

AI-Powered Project Management: How AI Agents Can Supercharge Decision-Making in Construction

May 2025

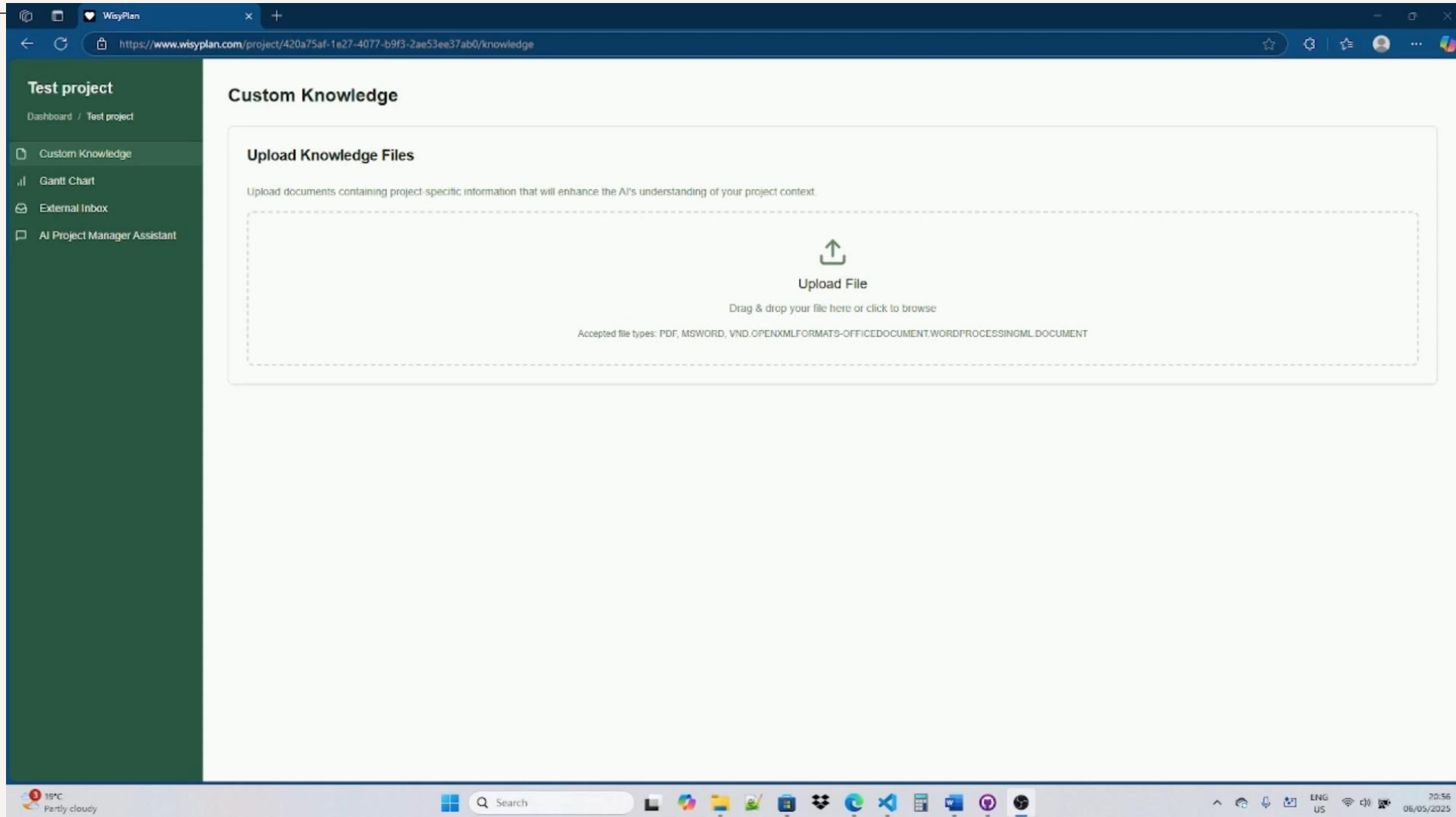
Agenda slide

Introduction	Section 1
Evolution of Project Management	Section 2
AI's Entry into Project Management: From Chatbots to Intelligent Agents	Section 3
Power of Data: Structured vs. Unstructured Information	Section 4
Use Case: AI in Action (live demo)	Section 5
AI-Powered Decision-Making: The Future of Project Management	Section 6



Introduction

Quick overview – www.wisyplan.com



Introduction

problem



About Speakers



Christian Pallaria

Digital Transformation Leader | Driving
innovation in Civil Infrastructure | Strateg...



