

# FlowSense — AI-Powered Salesforce Flow Governance Suite

Updated System Architecture & Data Model (AppExchange-Ready)

## 0) Goals & Scope

FlowSense delivers unified monitoring, documentation, version comparison, performance analysis, and AI assistance for Salesforce Flows. This document outlines the architecture, data model, extensibility, packaging strategy, and security-review considerations.

## 1) Core Modules

- **Flow Logging & Error Monitoring:** Log every Flow execution (run + steps) with inputs, outputs, timing, resource usage, status, and fault context. Real-time alerts (Email/Slack/Teams/WhatsApp).
- **Flow Version Compare (Diff):** Side-by-side comparison of any two Flow versions. Detect added/removed elements, formula and condition changes, and path modifications.
- **Auto-Documentation:** Generate Markdown + SVG diagrams, resources tables, decision explanations, and AI-generated test scenarios. Exportable as PDF.
- **Performance Analyzer:** Hotspot detection (SOQL/DML-in-loop, recursion, long-running elements). Heatmaps, scores, and optimization recommendations.
- **AI Flow Helper:** Natural-language flow blueprints, formula generation, explanations, optimization hints, and troubleshooting via secure Named Credentials.

## 2) Data Model (Managed Package Objects)

All object/API names are prefixed with **FS\_** for FlowSense.

### **FS\_Flow\_Run\_\_c (Parent)**

- Flow\_Api\_Name\_\_c (Text, Indexed)
- Flow\_Label\_\_c (Text)
- Flow\_Version\_\_c (Number, 0)
- Interview\_Id\_\_c (Text, External Id, Unique)
- Trigger\_Context\_\_c (Picklist: Before/After/Screen/Autolaunched/Scheduled/PlatformEvent)
- Entry\_Record\_Id\_\_c (Text(18), Indexed)
- Started\_At\_\_c (Datetime, Indexed)
- Ended\_At\_\_c (Datetime)
- Status\_\_c (Picklist: Success/Failed/Terminated/InProgress)
- CPU\_Millis\_\_c (Number, 0) | SOQL\_Count\_\_c (Number, 0) | DML\_Count\_\_c (Number, 0)
- Error\_Message\_\_c (Long Text) | Runtime\_User\_\_c (Lookup User) | Org\_Namespace\_\_c (Text)

### **FS\_Flow\_Step\_\_c (Child, M-D to Run)**

- Flow\_Run\_\_c (Master-Detail → FS\_Flow\_Run\_\_c)
- Sequence\_\_c (Number, 0, Indexed)
- Element\_DeveloperName\_\_c (Text, Indexed) | Element\_Label\_\_c (Text)

- Element\_Type\_\_c (Picklist:  
Assignment/Decision/GetRecords/UpdateRecords/ApexAction/Subflow/Screen/etc.)
- Entered\_At\_\_c (Datetime) | Exited\_At\_\_c (Datetime) | Duration\_Millis\_\_c (Number, 0)
- CPU\_Millis\_\_c (Number, 0) | SOQL\_Count\_\_c (Number, 0) | DML\_Count\_\_c (Number, 0)
- Outcome\_\_c (Text) // e.g., decision outcome, error

### **FS\_Flow\_Alert\_\_c (Policies)**

- Policy\_Name\_\_c (Text) | Active\_\_c (Checkbox) | Severity\_\_c (Picklist: Info/Warning/Critical)
- Applies\_To\_\_c (Picklist: All/By\_API\_Name/By\_Folder)
- Condition\_JSON\_\_c (Long Text) — serialized thresholds and filters
- Channel\_\_c (MultiPicklist: Email/Slack/Teams/WhatsApp/Webhook)

### **FS\_Flow\_Change\_\_c (Version & Diff)**

- Flow\_Api\_Name\_\_c (Text, Indexed) | Version\_\_c (Number, 0)
- Snapshot\_JSON\_\_c (Long Text) — normalized element graph
- Hash\_\_c (Text, Unique) — dedupe
- Diff\_Against\_Version\_\_c (Number, 0) | Diff\_Summary\_\_c (Long Text)
- Created\_By\_Tool\_\_c (Checkbox)

### **FS\_Flow\_Document\_\_c (Documentation)**

- Flow\_Api\_Name\_\_c (Text, Indexed) | Version\_\_c (Number, 0)
- Markdown\_\_c (Long Text) | Diagram\_SVG\_\_c (Long Text) | Test\_Scenarios\_\_c (Long Text)

### **Optional Big Objects (Archive)**

- FS\_Flow\_Run\_Archive\_\_b | FS\_Flow\_Step\_Archive\_\_b — for long-term retention
- Scheduled job to migrate >N days data from SObjects to Big Objects

### **ER Relationships (Narrative)**

FS\_Flow\_Run\_\_c (1) — (M-D many) FS\_Flow\_Step\_\_c. FS\_Flow\_Change\_\_c and FS\_Flow\_Document\_\_c are independent, keyed by Flow\_Api\_Name\_\_c + Version\_\_c. FS\_Flow\_Alert\_\_c applies to flows by API name/folder or globally.

