ALP AI Architecture

WORK IN PROGRESS

ALP will be using a hybrid event-driven business rules microservices framework enhanced by an orchestrated agentic framework

A2 — Technical architecture (high-level) - To be done with Gabe

Core components:

- **Data ingestion layer:** CW1 events, EDI, emails, carrier APIs, trucker confirmations.
- **Orchestration / platform (CargoX):** event bus, canonical object model, workflow engine, audit trail.
- **AI microservices:** booking validator, RAG conversational assistant, anomaly scoring, recommendation engine.
- **Vector DB:** embeddings storage for RAG & similarity search.
- **Human-in-loop UI:** exception review, confirmation flows, audit logs.
- **MLOps:** model training, monitoring, drift detection, CI/CD.
- **Security & governance:** RBAC, PII sanitization, logging, approvals.
  (A diagram should be produced for the slide deck.)

AI Components

The hybrid model:

- The **Orchestrator Agent** handles high-level decisions and user interactions.
- The **MCP Server** manages execution, tooling, and resource allocation.

- AI Agents are invoked as needed, either directly by the orchestrator or via MCP.

Goal	Recommended Approach
Flexibility & Modularity	Orchestrator Agent
Centralized Control & Performance	MCP as Coordinator
Distributed AI Agents	Orchestrator Agent
Tool-centric workflows	MCP as Coordinator

