastructure required significant maintenance costs.
- **Slow Deployment Cycles:** Manual processes delayed feature releases and updates
- **Response Time Issues:** Customers experienced delays during high-traffic periods

Islami Bank Bangladesh PLC. | Based on Islamic Shari'ah

About the Customer

Islami Bank Bangladesh PLC (IBBL) is one of Bangladesh's leading financial institutions, committed to providing Shariah-compliant banking services to millions of customers. As a pioneer in Islamic banking in the region, IBBL continuously seeks innovative solutions to enhance customer experience while maintaining the highest standards of security, compliance, and operational excellence. With a growing digital customer base, the bank recognized the need for intelligent automation to scale customer service operations efficiently.

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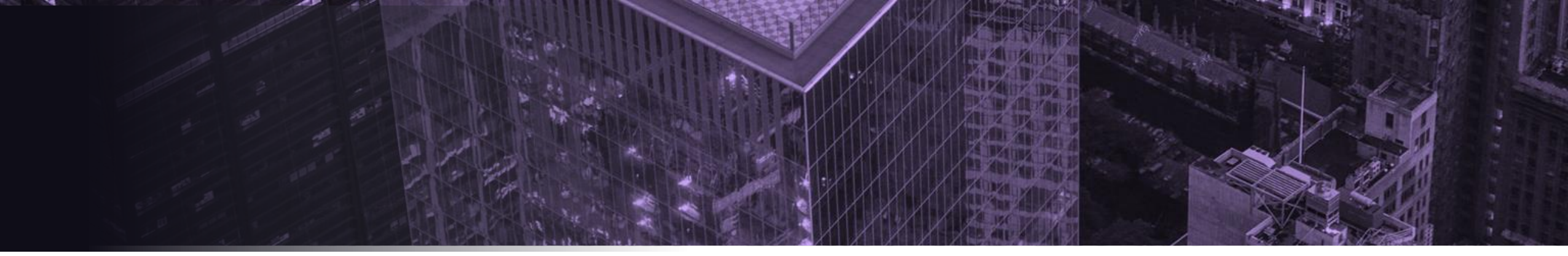
About the AWS Partner

Graaho Technologies LLC is an AWS Advanced Tier Services Partner specializing in AI/ML solutions, serverless architectures, and cloud-native application development. With deep expertise in Amazon Bedrock, generative AI, and DevOps automation, Graaho helps enterprises transform customer experiences through intelligent, scalable, and cost-effective cloud solutions. The company focuses on delivering production-ready AI platforms that combine cutting-edge technology with enterprise-grade reliability.



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Technical Requirements

- **Enterprise Security:** Banking-grade security & data isolation for multi-tenant operations
- **Compliance:** Adherence to financial regulatory requirements and data sovereignty
- **High Availability:** Mission-critical uptime requirements for customer-facing services
- **Performance:** Real-time response capabilities for conversational interactions
- **Scalability:** Support for thousands of concurrent AI agents across multiple use cases

Strategic Goals

- Reduce total cost of ownership while improving service quality
- Accelerate innovation through faster deployment cycles
- Enhance customer experience with intelligent, context-aware interactions
- Maintain competitive advantage through digital leadership

Solution Overview

Graaho Technologies designed and implemented **Graaho Agentic AI**, a comprehensive serverless SaaS platform leveraging AWS's most advanced AI and cloud services.

Architecture Highlights

Core AI & Application Services:

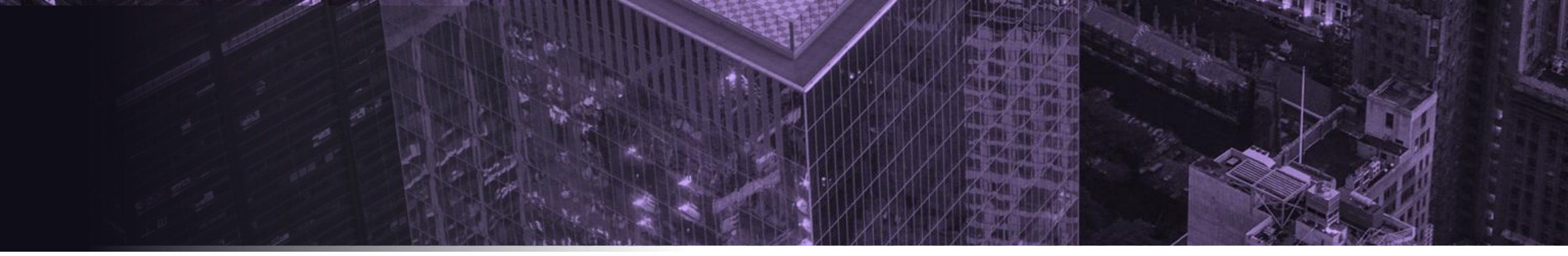
- **Amazon Bedrock AgentCore:** Powers intelligent conversational agents with foundation models
- **Amazon DynamoDB:** Provides millisecond-latency data access for session management and context storage
- **AWS Lambda:** Executes serverless compute for agent orchestration and business logic
- **Amazon API Gateway:** Manages secure, scalable API endpoints for agent interactions