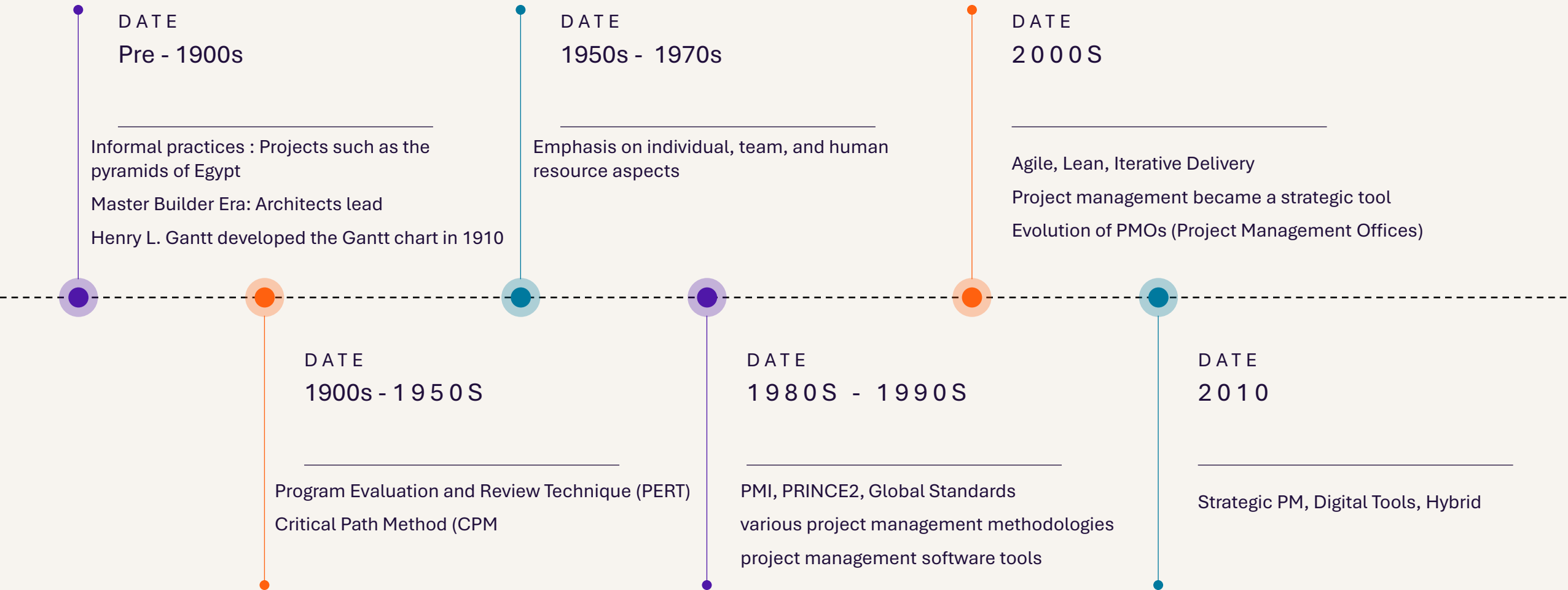
Sydney Mudau PMP® AMIEAust CEngA ...

Program Management | PMISC
President & Chair | Board Director...

