

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.