DevOps & Automation:

- **AWS CodePipeline:** Orchestrates end-to-end CI/CD workflows
- **AWS CodeBuild:** Automates build and testing processes
- **AWS CodeDeploy:** Enables zero-downtime deployments
- **Amazon CloudWatch:** Provides comprehensive monitoring and observability
- **AWS CloudFormation:** Infrastructure as Code for consistent environment provisioning

Security & Compliance:

- **AWS IAM:** Fine-grained access control and identity management
- **AWS KMS:** Encryption key management for data at rest and in transit
- **AWS WAF:** Web application firewall for API protection
- **Amazon VPC:** Network isolation for multi-tenant security
- **AWS CloudTrail:** Audit logging for compliance requirements



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Key Features Implemented

Multi-Tenant Architecture:

- Isolated data planes for each banking /use case
- Shared control plane for efficient resource utilization
- Tenant-specific customization and branding capabilities

Intelligent Agent Capabilities:

- Natural language understanding for customer queries
- Context-aware conversations with session persistence
- Integration with banking systems for real-time information
- Automated escalation to human agents when needed

Automated Operations:

- Fully automated CI/CD pipelines from code commit to production
- Automated testing including unit, integration, and performance tests
- Infrastructure provisioning and configuration management
- Automated scaling based on demand patterns
- Self-healing capabilities with automated recovery

Results & Benefits

Performance Improvements

Response Time Excellence:

- Achieved sub-500ms response times for 95th percentile requests
- 3x faster than previous legacy system
- Consistent performance during peak traffic periods

Reliability & Availability:

- 99.9% uptime SLA consistently met
- Zero critical outages since production launch
- Automated failover and recovery mechanisms

Scalability Achievement:

- Successfully supporting 1,000+ concurrent AI agents
- Automatic scaling handles 10x traffic spikes
- No performance degradation during peak periods

Implementation Process

Phase 1: Discovery & Design (Weeks 1-2)

- Conducted AWS Well-Architected Framework review
- Defined security and compliance requirements
- Designed multi-tenant architecture
- Created proof of concept with Amazon Bedrock

Phase 2: Core Platform Development (Weeks 3-8)

- Implemented serverless backend infrastructure
- Integrated Amazon Bedrock AgentCore
- Developed DynamoDB data models for optimal performance
- Built API layer with authentication and authorization
- Established monitoring and logging framework

Phase 3: DevOps Automation (Weeks 9-10)

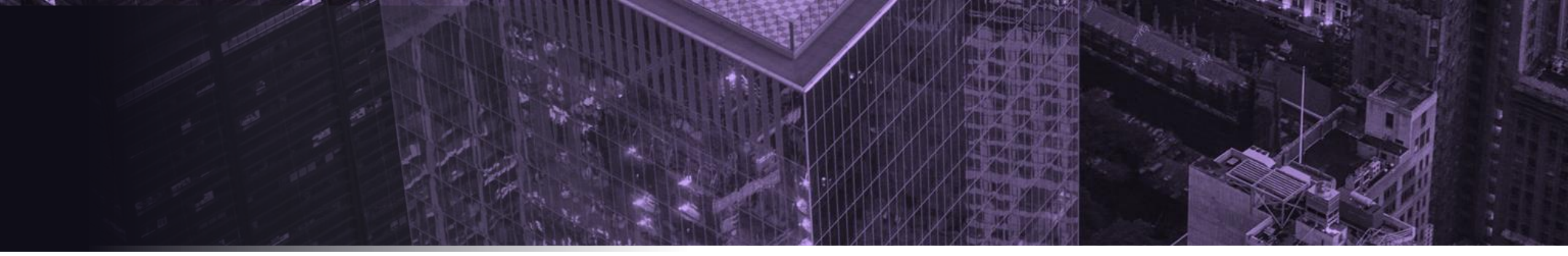
- Configured AWS CodePipeline for automated deployments
- Implemented infrastructure as code with CloudFormation
- Created automated testing suites
- Established deployment strategies (blue-green, canary)
- Configured CloudWatch dashboards and alarms

