Functional / Technical Design Document

Apex Claims
Insurance Claims Management Solution

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Exhibit 2
Version history

Version	Changes	Initiator	Date
1.0	Initial Draft	Patrick Y	27/12/2025

Table of Contents

1 Introduction

1.1 The composition of the document

The functional design document (FDD) contains:
- Scope
- Organisation structure: The functional management of departments for creating a security model of the solution
- Business process: The schema of business process in the solution
- Architecture solution design: Object model, Data model
- Additional customisation
- Security Roles
- Integration
- Data Migration

1.2 Abbreviations

Abbreviation	Transcript
Plug-in	Plug-in is a software component that adds a specific feature to an existing software application
POC	Point of contact
FDD	Functional Design Document
TDD	Technical Design Document
PCF	Power Apps Component Framework - framework for building custom controls
API	Application Programming Interface
GUID	Globally Unique Identifier
SLA	Service Level Agreement

2 Project overview

2.1 Scope

Apex Claims is an insurance claims management solution built on Microsoft Power Platform and Azure. It provides:
- **Customer Self-Service Portal:** Power Pages portal for claim submission and tracking
- **Claims Processing Application:** Model-driven app for claims adjusters
- **Automated Enrichment:** Fraud detection, geocoding, and weather data
- **Visual Risk Assessment:** Custom PCF control for fraud risk visualisation

Technology Stack:

Layer	Technology
Frontend (Customer)	Power Pages Portal
Frontend (Internal)	Model-driven App
Data Platform	Microsoft Dataverse
Orchestration	Power Automate (Cloud Flows)
Backend Services	Azure Functions (Node.js 18.x)
Business Logic	Dataverse Plugins (C# .NET 4.6.2)
Custom Controls	PCF (React/TypeScript)
AI/ML Services	Azure Computer Vision
External APIs	Azure Maps, Open-Meteo

3 Description of business processes

3.1 Common information about organisation process

This document includes the following business processes to be automated:
1. Claim Submission (Customer Portal)
2. Claim Intake Orchestration
3. Document AI Processing
4. Fraud Detection
5. Geocoding and Weather Enrichment

3.2 Claim Submission

3.2.1 New Claim Submission (Portal)

Process Flow

5-step wizard for claim submission via Power Pages Portal:

Step Id	Description	Remarks
CLM-SUB-01	Policy Verification	Enter and validate policy number via Portal Web API
CLM-SUB-02	Incident Details	Capture date, time, location, claim type
CLM-SUB-03	Description & Amount	Detailed incident description, estimated amount
CLM-SUB-04	Evidence Upload	Drag-and-drop file upload for damage photos, supporting documents
CLM-SUB-05	Review & Sign	Summary review, canvas-based digital signature capture, certification. Sets statuscode: 100000003 (Submitted)

Functional design

ID	Description	Rules / Examples / Comments
CLM-SUB-FD-01	Real-time policy validation	Portal Web API validates policy number before proceeding
CLM-SUB-FD-02	Digital signature capture	Canvas-based signature stored in new_digitalsignature field

3.3 Claim Intake Orchestration

3.3.1 Claim Intake Orchestrator Flow

Trigger: When a claim record status changes from Draft to Submitted
Purpose: Orchestrates the intake process for new claim submissions

Process flow

Step Id	Description	Remarks
CIO-01	Policy Validation	Validates linked policy is active and not expired. If invalid, sets status to Rejected and notifies customer.
CIO-02	Parallel Processing	Simultaneously calls FraudDetection Azure Function and WeatherLookup for incident date/location
CIO-03	Fraud Risk Assessment	Updates claim with fraud risk score. If score > 75: Sets status to "Fraud Review", creates investigation task, notifies fraud team via Teams. If score <= 75: Proceeds to adjuster assignment.

CIO-04	Adjuster Assignment	Child flow queries active adjusters by claim type expertise, ranks by workload and geographic proximity, assigns top-ranked adjuster
CIO-05	SLA Calculation	Auto claims: 5 business days; Home claims: 7 business days; Commercial claims: 10 business days
CIO-06	Notifications	Sends confirmation email to customer, Teams adaptive card to adjuster, creates timeline event

Error Handling

- All external API calls wrapped in try-catch with retry logic
- Failures logged to Application Insights
- Claim flagged with error status but processing continues

3.4 Document AI Processing

3.4.1 Document AI Processor Flow

Trigger: When a new document is added to new_claimdocument table with type "Damage Photo"
Purpose: Analyses uploaded damage photos using AI to assess severity and update estimates