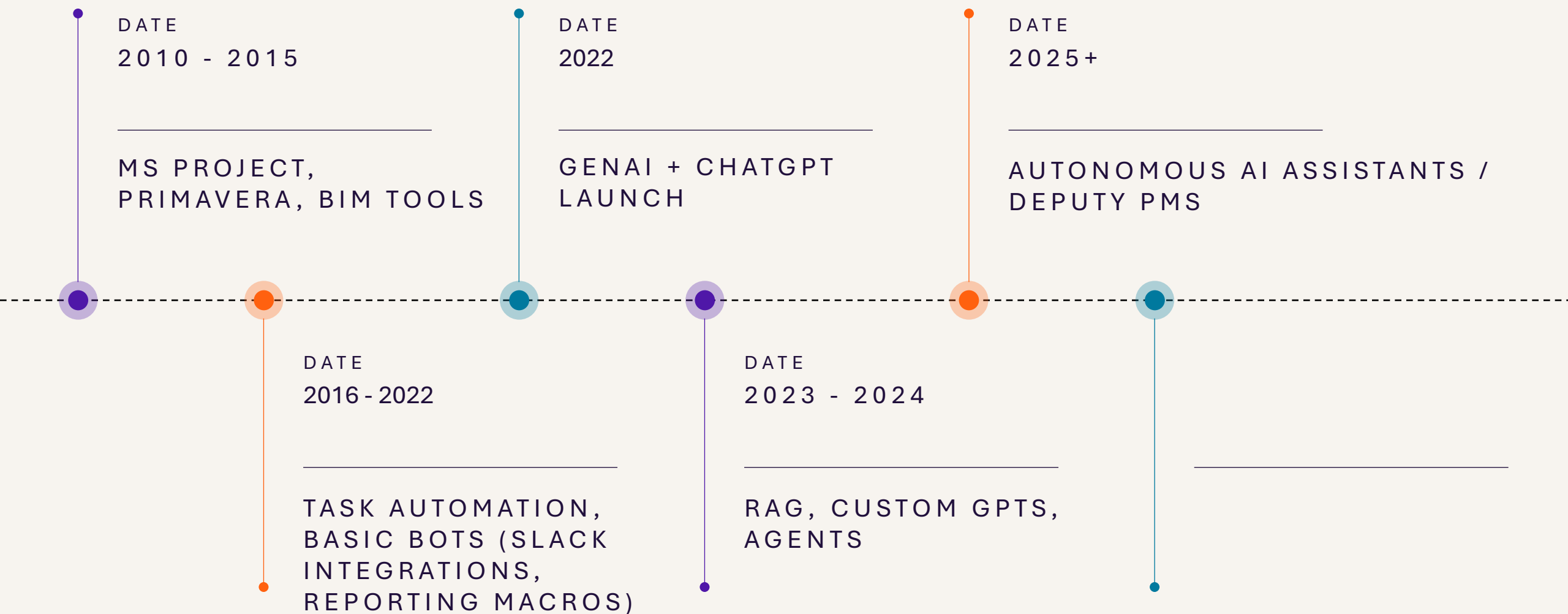


Evolution of Project management

Evolution of Project management



Evolution of Project management





AI's Entry into PM

From Chatbots to Intelligent Agents

AI today

From chatGPT to Intelligent Agents

1

GenAI

The engine behind intelligent creation

- **Foundation models** that generate human-like text, images, or code.
- Trained on **massive datasets** to understand and predict language patterns.
- **Powers everything** from email drafts to complex reasoning tasks.

2

ChatGPT

The breakthrough that made AI conversational

- **Game-changer** released by OpenAI in Nov 2022.
- Made GenAI **accessible** via natural conversations.
- **First real interaction** for most professionals with advanced language models.

3

RAG

Where knowledge meets relevance

- Combines geAI's reasoning with real **project knowledge**.
- **Searches** a vector database before answering, grounding responses in actual files.
- Prevents “**hallucinations**” and enables document-aware assistants.

“ AI Agents

the description of an AI Agent can be simplified as a robot with a checklist or workflow.

- Goal-oriented systems that can plan, search, and act.
 - Customizable with tools (i.e. functions), memory, and logic.
 - Transitioning from passive bots to proactive project assistants.
-

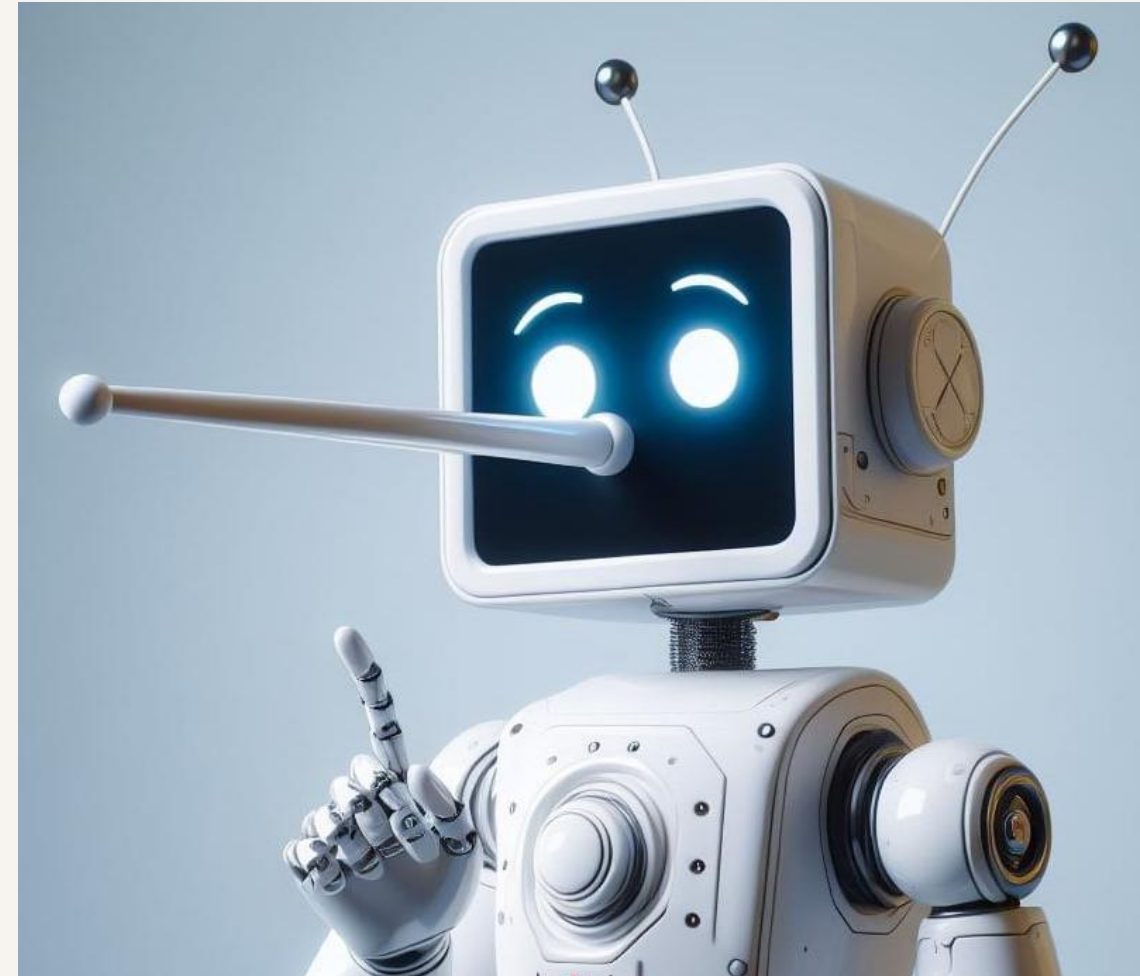


What is RAG and Why it Matters

The problem of fundamental knowledge

RAG is an AI technique that **combines search and generation** to provide accurate, context-aware answers grounded in real data.