Phase 4: Testing & Optimization (Weeks 11-12)

- Conducted load testing for 1,000+ concurrent agents
- Optimized DynamoDB capacity and Lambda configurations
- Performed security penetration testing
- Fine-tuned AI agent responses and accuracy
- Validated compliance requirements

Phase 5: Prod Launch & Handover (Weeks 13-14)

- Executed phased production rollout
- Conducted knowledge transfer sessions
- Established support run books and procedures
- Implemented continuous monitoring
- Validated SLA achievement
- Self-healing capabilities with automated recovery



Cost Optimization

65% Reduction in Operating Costs:

- Eliminated infrastructure maintenance overhead
- Pay-per-use pricing model with serverless architecture
- Reduced human resource requirements for operations
- Optimized AWS resource utilization through right-sizing

Cost Predictability:

- Transparent, usage-based billing
- Automated cost monitoring and optimization
- Reserved capacity for predictable workloads

Development Velocity

75% Faster Deployment Cycles:

- Reduced deployment time from hours to minutes
- Automated testing catches issues before production
- Zero-downtime deployments enable continuous delivery

70% Improvement in Release Velocity:

- Multiple deployments per day capability
- Faster time-to-market for new features
- Reduced risk through automated validation

Business Impact

Enhanced Customer Experience:

- Instant, intelligent responses to customer queries
- 24/7 availability without human intervention
- Personalized interactions based on customer context
- Seamless escalation to human agents when needed

Operational Excellence:

- Minimal operational overhead with automated management
- Proactive issue detection and resolution
- Comprehensive audit trails for compliance
- Simplified capacity planning with predictable scaling

Digital Leadership:

- Positioned IBBL as an innovation leader in Bangladesh banking
- Competitive advantage through advanced AI capabilities
- Foundation for future AI-driven services
- Improved brand perception among digital-savvy customers

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AWS Services Used

AI & Machine Learning:

- Amazon Bedrock (AgentCore)

Compute:

- AWS Lambda

Database & Storage

- Amazon DynamoDB
- Amazon S3

Networking & Content Delivery

- Amazon API Gateway
- Amazon VPC
- Amazon CloudFront

Developer Tools

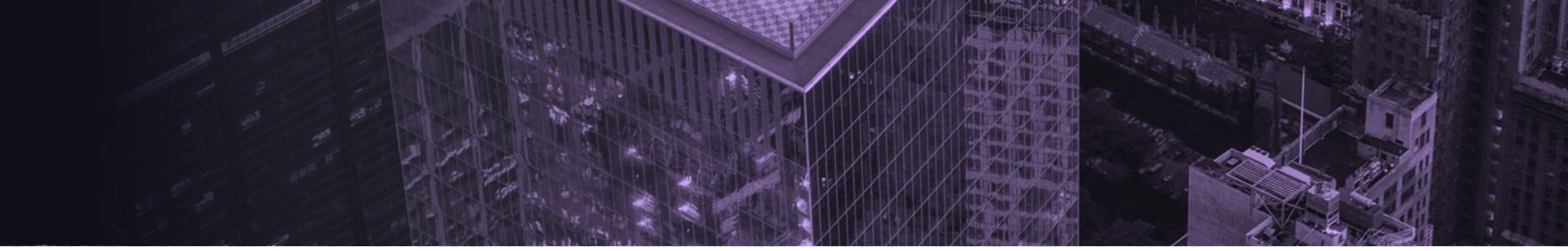
- AWS CodePipeline
- AWS CodeBuild
- AWS CodeDeploy
- AWS CloudFormation

Security, Identity & Compliance

- AWS IAM
- AWS KMS
- AWS WAF
- AWS CloudTrail
- AWS Secrets Manager

Management & Governance

- Amazon CloudWatch
- AWS Systems Manager
- AWS Config



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Technical Deep Dive

Amazon Bedrock Integration

Graaho leveraged Amazon Bedrock's AgentCore capabilities to create sophisticated conversational agents:

