



# Acme Platform — Q4 Engineering Report

## Executive Summary

This report covers the engineering progress for **Acme Platform** during Q4 2025. Our team shipped three major features, resolved 47 production incidents, and reduced average API latency by **38 percent**. The sections below detail each initiative, the technical decisions behind them, and our plans for Q1 2026.

"Ship small, ship often, and measure everything." — Acme Engineering Principles

## Infrastructure Improvements

### Database Migration

We migrated our primary datastore from PostgreSQL 14 to PostgreSQL 16, gaining significant performance improvements in parallel query execution. The migration was completed with *zero downtime* using logical replication.

Key metrics after migration:

| Metric               | Before (Q3) | After (Q4) | Change  |
|----------------------|-------------|------------|---------|
| Avg query latency    | 12.4 ms     | 7.1 ms     | -42%    |
| P99 query latency    | 89 ms       | 34 ms      | -62%    |
| Connection pool util | 78%         | 51%        | -27 pts |
| Daily vacuum time    | 45 min      | 18 min     | -60%    |

### Deployment Pipeline

The CI/CD pipeline was overhauled to support **parallel test execution** and **sequential deployments** using rolling deployments. Build times dropped from 14 minutes to under 5 minutes.

The new pipeline configuration uses a declarative format:

```
1 interface PipelineConfig {
2   stages: Stage[];
3   parallelism: number;
4   rollback: {
5     automatic: boolean;
6     healthCheckUrl: string;
7     timeoutSeconds: number;
8   };
9 }
10
11 function createPipeline(config: PipelineConfig): Pipeline {
12   const stages = config.stages.map((stage) =>
13     stage.withParallelism(config.parallelism)
14   );
15   return new Pipeline(stages, config.rollback);
16 }
```

## Feature Releases

### Authentication Overhaul

Ir legacy session-based auth with a modern token-based system. The implementation uses `jsonwebtoken` for signing and `bcrypt` for password hashing. See the [Auth RFC for the full design document](#).

Benefits of the new system:

- Stateless authentication reduces server memory usage
- Token refresh flow eliminates forced logouts
  - Refresh tokens rotate on each use
  - Expired tokens trigger a silent re-auth
- Support for multiple concurrent sessions per user
- API key authentication for service-to-service calls
  - Scoped permissions per key
  - Automatic key rotation every 90 days

### Search Improvements

The search backend was rewritten with the following priorities:

1. Relevance scoring using BM25 algorithm
2. Typo tolerance with Levenshtein distance
  1. Single-character edits within 2 distance
  2. Prefix matching for partial queries
3. Faceted filtering by category, date, and author
4. Response time under 100ms at the 95th percentile

# Operational Highlights

Our on-call rotation handled **47 incidents** this quarter. The mean time to resolution (MTTR) improved from 34 minutes to 19 minutes thanks to better runbooks and automated alerting.

## Incident Breakdown

| Severity | Count | Avg MTTR | Top Cause          |
|----------|-------|----------|--------------------|
| P1       | 3     | 8 min    | DNS failover delay |
| P2       | 11    | 15 min   | Memory pressure    |
| P3       | 33    | 22 min   | Config drift       |

The most impactful improvement was adding automated canary analysis. Previously, engineers had to manually run `health-check --deep` — now the system runs `health-check --deep` automatically and rolls back if error rates exceed thresholds.

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## Q1 2026 Roadmap

### Short-term Goals

- Migrate remaining services to Kubernetes
- Implement distributed tracing with OpenTelemetry
- Launch the public GraphQL API

### Long-term Vision

We aim to achieve **99.99% uptime** by end of 2026. This requires investment in multi-region failover, automated chaos testing, and a dedicated platform reliability team.

[Image: Architecture Diagram]

For questions or feedback, contact the engineering team at [eng@acme.dev](mailto:eng@acme.dev) or visit the [Acme Developer Portal](#).