Traditional large language models (LLMs) generate responses based on patterns learned from public training data. While powerful, they often **lack access to project-specific documents** and can “**hallucinate**”, confidently giving wrong answers when asked about details they were never trained on.

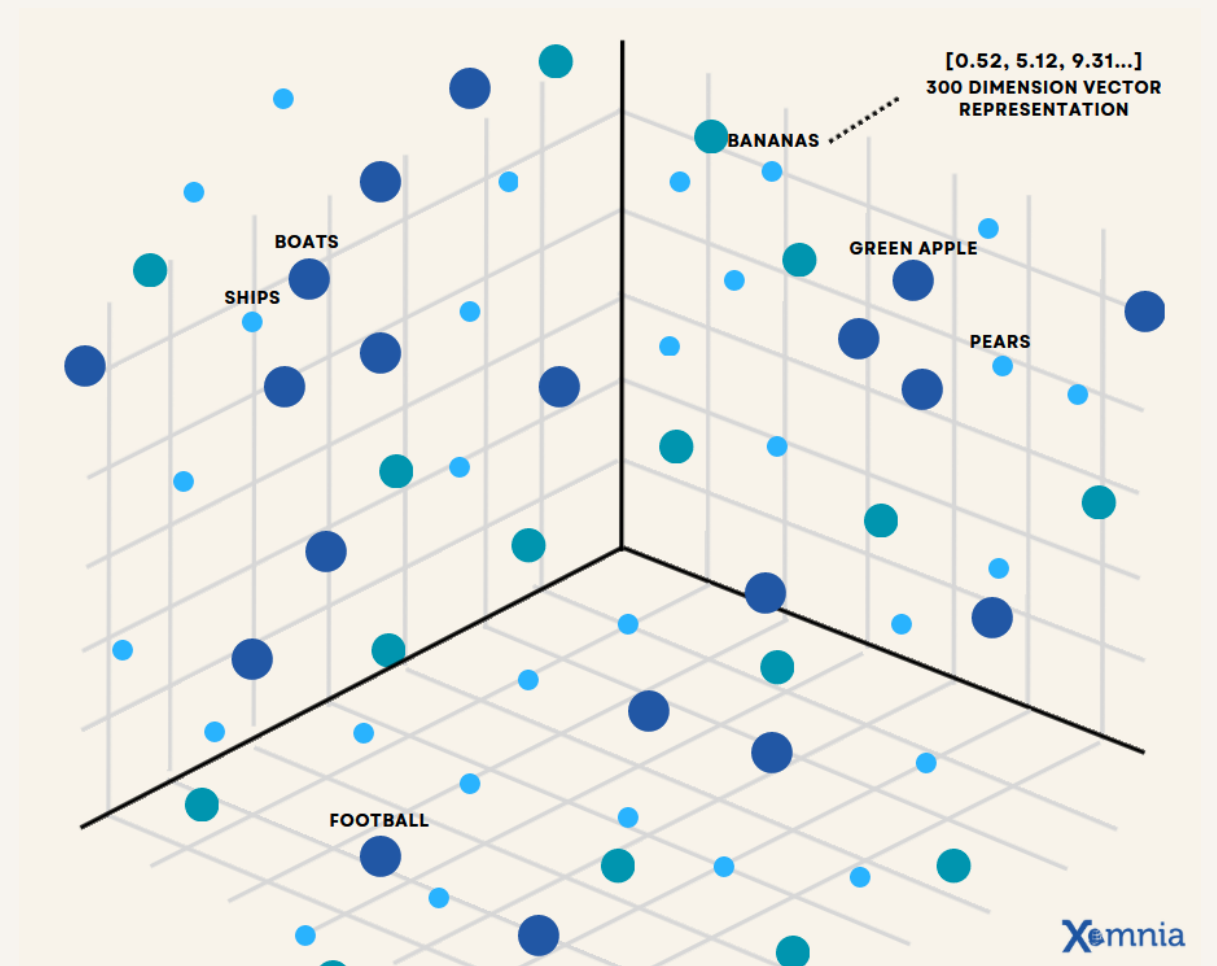


What is RAG and Why it Matters

Solving "hallucinations"

