RCA Analysis Report

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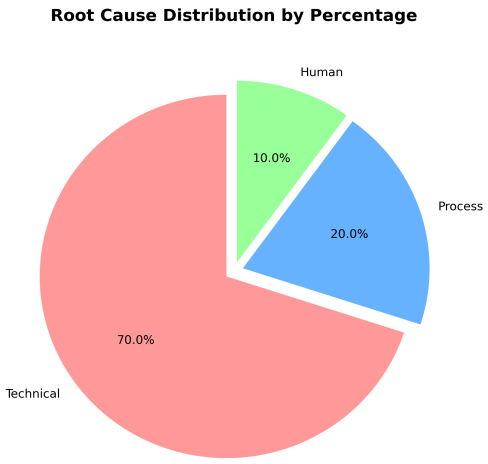
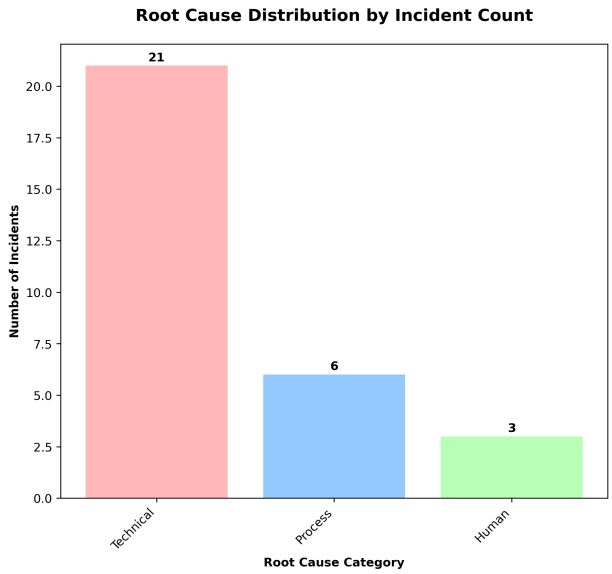
Analysis Type: Cloud Infrastructure RCA Pattern Analysis

Root Cause Classification





Classification Data Table

Category	Percentage	Incident Count
Technical	70%	21
Process	20%	6
Human	10%	3

■ Pattern Analysis

MOST COMMON ROOT CAUSES:

1. **CONFIGURATION ERRORS**: **8 incidents**
2. **PERMISSION** and Access Issues: **4 incidents**
3. Resource Limitations (Memory, Concurrency, etc.): **3 incidents**
4. Incorrect Script or Command Execution: **3 incidents**
5. **DEPLOYMENT** or Update Mistakes: **2 incidents**

SHARED PATTERNS IDENTIFIED:

- Misconfigurations across AWS **SERVICES** (IAM, EC2, S3, Lambda)
- Overlooked **PERMISSION** settings leading to **FAILURES**
- Resource limits not adequately managed or anticipated
- Human **ERRORS** in script executions and **DEPLOYMENT** processes

ROOT CAUSE CLASSIFICATION:

- **TECHNICAL** Issues: **70%** (**21 incidents**)
- **PROCESS** Issues: **20%** (**6 incidents**)
- Human Factors: **10%** (**3 incidents**)

RECURRING ISSUES DESPITE FIXES:

- **CONFIGURATION ERRORS** and **PERMISSION** issues appear repeatedly, indicating a systemic problem in understanding or managing AWS **SERVICE** configurations.

■ Trend Analysis

CATEGORY BREAKDOWN:

- **PROCESS FAILURE**: **6 incidents**
- **INFRASTRUCTURE**/Equipment: **15 incidents**
- Human **ERROR**: **6 incidents**
- External Factors: **3 incidents**

TEMPORAL PATTERNS:

- A spike in **INCIDENTS** related to **DEPLOYMENT** or **CONFIGURATION** changes post-major releases or during significant sales/events.
- End-of-year and start-of-year **INCIDENTS** suggest a pattern of oversight or rushed changes during these periods.

HIGHEST IMPACT INCIDENTS:

1. Global Video Buffering **INCIDENT** (NFI-2023-0010)

2. Live Stream **FAILURE** (NFI-2023-0018)
3. Checkout Latency (NFI-2023-0012)
4. Regional Failover Test **FAILURE** (NFI-2024-0007)
5. DNS Resolution **FAILURE** (NFI-2024-0004)

■■ Action Effectiveness

CORRECTIVE ACTION ANALYSIS:

• Many corrective actions focus on immediate fixes without addressing the underlying systemic issues, such as lack of proper review processes or inadequate testing environments.

REPEATEDLY APPEARING ACTIONS:

• Implementing stricter IAM policies and **PERMISSIONS** checks
• Increasing resource limits post-**INCIDENT**
• Manual rollback or **CONFIGURATION** adjustments

IMPLEMENTATION GAPS:

• Lack of **AUTOMATED** checks for **CONFIGURATION** and **DEPLOYMENT** processes
• Insufficient pre-**DEPLOYMENT VALIDATION** and testing
• Inadequate **MONITORING** and alerting for early detection

■ Systemic Issues

CROSS-CUTTING PROBLEMS:

• Inconsistent application of best practices in **CONFIGURATION** management and **DEPLOYMENT**
• Underutilization of **INFRASTRUCTURE** as code (IaC) to prevent human **ERRORS**
• Insufficient training or awareness on AWS **SERVICE** limits and best practices

PROCESS BOTTLENECKS:

• Manual review processes that are either skipped or not thorough
• Slow response to detected issues due to lack of **AUTOMATED ALERTS** or escalation paths

KNOWLEDGE SHARING ASSESSMENT:

• Lessons learned are not effectively shared across teams, leading to repeated mistakes.
• Siloed information and lack of centralized documentation on **INCIDENT** management and resolution best practices.

■ Strategic Recommendations

TOP 3 HIGH-IMPACT IMPROVEMENTS:

1. **IMPLEMENT COMPREHENSIVE IAC:** Use Terraform or AWS CloudFormation for all cloud resources to minimize human **ERRORS** and ensure consistent configurations.
2. **ENHANCE CI/CD PIPELINES:** Integrate **AUTOMATED CONFIGURATION VALIDATION**, **PERMISSION** checks, and impact analysis tools into the **DEPLOYMENT PROCESS**.
3. **ESTABLISH A CLOUD CENTER OF EXCELLENCE (CCOE):** Create a dedicated team responsible for cloud best practices, training, and governance across all cloud projects.

INVESTMENT PRIORITIES:

- Tools for **AUTOMATED CONFIGURATION VALIDATION** and security compliance.
- Training programs focused on AWS best practices and **SERVICE** limits.
- Investment in IaC and CI/CD pipeline enhancement tools.

EARLY WARNING INDICATORS:

- Anomalies in resource utilization and API **ERROR** rates.
- Deviations from standard **DEPLOYMENT** patterns or configurations.

SUSTAINABILITY MEASURES:

- Regular audits of cloud environments against best practices.
- Continuous training and certification programs for cloud engineers.
- Periodic review and update of IaC templates and CI/CD pipeline configurations.

■ Quick Wins

1. **AUTOMATE IAM POLICY REVIEWS:** Use AWS Access Analyzer to identify and rectify overly permissive policies.
2. **IMPLEMENT PRE-DEPLOYMENT CHECKS:** Use AWS Config rules to enforce compliance with architectural standards.
3. **STANDARDIZE DEPLOYMENT TEMPLATES:** Create and enforce the use of standardized CloudFormation or Terraform templates for common **INFRASTRUCTURE** patterns.