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Improving Data Resilience and Server Efficiency

Overview

The client is one of the India's largest newsprint manufacturers, producing 150,000 tons per annum, with a quality that rivals imported alternatives. The organization also operates a significant consumer packaging board business line with a 200,000 tpa capacity, serving a diverse market with both recycled and virgin grade products. Given the scale of their operations, the company's IT infrastructure is crucial for supporting production planning, supply chain logistics, and corporate functions. Ensuring the reliability, security, and cost-efficiency of their cloud resources on AWS is a primary operational objective.

Challenges

The client's AWS environment presented several technical and operational inefficiencies that needed to be addressed to ensure stability and control costs.

Lack of Proactive Monitoring

The infrastructure operated without a continuous monitoring system. This reactive approach meant that performance degradation or service outages were only detected after they had already impacted business users, leading to longer resolution times and operational disruptions.

Absence of Backup Policies

There was no automated or standardized backup policy for the client's servers. This exposed the organization to a high risk of data loss from hardware failure, accidental deletion, or other system-level issues, jeopardizing critical business data.

Persistent Configuration Issues

A recurring technical problem was causing data volumes to become inaccessible after a server reboot. The mount points for attached Amazon EBS volumes were not configured to persist, meaning any planned or unplanned reboot required manual intervention to restore application functionality, causing downtime and administrative overhead.

Inefficient Resource Allocation

An initial audit revealed that the server fleet was not optimized. EC2 instances were provisioned with resources that far exceeded their actual workload demands, leading to significant and unnecessary monthly cloud expenditure.

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Solution Proposed

A series of technical solutions were implemented to build a more resilient, secure, and cost-effective cloud foundation.

- **Continuous Monitoring and Alerting:** AWS CloudWatch was implemented across the environment. The CloudWatch agent was installed on all EC2 instances to gather key performance metrics such as CPU utilization, memory usage, and disk I/O. Dashboards were created for real-time visibility, and CloudWatch Alarms were configured to send proactive notifications via Amazon SNS to the technical team when predefined thresholds were breached.

- **Automated Mount Point Persistence:** To resolve the disappearing volume issue, the /etc/fstab (file system table) file on each Linux server was correctly configured. By adding an entry using the EBS volume's Universally Unique Identifier (UUID), the system now ensures that all necessary data volumes are automatically and reliably mounted at their designated points upon every server boot.

- **Auditing and Governance:** AWS CloudTrail was enabled for the account. This service provides a comprehensive event log of all actions and API calls made within the environment. This creates an essential audit trail for security analysis, troubleshooting, and governance.

- **Cost Optimization and Automation:** To address server over-provisioning, a detailed analysis of performance metrics was conducted, and a report with specific right-sizing recommendations was delivered. Additionally, a serverless AWS Lambda function was developed and deployed. Triggered by a scheduled Amazon EventBridge rule, this function automatically stops non-production instances during non-working hours and restarts them before the start of business, drastically reducing compute costs.

Architectural Layout
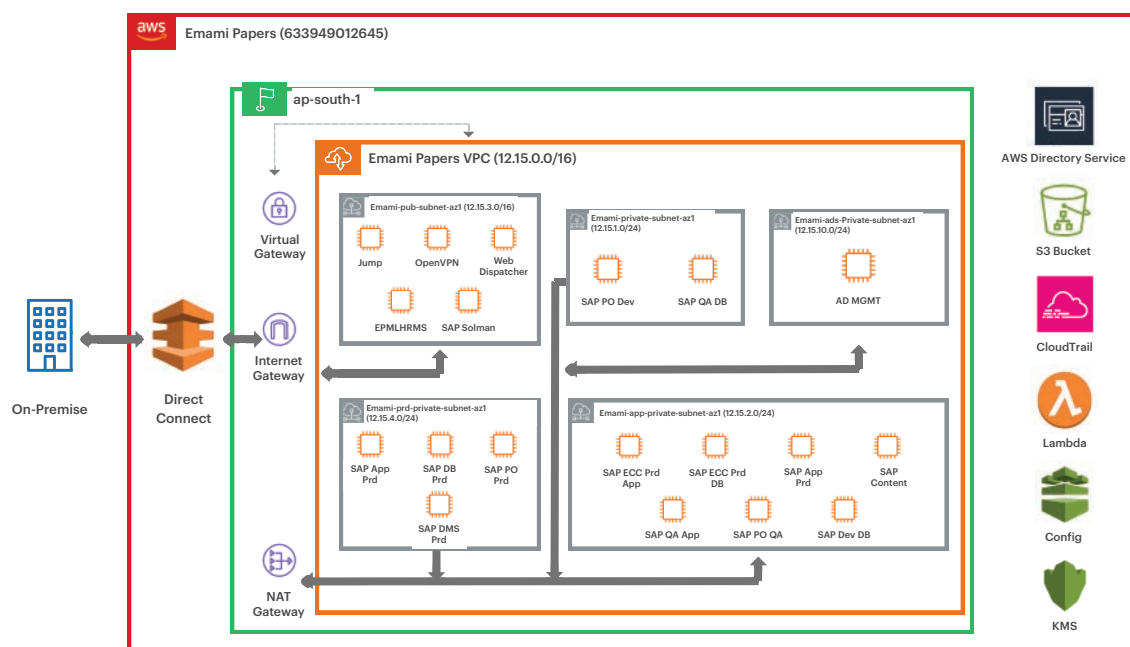
Tech Stack
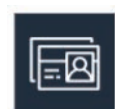
| AWS Directory Services | S3 Bucket | Cloudtrail | Lamda | Config | KMS |

Business Impact

The implemented solutions delivered substantial improvements to the client's operational stability, security posture, and financial management.

Enhanced System Reliability

Proactive alarms from CloudWatch and the resolution of the fstab configuration issue have significantly increased infrastructure stability and uptime. This ensures that business-critical applications are consistently available.

Improved Data Protection

The establishment of formal backup policies and procedures, guided by the initial assessment, has greatly improved the client's data resilience and disaster recovery capabilities.

Strengthened Security and Governance

The activation of AWS CloudTrail provides complete visibility into account activity, strengthening the security posture and providing auditors with a clear, immutable log for compliance checks.

Reduced Operational Costs

The combination of right-sizing EC2 instances and implementing the automated start/stop Lambda function has led to a direct and significant reduction in the monthly AWS bill.

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