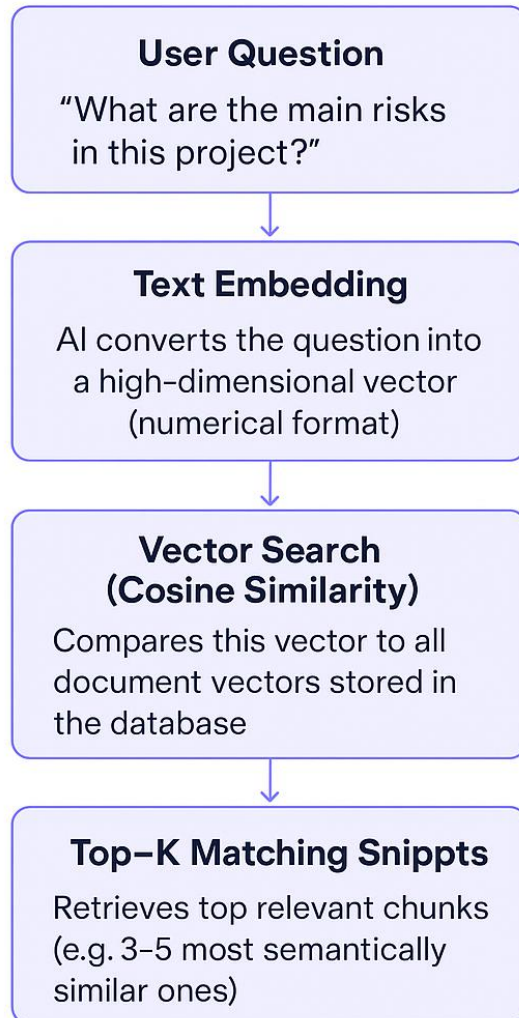
RAG solves this problem.

Instead of relying only on what the AI model *remembers*, RAG first **searches your project's knowledge base** (such as contracts, Gantt charts, meeting minutes, or reports) stored in a **vector database**. It retrieves the most relevant content, injects it into the model's prompt, and then generates an answer **based on that retrieved information**.



What is RAG and Why it Matters

How it Works – Delve into Details



? **User Question**

→ “What are the main risks in this project?”



Text Embedding

→ AI converts the question into a high-dimensional vector



Vector Search (Cosine Similarity)

→ Compares this vector to all document vectors



Top-K Matching Snippets

→ Retrieves top relevant (semantically similar) chunks



Answer Generation

→ Injects these snippets into the prompt and generates an accurate response

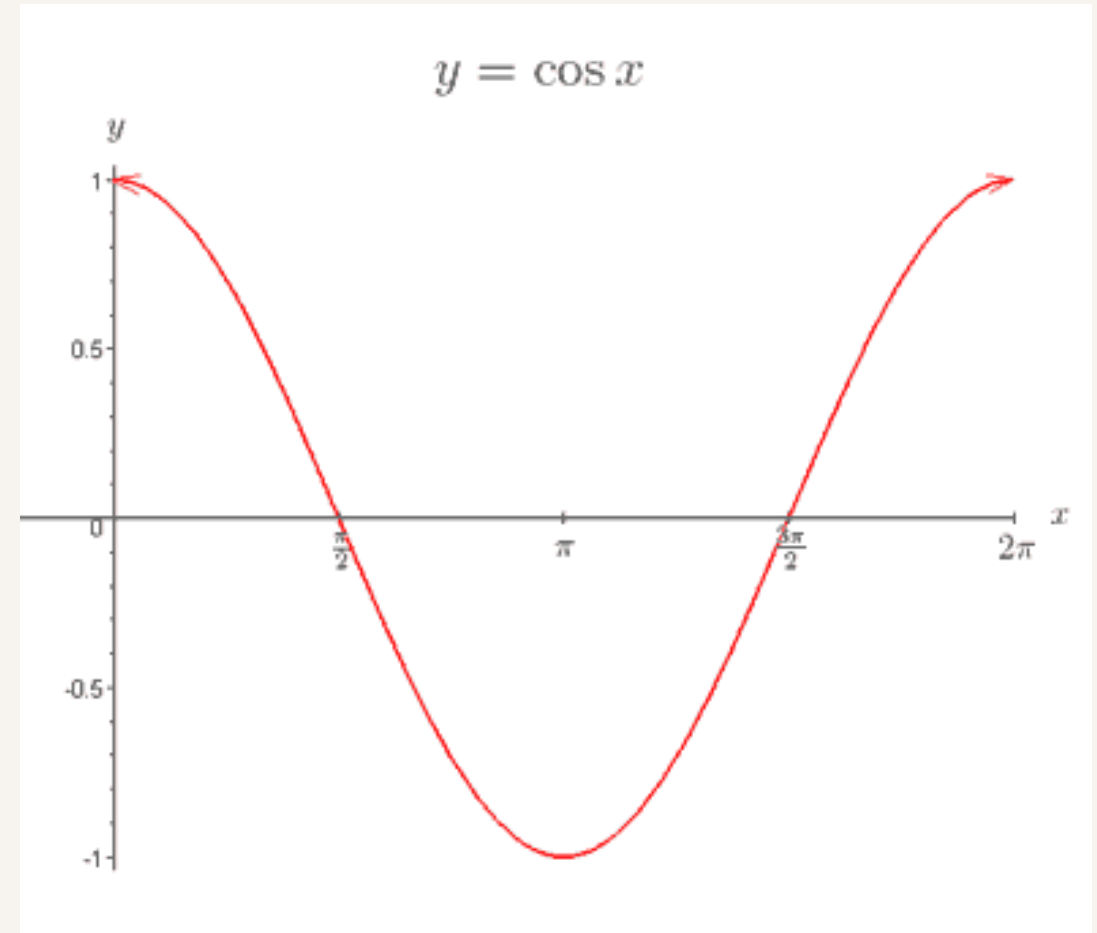
What is RAG and Why it Matters

Cosine similarity - Measuring the angle between thoughts

In a vector database, every document or text chunk is represented as a numerical vector in a multi-dimensional space.