Process flow

Step Id	Description	Remarks
DAI-01	File Retrieval	Waits 10 seconds for upload completion, retrieves file content, retries up to 3 times with 5-second delays
DAI-02	Azure Computer Vision Analysis	Sends image to Azure Computer Vision API, extracts detected objects and damage indicators
DAI-03	Damage Assessment	Classifies as Minor (cosmetic), Moderate (functional damage to one area), Severe (multiple areas), or Total Loss (>80% value)
DAI-04	Estimate Calculation	Estimates repair cost range based on severity and claim type, updates document with AI damage score
DAI-05	Claim Update	First photo sets estimate; additional photos update if higher. Severe/Total Loss sets priority to High.
DAI-06	Notifications	Severe/Total Loss sends alert to claims manager, creates internal timeline event

4 Data Model

4.1 Overview

The solution uses Microsoft Dataverse as the data platform with the following core entities: Claims (new_claim), Policies (new_policy), Claim Documents (new_claimdocument), Claims Timeline (new_claimtimeline), and Fraud Assessment (new_fraudassessment).

4.2 Tables

4.2.1 Claim (new_claim)

General

Option	Enable / Disable
Display Name	Claim
Plural Name	Claims
Schema name (Table)	new_claim
Primary field (schema name)	new_claimnumber
Business process flows	Yes
Notes	Yes
Activities	Yes
Duplicate Detection	Yes
Auditing	Yes
Enable for mobile	Yes
Ownership	User or Team

Form (Main)

Display Name	Schema Name	Field Type	Req	Notes	Search
Claim ID	new_claimid	GUID	+	Primary key	
Claim Number	new_claimnumber	String	+	Auto-generated	+
Claim Type	new_claimtype	OptionSet	+	Auto/Home/Commercial	+
Status	statuscode	OptionSet	+	Draft/Submitted/etc.	+
Incident Date	new_incidentdate	DateTime	+	Date/time of incident	+
Incident Location	new_incidentlocation	String	+	Address/description	+
Incident Latitude	new_incidentlatitude	Decimal		Geocoded latitude	
Incident Longitude	new_incidentlongitude	Decimal		Geocoded longitude	
Description	new_description	Text		Detailed description	
Estimated Amount	new_estimatedamount	Currency		Claimed amount	
Approved Amount	new_approvedamount	Currency		Approved payout	
Fraud Risk Score	new_fraudriskscore	Whole Number		0-100 risk score	
Weather Conditions	new_weatherconditions	String		Historical weather	
Digital Signature	new_digitalsignature	Image		Customer signature	

4.2.2 Policy (new_policy)

General

Option	Enable / Disable
Display Name	Policy
Plural Name	Policies
Schema name (Table)	new_policy
Primary field (schema name)	new_policynumber
Ownership	User or Team

Form (Main)

Display Name	Schema Name	Field Type	Req	Notes	Search
Policy ID	new_policyid	GUID	+	Primary key	
Policy Number	new_policynumber	String	+	Policy number	+
Coverage Type	new_coveragetype	OptionSet	+	Comprehensive/etc.	+
Coverage Limit	new_coveragelimit	Currency	+	Max coverage	
Deductible	new_deductibleamount	Currency		Deductible amount	
Effective Start	new_effectivestartdate	Date	+	Policy start date	
Effective End	new_effectiveenddate	Date	+	Policy end date	
Customer	new_customerid	Lookup	+	Contact reference	+

4.2.3 Claim Document (new_claimdocument)

General

Option	Enable / Disable
Display Name	Claim Document
Plural Name	Claim Documents
Schema name (Table)	new_claimdocument
Primary field (schema name)	new_documentname

Form (Main)

Display Name	Schema Name	Field Type	Req	Notes	Search
Document ID	new_claimdocumentid	GUID	+	Primary key	
Document Name	new_documentname	String	+	File name	+
Document Type	new_documenttype	OptionSet	+	Photo/Document	+
File	new_file	File	+	Uploaded file	
File Size	new_filesize	Whole Number		Size in bytes	
MIME Type	new_mimetype	String		Content type	

4.2.4 Claims Timeline (new_claimtimeline)

General

Option	Enable / Disable
Display Name	Claims Timeline
Plural Name	Claims Timeline
Schema name (Table)	new_claimtimeline
Primary field (schema name)	new_name

Form (Main)

Display Name	Schema Name	Field Type	Req	Notes	Search
Timeline ID	new_claimtimelineid	GUID	+	Primary key	
Name	new_name	String	+	Event title	+
Claim	new_claimid	Lookup	+	Related claim	+
Event Type	new_eventtype	OptionSet	+	Status Change/Note/Document	+
Event Date	new_eventdate	DateTime	+	When event occurred	+

Description	new_description	Text		Event details	
Is Internal	new_isinternal	Two Options		Hidden from customer	

4.2.5 Fraud Assessment (new_fraudassessment)

General

Option	Enable / Disable
Display Name	Fraud Assessment
Plural Name	Fraud Assessments
Schema name (Table)	new_fraudassessment
Primary field (schema name)	new_name

