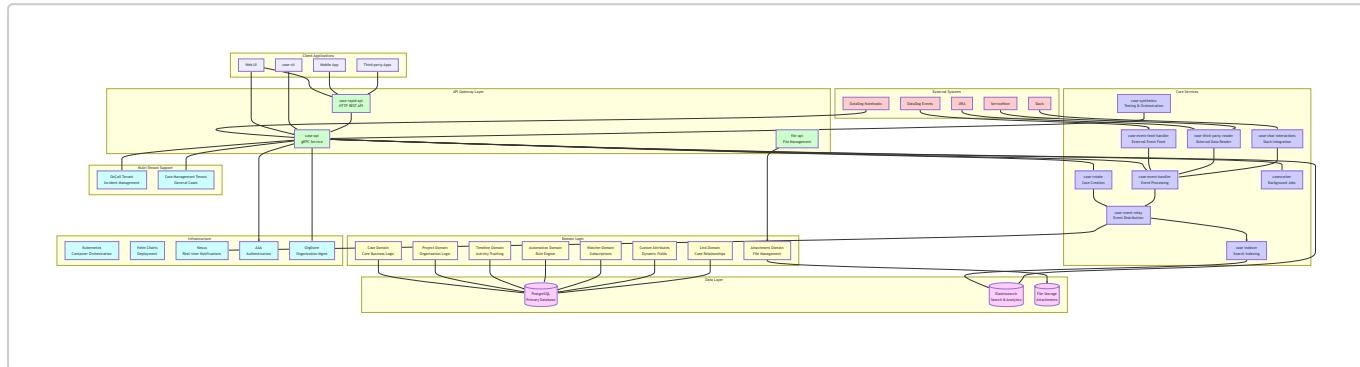


Case Management Domain Architecture Report

Overview

The Case Management domain at DataDog is a sophisticated, multi-tenant system designed to handle both incident management (OnCall) and general case/ticket management workflows. The architecture follows Domain-Driven Design (DDD) principles with a microservices approach, supporting real-time operations, extensive third-party integrations, and enterprise-scale deployment.

Architecture Diagram



Service Descriptions

API Gateway Layer

case-api (gRPC Service)

- **Location:** `domains/case_management/apps/case-api/`
 - **Purpose:** Primary gRPC API service providing the main interface for all case management operations
 - **Key Features:**
 - Multi-tenant support (OnCall and Case Management)
 - Full CRUD operations for cases, projects, and related entities
 - Real-time event streaming
 - Authentication and authorization integration
 - **Proto Definitions:** Comprehensive gRPC service definitions in `proto/` directory

case-rapid-api (HTTP REST API)

- **Location:** `domains/case_management/apps/apis/case-rapid-api/`
 - **Purpose:** HTTP REST API for external integrations and web applications
 - **Key Features:**
 - RESTful endpoints mirroring gRPC functionality
 - JSON request/response format
 - External system integration support
 - Rate limiting and authentication

file-api (File Management Service)

- **Location:** domains/case_management/apps/apis/file-api/
- **Purpose:** Dedicated service for handling file attachments
- **Key Features:**
 - File upload/download operations
 - Metadata management
 - Security scanning
 - Storage abstraction layer

Core Processing Services

case-intake (Case Creation Service)

- **Location:** domains/case_management/apps/case-intake/
- **Purpose:** Handles new case creation and initial processing
- **Key Features:**
 - Input validation and sanitization
 - Case type routing
 - Initial enrichment
 - Event generation for new cases

case-event-handler (Event Processing Engine)

- **Location:** domains/case_management/apps/case-event-handler/
- **Purpose:** Central event processing engine for all case-related events
- **Key Features:**
 - Event sourcing implementation
 - State transition validation
 - Business rule enforcement
 - Timeline generation

case-event-relay (Event Distribution Service)

- **Location:** domains/case_management/apps/case-event-relay/
- **Purpose:** Distributes events to various consumers and external systems
- **Key Features:**
 - Pub/sub pattern implementation
 - Event routing based on rules
 - Guaranteed delivery mechanisms
 - Integration with Nexus for real-time notifications

case-indexer (Search Indexing Service)

- **Location:** domains/case_management/apps/case-indexer/
- **Purpose:** Maintains Elasticsearch indices for case search and analytics
- **Key Features:**
 - Real-time index updates
 - Bulk indexing operations
 - Search optimization
 - Analytics data preparation

caseworker (Background Job Service)

- **Location:** domains/case_management/apps/caseworker/
- **Purpose:** Handles asynchronous background operations
- **Key Features:**
 - Scheduled task execution
 - Bulk operations processing
 - Data cleanup and maintenance
 - Report generation

Integration Services

case-third-party-reader (External System Integration)

- **Location:** domains/case_management/apps/case-third-party-reader/
- **Purpose:** Reads data from external systems like JIRA and ServiceNow
- **Key Features:**
 - Bi-directional synchronization
 - Data transformation and mapping
 - Conflict resolution
 - Rate limiting for external APIs

case-chat-interactions (Slack Integration)