Cosine similarity measures how close two vectors are in direction — even if their lengths differ.

- ✓ **Cosine Similarity = 1** means perfect similarity (same direction)
- **Cosine Similarity = 0** means no similarity (orthogonal vectors)
- ✗ **Cosine Similarity = -1** means opposite meaning (rare in most use cases)

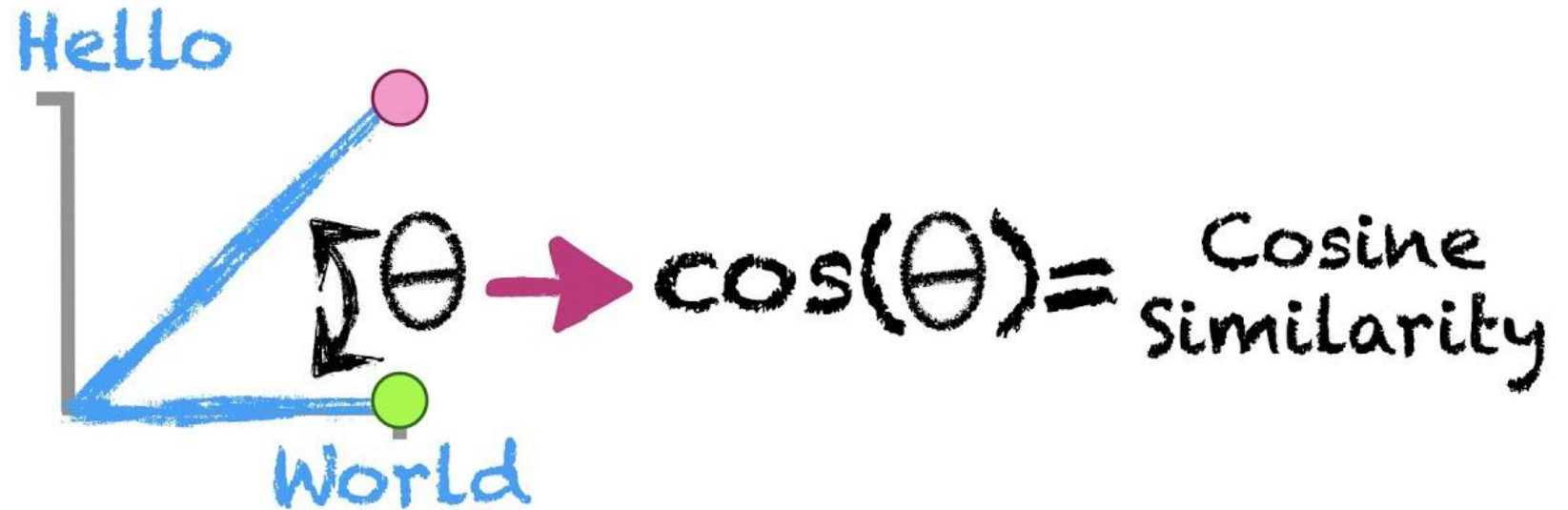


What is RAG and Why it Matters

Cosine similarity - Measuring the angle between thoughts

When you ask a question, the AI translates it into a vector. It then compares it with pre-embedded chunks from your project documents using cosine similarity, a mathematical way to measure how semantically aligned they are. The top matching chunks are brought back and injected into the AI's prompt, allowing it to answer with real context.

Cosine Similarity...



...Clearly Explained!!!

What is RAG and Why it Matters

Why RAG matters in Project Management

-  **Accuracy:** Reduces hallucinations by anchoring responses in your project files.
-  **Document awareness:** Gives context-specific insights, not general guesses.
-  **Auditability:** You can always trace where the answer came from.
-  **Trust:** Enables AI to act like a smart assistant with real knowledge, not a guesser.

How Agents work

What Makes an Agent Different

Agents vs. Chatbots

Feature	Chatbot	Agent
<i>Responds to input</i>	✓	✓
<i>Has memory</i>	✗	✓ (project-aware)
<i>Uses external tools</i>	✗	✓ (file search, custom functions, etc...)
<i>Decision-making logic</i>	✗	✓
<i>Acts autonomously</i>	✗	⚠ (proactive alerts)

Agents don't just answer—they analyse, decide, and sometimes act.