Form (Main)

Display Name	Schema Name	Field Type	Req	Notes	Search
Assessment ID	new_fraudassessmentid	GUID	+	Primary key	
Name	new_name	String	+	Assessment reference	+
Claim	new_claimid	Lookup	+	Related claim	+
Risk Score	new_riskscore	Whole Number	+	0-100 score	
Risk Factors	new_riskfactors	Text		Identified risk factors	
Recommendation	new_recommendation	OptionSet	+	Proceed/Review/Investigate	+
Assessment Date	new_assessmentdate	DateTime	+	When assessed	+
Correlation ID	new_correlationid	String		API tracking ID	

5 Additional functionality

5.1 PCF Control - FraudRiskBar

A custom Power Apps Component Framework (PCF) control that displays fraud risk scores as an animated progress bar with colour-coded risk levels.

Risk Levels:

Level	Score Range	Colour	Hex
Low Risk	0-25	Green	#22C55E
Medium Risk	26-50	Yellow	#EAB308
High Risk	51-75	Orange	#F97316
Critical Risk	76-100	Red	#EF4444

Features:
- Animated progress bar with smooth width animation on score change
- Pulse animation for critical scores (>75)
- Responsive design (hides labels/ticks when container < 200px)
- Accessibility: ARIA labels, keyboard focusable

5.2 Power Pages Portal

Customer-facing self-service portal for claim submission and tracking.

Portal Pages:

Path	Description
/	Home Page - Redirects authenticated users to Claims Dashboard
/claims-dashboard	Claims Dashboard - Statistics, filterable/sortable table, status badges
/new-claim	New Claim - 5-step wizard for claim submission
/claim-detail	Claim Detail - Read-only view of claim details
/profile	Profile - Custom-styled profile page with avatar and information cards

5.3 Web Resource - ClaimLocationMap

An interactive map component embedded in the Claim form that displays the incident location.

File: new_ClaimLocationMap.html

Functionality:
- Displays incident location on an Azure Maps map
- Shows a red marker with coordinates when location is set
- Displays "No Location Set" message when coordinates are empty
- Automatically updates when the incident location changes

6 Integration

6.1 Logging mechanism

All external API call failures are logged to Application Insights.

6.2 Integration 1 - FraudDetection Azure Function

Analyses claim data and returns a fraud risk score (0-100) with risk factors.

6.2.1 Scope

Called by Claim Intake Orchestrator flow when claim is submitted.

6.2.2 Interface design

Overview

Endpoint: POST /api/FraudDetection
Runtime: Node.js 18.x on Azure Functions Consumption Plan

Request Format

JSON body with: claimId (GUID), policyId (GUID), claimType (string), amount (number), location (string), incidentDate (ISO datetime), description (string)

Response Format

JSON response with: riskScore (0-100), riskFactors (array), recommendation (Proceed/Review/Investigate), assessmentId, correlationId, timestamp

Scoring Rules

Rule	Condition	Points
Base Score	Starting point	+15
High Amount	> $50,000	+25
Elevated Amount	> $20,000	+15
Weekend Incident	Saturday/Sunday	+10
Rapid Submission	Within 1 day	+8
Delayed Reporting	> 30 days	+12
Minimal Description	< 50 characters	+15
Has Evidence	Contains witness/police report	-10

6.3 Integration 2 - GeocodeLocation Azure Function

Converts street addresses to latitude/longitude coordinates using Azure Maps.

6.3.1 Scope

Called by ClaimGeocoder Dataverse plugin when claim incident location is created or updated.

6.3.2 Interface design

Overview

Endpoint: POST /api/GeocodeLocation

Request Format

JSON body with: address (string)

Response Format

JSON response with: success (boolean), latitude, longitude, formattedAddress, confidence (High/Medium/Low/VeryLow)

6.4 Integration 3 - WeatherLookup Azure Function

Retrieves historical weather conditions using Open-Meteo Archive API.

6.4.1 Scope

Called by ClaimWeather Dataverse plugin when coordinates or incident date change.

6.4.2 Interface design

Overview

Endpoint: POST /api/WeatherLookup

Request Format

JSON body with: latitude (decimal), longitude (decimal), date (ISO date)

Response Format

JSON response with: success (boolean), conditions (string summary), details (object with weather data)

6.5 Environment Variables

Schema Name	Description
new_geocodeapiurl	GeocodeLocation function URL
new_geocodeapikey	GeocodeLocation function key
new_weatherapiurl	WeatherLookup function URL
new_weatherapikey	WeatherLookup function key
new_azuremapskey	Azure Maps subscription key
new_visionendpoint	Azure Computer Vision endpoint
new_visionkey	Azure Computer Vision subscription key