## **3) Configuration (Custom Metadata Types)**

### **FS\_Global\_Settings\_\_mdt**

- Enable\_Error\_Alerts\_\_c (Checkbox)
- Retention\_Days\_\_c (Number)
- Enable\_CPU\_Approx\_\_c (Checkbox)
- Max\_Runs\_To\_Retain\_\_c (Number)

### **FS\_Integration\_Channel\_\_mdt**

- Channel\_Name\_\_c (Picklist)
- Webhook\_URL\_\_c (Text)
- Slack\_Token\_\_c (Protected Text)
- Teams\_Webhook\_\_c (Text)

- WhatsApp\_Endpoint\_\_c (Text)

### **FS\_AI\_Settings\_\_mdt**

- Provider\_\_c (Picklist: OpenAI/Azure/...)
- Named\_Credential\_\_c (Text)
- Model\_\_c (Text)
- Temperature\_\_c (Number,2)

## 4) Integrations & Callouts

- **Named Credential:** FS\_AI\_Provider — outbound AI calls (JWT/OAuth2).
- **Named Credential:** FS\_Self — Tooling/REST calls to fetch Flow metadata (no Remote Site).
- **Platform Event:** FS\_Flow\_Alert\_Event\_\_e — optional outbound alert stream.

## 5) Apex Architecture (Service/Domain/Selector)

**Selectors:** FS\_FlowRunSelector, FS\_FlowStepSelector, FS\_FlowChangeSelector, FS\_FlowDocSelector

**Domains:** FS\_FlowRunDomain, FS\_FlowStepDomain, FS\_FlowChangeDomain, FS\_FlowDocDomain

### **Services:**

- FS\_LoggingService (startRun, logStep, endRun; async buffering)
- FS\_PerformanceService (scoreRun, analyzeFlow; heuristics)
- FS\_FlowMetadataService (getFlowVersionJson, normalizeToGraph)
- FS\_DiffService (diffGraphs; persist diffs)
- FS\_DocumentationService (generateMarkdown, renderDiagramSvg)
- FS\_AIService (explainFlow, generateTestScenarios, suggestOptimizations)
- FS\_NotifyService (Email/Slack/Teams/WhatsApp via Named Credentials)

## 6) Invocable Actions (Admin-Friendly Instrumentation)

- FS\_LogStartAction → returns RunId
- FS\_LogStepAction → accepts RunId + element info (+ counters)
- FS\_LogEndAction → status + error + counters
- FS\_NotifyOnErrorAction → for Fault paths
- FS\_PerformanceScoreAction → on-demand analysis

## 7) LWC / UX Architecture

- FS\_App (Lightning App: FlowSense)
- FS\_Dashboard (KPIs, filters, recent alerts)
- FS\_RunExplorer (runs + step timeline + error drill-down)
- FS\_PerfHeatmap (hotspots, scores, recs)
- FS\_VersionCompare (pick flow + versions, tree diff, export)
- FS\_DocViewer (SVG diagram, Markdown docs, test scenarios)

- FS\_AIAssistant (chat, context chips, actions)
- FS\_Settings (CMDT-backed configuration)

## 8) Runtime Sequences (Narrative)

**Instrumented Flow Execution:** Start (FS • Start Run) → Business logic + optional FS • Log Step → Fault path (FS • Notify On Error) → End (FS • End Run). Apex buffers step logs and computes counters; errors raise alerts.

**Version Diff:** LWC selects Flow + versions → Apex fetches metadata (Tooling) → normalize to graph → diff → persist → display/export.

**Documentation:** User clicks Generate → graph → Markdown + SVG → save FS\_Flow\_Document\_\_c → export.

**Performance:** Nightly job aggregates FS\_Flow\_Run\_\_c + FS\_Flow\_Step\_\_c → scores + heatmap metrics → LWC renders.

## 9) Limits, Scale & Retention

- Bulk-safe logging; batch/queueable inserts for steps.
- Retention via FS\_Global\_Settings\_\_mdt; archive to Big Objects after N days.
- Selector-driven SOQL; server-side pagination; field-level fetches.
- Virtualized tables in LWC for large datasets.

## 10) Security Review Readiness

- CRUD/FLS enforced in all Apex service methods (avoid System.runAs in tests).
- Named Credentials only; no hardcoded endpoints; PII redaction in logs.
- Permission Sets: FS\_Admin, FS\_Analyst, FS\_LOGGER.
- CSP-safe (no external JS); strict input validation & size limits.
- Opt-out switch to disable AI/callouts per org policy.

## 11) Packaging & Roadmap

**Packaging:** Managed package, LMA licensing, post-install wizard to seed CMDT and create app + tabs.

### 12-Week Roadmap:

- Weeks 1–4: Data model, Invocables, Logging Service, Run Explorer LWC
- Weeks 5–8: Performance Analyzer, Alerts (email/webhook), Dashboard
- Weeks 9–10: Version Diff (Tooling API) + Viewer, Export
- Weeks 11–12: Documentation (Markdown + SVG), AI Assistant, Settings, Packaging

FlowSense provides end-to-end visibility and intelligence for Salesforce Flows — designed for scale, security, and AppExchange success.