How Agents work

A multi-assistant agent architecture

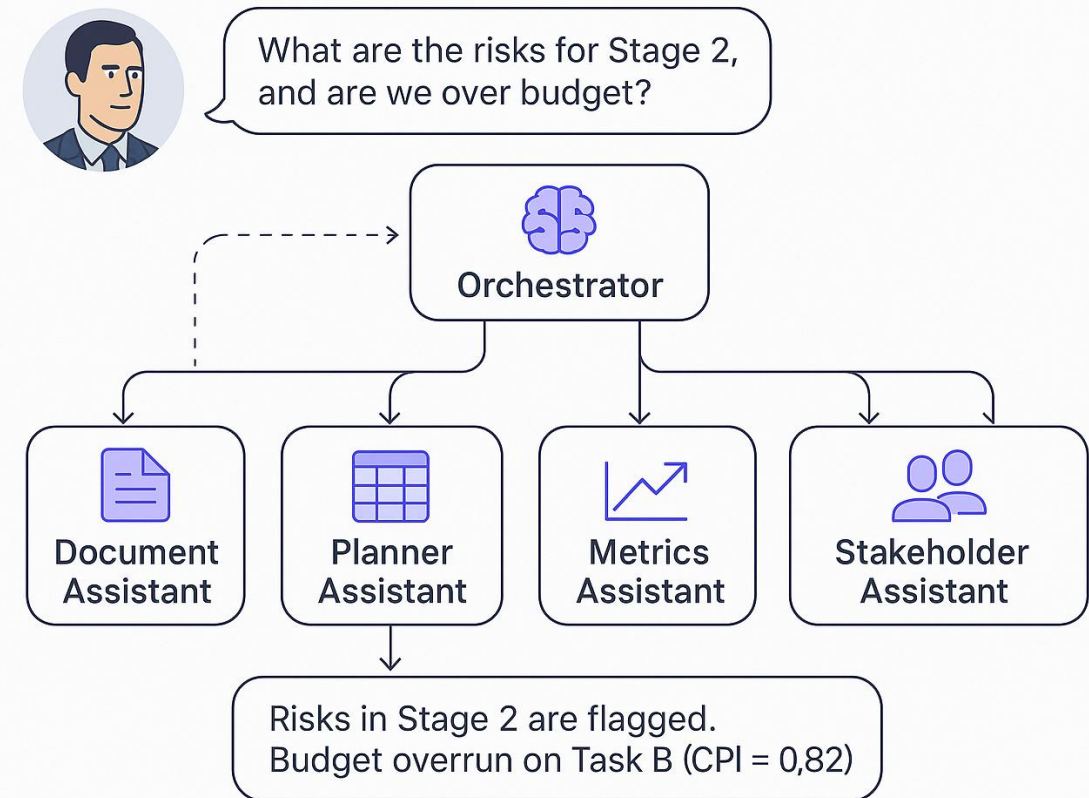
 **Top Layer: User** prompting the query

 **Middle Layer: Orchestrator** (Router Agent)

- Receives the user query
- Determines intent & routes to relevant assistants
- Aggregates responses into a unified reply

▼ Bottom Layer: Specialized Assistants

Assistant	Function
 Document Assistant	Uses RAG to extract info from PDFs, contracts, reports
 Planner Assistant	Interacts with Gantt data
 Metrics Assistant	Calculates and explains BCWP, ACWP, variances
 Stakeholder Assistant	Tracks who's responsible / informed
 Strategy Assistant	Suggests next actions or mitigations