- **Location:** domains/case_management/apps/case-chat-interactions/
- **Purpose:** Provides Slack integration for case management workflows
- **Key Features:**
 - Slack bot functionality
 - Interactive case creation/updates
 - Notification management
 - Slash command support

case-synthetics (Testing & Orchestration)

- **Location:** domains/case_management/apps/case-synthetics/
- **Purpose:** Synthetic testing and service orchestration
- **Key Features:**
 - End-to-end testing
 - Service health monitoring
 - Workflow orchestration
 - Performance testing

Domain Logic Layer

Case Domain (Core Aggregate)

- **Location:** domains/case_management/libs/casem/
- **Purpose:** Core business logic for case management
- **Key Entities:**

- Case aggregate root
- Case status and lifecycle management
- Priority and escalation logic
- Assignment and routing rules

Project Domain

- **Location:** domains/case_management/libs/project/
- **Purpose:** Project organization and management
- **Key Features:**
 - Project hierarchy management
 - Team and user assignments
 - Project-level configurations
 - Favorites and preferences

Timeline Domain

- **Location:** domains/case_management/libs/timeline/
- **Purpose:** Case activity tracking and timeline management
- **Key Features:**
 - Activity logging
 - Comment and update tracking
 - Timeline visualization
 - Activity filtering and search

Automation Domain

- **Location:** domains/case_management/libs/automation/
- **Purpose:** Business rule engine and workflow automation
- **Key Features:**
 - Rule definition and execution
 - Trigger-based automation
 - Workflow orchestration
 - SLA management

Data Layer

PostgreSQL Database

- **Primary Storage:** Main transactional database for all case management data
- **Key Tables:**
 - `case`: Core case entity with full audit trail
 - `project`: Project organization structure
 - `timeline_cell`: Activity and timeline entries
 - `automation_rule`: Business automation rules
 - `custom_attribute`: Dynamic field definitions
 - `case_link`: Case relationship mapping
- **Migration Management:** 132+ migrations showing system evolution

Elasticsearch Cluster

- **Search Engine:** Full-text search and analytics platform
- **Key Indices:**
 - Case search index with faceted search
 - Analytics aggregation data
 - Auto-complete suggestions
- **Features:**
 - Real-time search capabilities
 - Advanced filtering and facetting
 - Analytics and reporting queries

Multi-Tenant Architecture

OnCall Tenant

- **Purpose:** Incident management and emergency response
- **Key Features:**
 - Rapid case creation from alerts
 - Integration with DataDog monitoring
 - Escalation procedures
 - On-call rotation management

Case Management Tenant

- **Purpose:** General case and ticket management
- **Key Features:**
 - Flexible case types and workflows
 - Customer service integration
 - SLA tracking
 - Custom field management

Deployment Architecture

Kubernetes Infrastructure

- **Multi-datacenter deployment:** ap1, ap2, eu1, us1, us3, us5
- **Helm-based deployments:** Standardized configuration management
- **Auto-scaling:** Horizontal pod autoscaling based on metrics
- **Service mesh:** Inter-service communication and observability

Configuration Management

- **Environment-specific configurations:** Staging and production variants
- **Tenant-specific settings:** Isolated configurations per tenant
- **Feature flags:** Runtime behavior modification
- **Secret management:** Secure credential handling

Key Integrations

External Systems

1. **JIRA**: Bi-directional issue synchronization
2. **ServiceNow**: Service management integration
3. **Slack**: Real-time notifications and interactive workflows
4. **DataDog Events**: Event correlation and enrichment
5. **DataDog Notebooks**: Investigation workflow integration

Internal DataDog Services

1. **AAA (Authentication, Authorization, Accounting)**: User management
2. **OrgStore**: Organization and account management
3. **OUI (Org User Info)**: User profile and preference service
4. **Nexus**: Real-time notification delivery
5. **OnCall**: PagerDuty-style incident management

Technical Highlights

Event-Driven Architecture

- **Event Sourcing**: Complete audit trail of all case changes
- **CQRS Pattern**: Separation of command and query responsibilities
- **Real-time Processing**: Immediate event propagation and processing
- **Event Replay**: Ability to rebuild state from events

Scalability Features

- **Horizontal Scaling**: Stateless services with load balancing
- **Database Sharding**: Tenant-based data isolation
- **Caching Strategies**: Multi-level caching for performance
- **Async Processing**: Background job queues for heavy operations

Security and Compliance

- **Multi-tenant Isolation**: Secure data separation
- **Role-based Access Control**: Granular permission management
- **Audit Logging**: Complete operation tracking
- **Data Encryption**: At-rest and in-transit encryption

Development and Operations

Development Tools

- **CLI Interface**: `case-cli` for administrative operations
- **Local Development**: Tilt-based development environment
- **Testing**: Comprehensive unit and integration test suites
- **API Documentation**: Auto-generated from Protocol Buffer definitions

Monitoring and Observability

- **Metrics Collection**: Prometheus-based metrics

- **Distributed Tracing:** Full request tracing across services
- **Log Aggregation:** Centralized logging with structured data
- **Health Checks:** Service health monitoring and alerting

This architecture represents a mature, enterprise-grade case management platform capable of handling high-volume, mission-critical operations while maintaining flexibility for diverse use cases and integration requirements.