- **Foundation Model Selection:** Evaluated & selected optimal models for banking use cases
- **Prompt Engineering:** Developed banking-specific prompts for accurate responses
- **Knowledge Base Integration:** Connected agents to IBBL's knowledge repositories
- **Action Groups:** Implemented custom actions for banking transactions and queries
- **Guardrails:** Configured content filtering and safety mechanisms

DynamoDB Design Patterns

Optimized data architecture for performance and cost:

- Single-table design for efficient queries and reduced costs
- Global Secondary Indexes for flexible access patterns
- DynamoDB Streams for real-time event processing
- On-demand capacity for unpredictable workloads
- Point-in-time recovery for data protection

DevOps Automation Architecture

Comprehensive CI/CD pipeline implementation:

Code Commit → CodePipeline → CodeBuild (Test) → Security Scan → CodeDeploy (Staging) → Automated Testing → Approval Gate → CodeDeploy (Production) → Monitoring

Key Automation Features:

- Automated infrastructure provisioning
- Integrated security scanning (SAST/DAST)
- Automated rollback on failure detection
- Canary deployments for risk mitigation
- Automated performance testing

Security Implementation

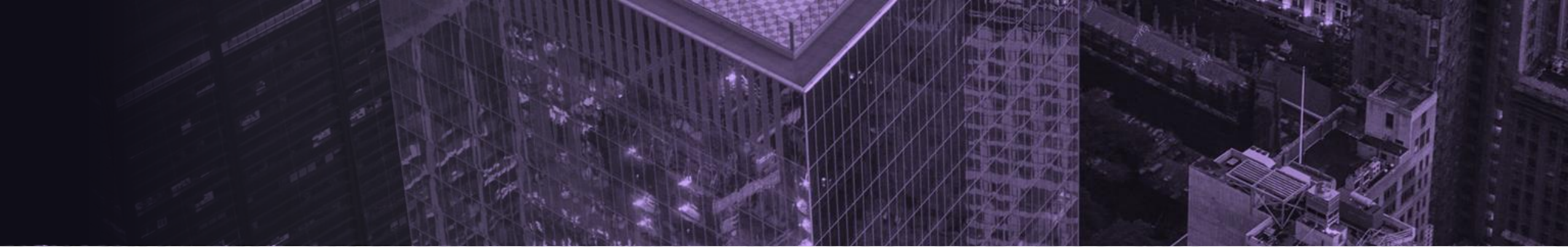
Multi-layered security approach:

- **Encryption:** All data encrypted at rest (KMS) and in transit (TLS 1.3)
- **Network Security:** VPC isolation with private subnets
- **API Security:** OAuth 2.0 authentication, rate limiting, WAF protection
- **Tenant Isolation:** Logical separation with IAM policies
- **Audit Logging:** Comprehensive CloudTrail and application logs
- **Compliance:** Adherence to banking regulations and data protection laws

Customer Testimonial

— Sr. Technology Executive, IBBL

“Graaho Technologies has transformed our customer engagement capabilities with their Agentic AI platform. The combination of Amazon Bedrock's intelligence and their serverless architecture expertise has delivered exceptional results. We're now able to serve our customers faster, more efficiently, and at a fraction of the previous cost. The automated DevOps pipelines have revolutionized how quickly we can innovate and deploy new features. This partnership has been instrumental in strengthening our position as a digital banking leader in Bangladesh.”



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Best Practices Implemented

AWS Well-Architected Framework

Operational Excellence:

- Infrastructure as Code for all resources
- Automated deployment pipelines
- Comprehensive monitoring and alerting
- Runbook automation for common scenarios

Security:

- Defense in depth with multiple security layers
- Principle of least privilege for all access
- Automated security scanning in CI/CD
- Regular security assessments and updates

Reliability:

- Multi-AZ deployment for high availability
- Automated backup and recovery procedures
- Chaos engineering for resilience testing
- Circuit breakers and retry logic

Performance Efficiency:

- Serverless architecture for optimal resource utilization
- DynamoDB optimization for low-latency access
- CloudFront caching for static content
- Lambda function optimization and right-sizing

Cost Optimization:

- Pay-per-use serverless model
- Reserved capacity for predictable workloads
- Automated resource cleanup
- Regular cost optimization reviews

Sustainability:

- Serverless reduces carbon footprint
- Efficient resource utilization
- Minimal idle resources

Lessons Learned

Technical Insights:

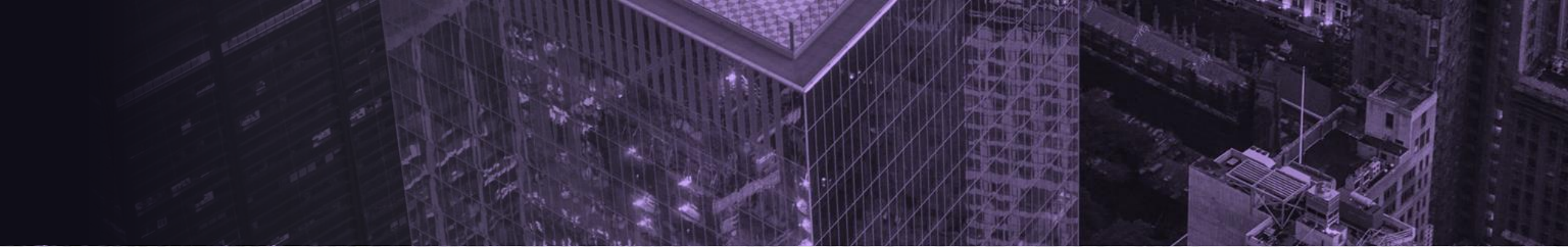
- **Amazon Bedrock Optimization:** Careful prompt engineering and model selection significantly impact response quality and cost
- **DynamoDB Design:** Single-table design with well-planned access patterns delivers optimal performance
- **Lambda Cold Starts:** Provisioned concurrency for critical paths ensures consistent performance
- **Multi-Tenancy:** Proper isolation design from the start prevents costly refactoring

Process Improvements:

- **Automated Testing:** Comprehensive test automation is essential for rapid deployment cycles
- **Monitoring First:** Implementing observability early accelerates troubleshooting
- **Incremental Rollout:** Phased deployments reduce risk and build confidence
- **Documentation:** Automated documentation generation keeps pace with rapid changes

Partnership Success Factors:

- **Clear Communication:** Regular stakeholder updates ensured alignment
- **Agile Methodology:** Iterative development allowed for course corrections
- **Knowledge Transfer:** Comprehensive training enabled customer self-sufficiency
- **AWS Support:** Leveraging AWS technical resources accelerated implementation



Future Roadmap

IBBL and Graaho Technologies are planning several enhancements:

Short-term (3-6 months)

- Expand to additional banking use cases (loan processing, account opening)
- Implement voice-based interactions using Amazon Transcribe and Polly
- Add multilingual support for regional languages
- Enhance analytics with Amazon QuickSight dashboards

Medium-term (6-12 months)

- Integrate with additional banking systems for broader automation
- Implement predictive analytics for proactive customer service
- Develop mobile SDK for embedded agent experiences
- Expand to other financial institutions in the region

Long-term (12+ months)

- Explore Amazon Bedrock's advanced features as they become available
- Implement federated learning for privacy-preserving model improvements
- Develop industry-specific agent templates for rapid deployment
- Create marketplace offering for other financial institutions

Contact Information

To learn more about this solution:

Graaho Technologies LLC

❑ Website: www.graaho.com
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❑ AWS Partner Profile: Graaho Technologies LLC

AWS Partner Team

❑ For partnership inquiries: +1 703 936 9360

Additional Resources

❑ Amazon Bedrock Documentation
❑ AWS Serverless Application Lens
❑ DynamoDB Best Practices
❑ AWS DevOps Blog
❑ Financial Services on AWS

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Conclusion

The partnership between Graaho Technologies LLC and Islami Bank Bangladesh PLC demonstrates the transformative power of AWS's AI and serverless technologies in the financial services sector. By leveraging Amazon Bedrock, DynamoDB, and comprehensive DevOps automation, Graaho delivered a production-grade conversational AI platform that exceeds performance expectations while dramatically reducing costs.

The solution's success—characterized by sub-500ms response times, 99.9% uptime, 65% cost reduction, and 75% faster deployments—showcases how modern cloud-native architectures can deliver both technical excellence and business value. The fully automated DevOps pipelines enable continuous innovation, allowing IBBL to maintain its competitive edge in Bangladesh's rapidly evolving digital banking landscape.

This case study exemplifies AWS's commitment to empowering partners and customers to build intelligent, scalable, and cost-effective solutions that drive digital transformation and enhance customer experiences.