Agent orchestrator

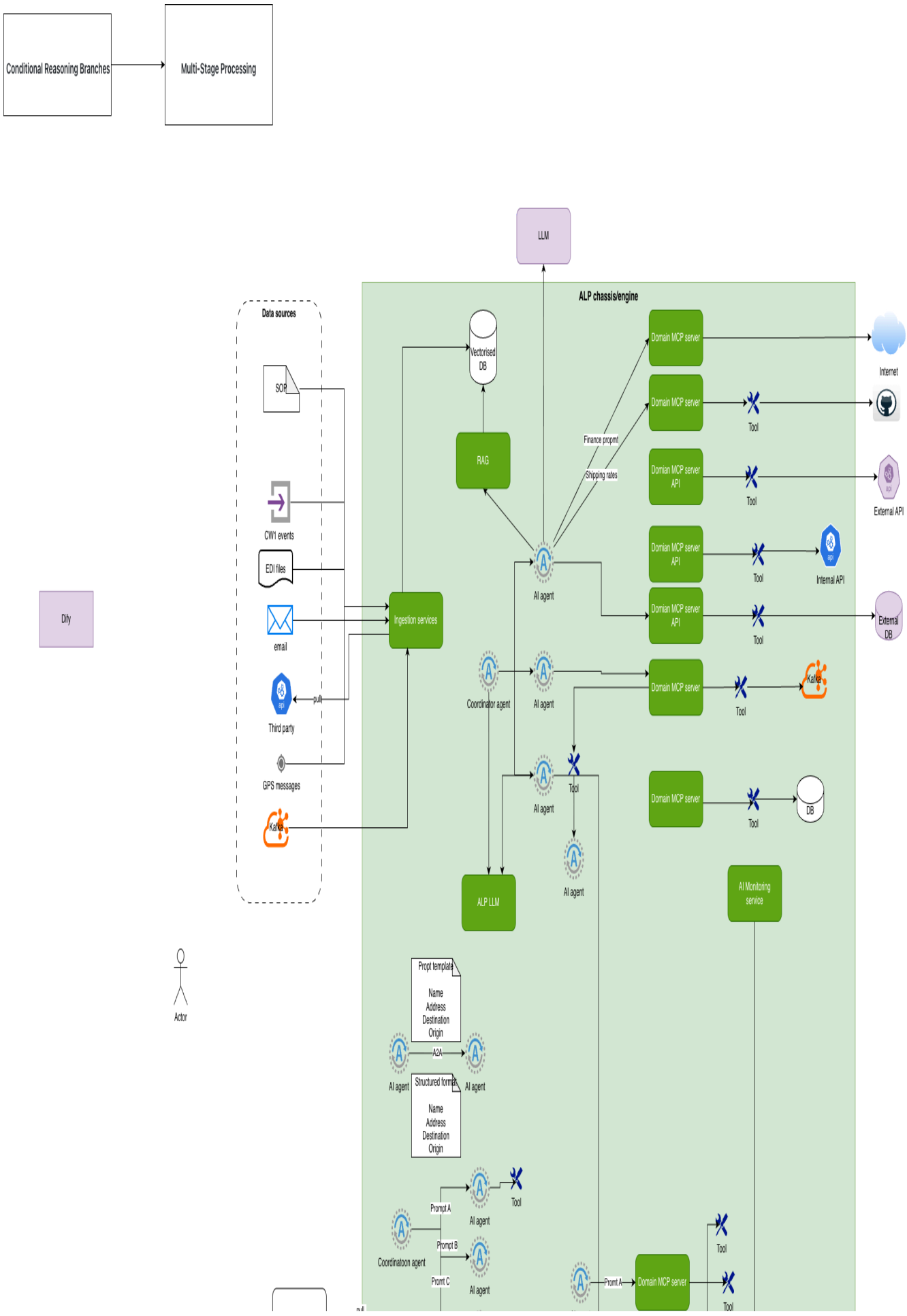
MCP servers

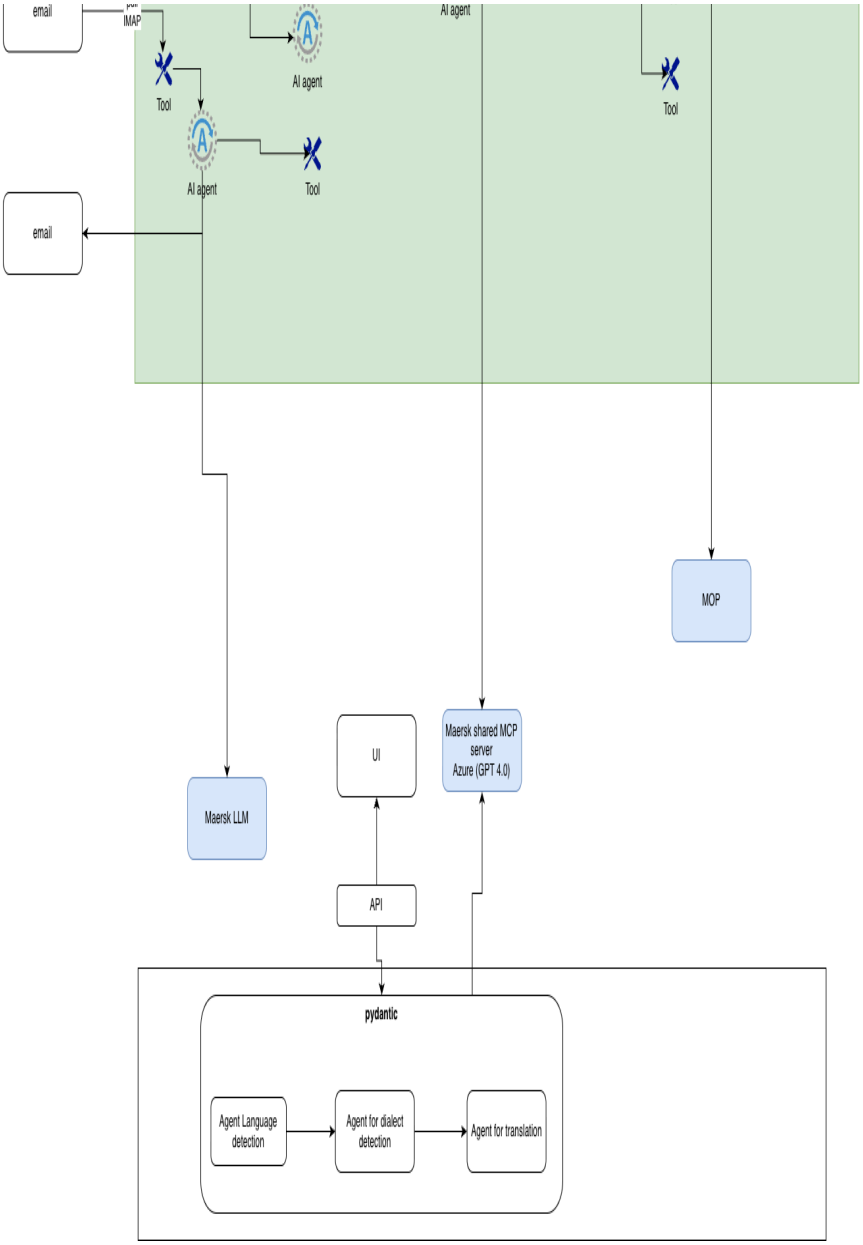
MCP tools

Standard propt templates

Must use standard templates to obtain consistent replies

ALP AI architecture pattern


Conditional Reasoning Branches
Multi-Stage Processing
LLM
ALP chassis/engine
Data sources
Vectorised DB
SOR
CW1 events
EDI files
email
Third party
GPS messages
Kafka
pull
RAG
Ingestion services
Dify
AI agent
Coordinator agent
ALP LLM
Tool
DB
Domain MCP server
Domian MCP server API
Finance propmt
Shipping rates
Internet
External API
Internal API
External DB
AI Monitoring service
Actor
Propt template
Name
Address
Destination
Origin
A2A
Structured format
Coordinatoon agent
Prompt A
Prompt B
Promt C
Promt A


email
IMAP
AI agent
Tool
AI agent
Tool
AI agent
Tool
email
MOP
Maersk LLM
UI
Maersk shared MCP server
Azure (GPT 4.0)
API
pydantic
Agent Language detection
Agent for dialect detection
Agent for translation