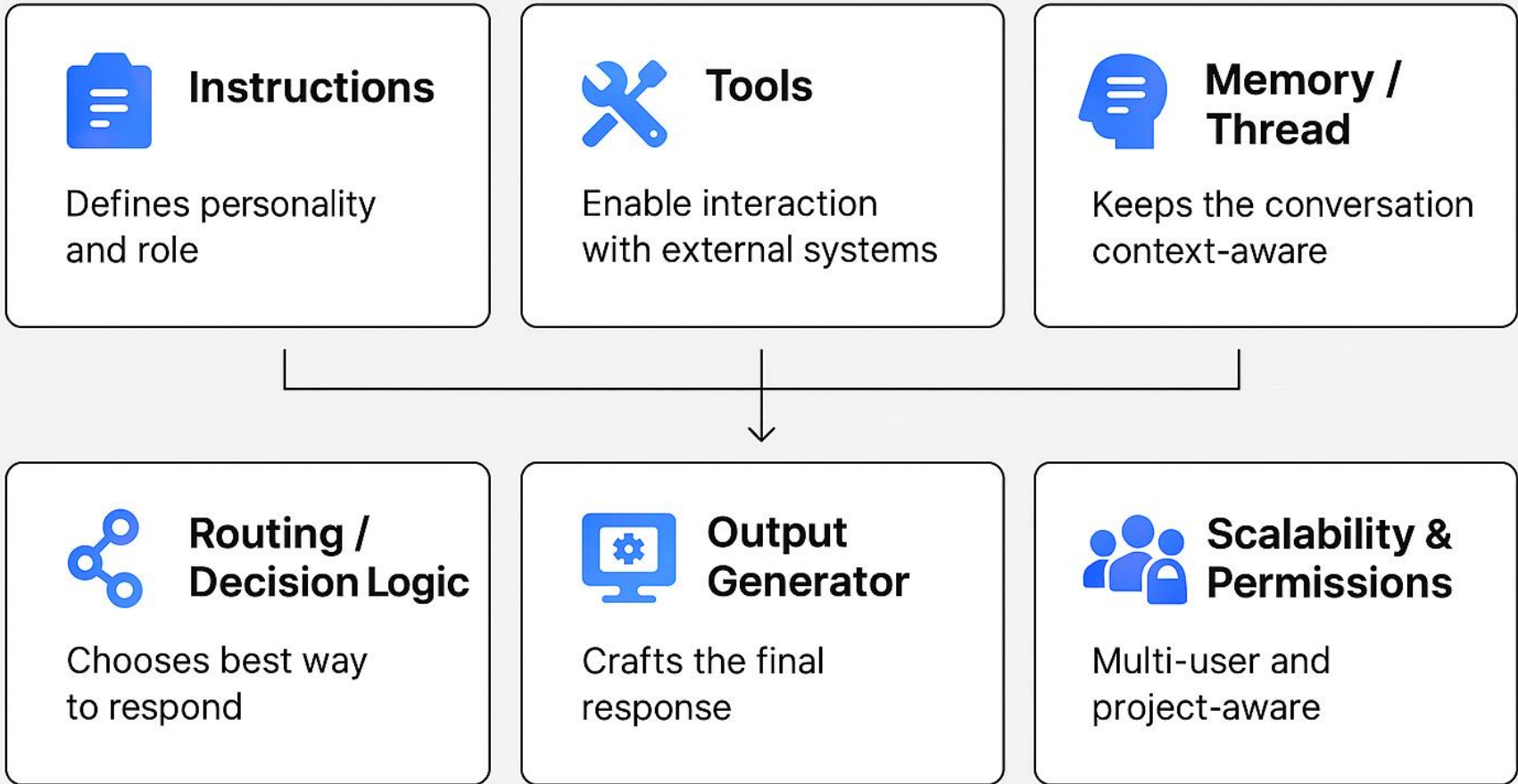


The **orchestrator merges all outputs** into one clear message to the user

How Agents work

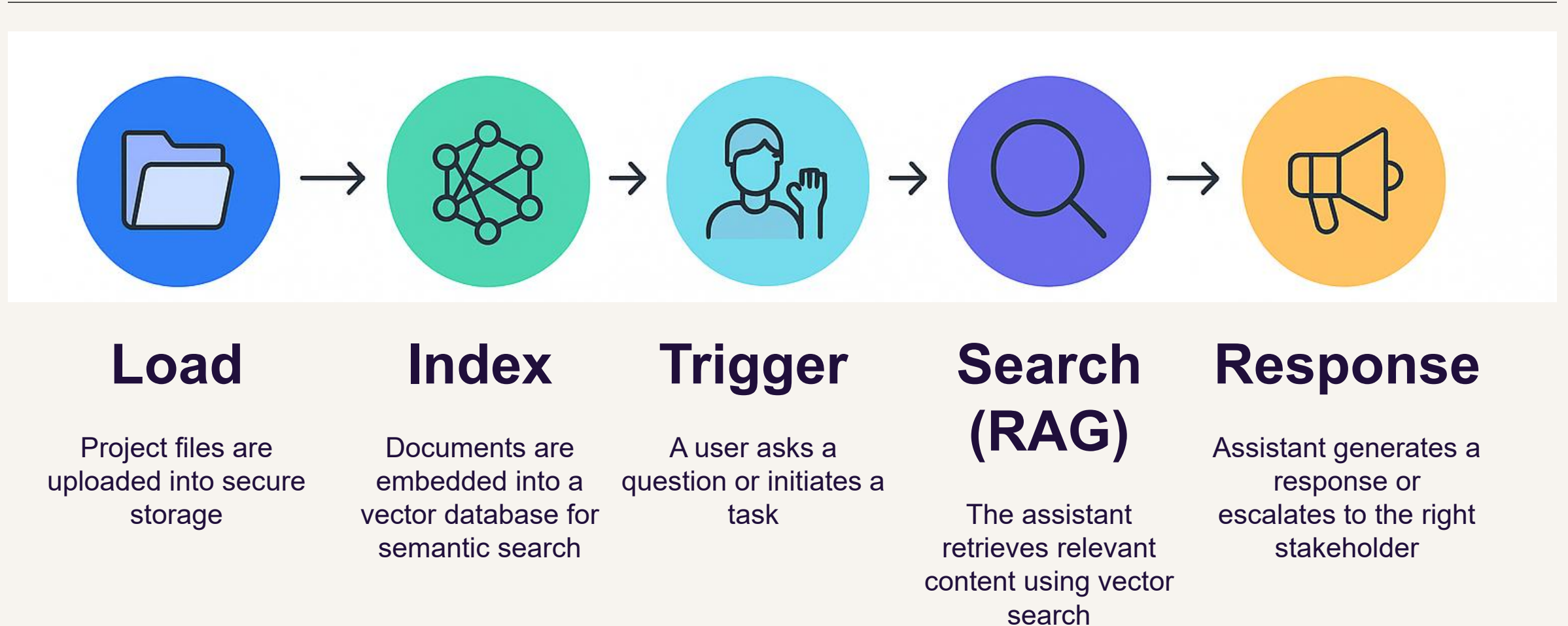
How a Specialized Assistant is built

This isn't a monolithic AI, it's **modular**, **adaptable**, and future-ready.



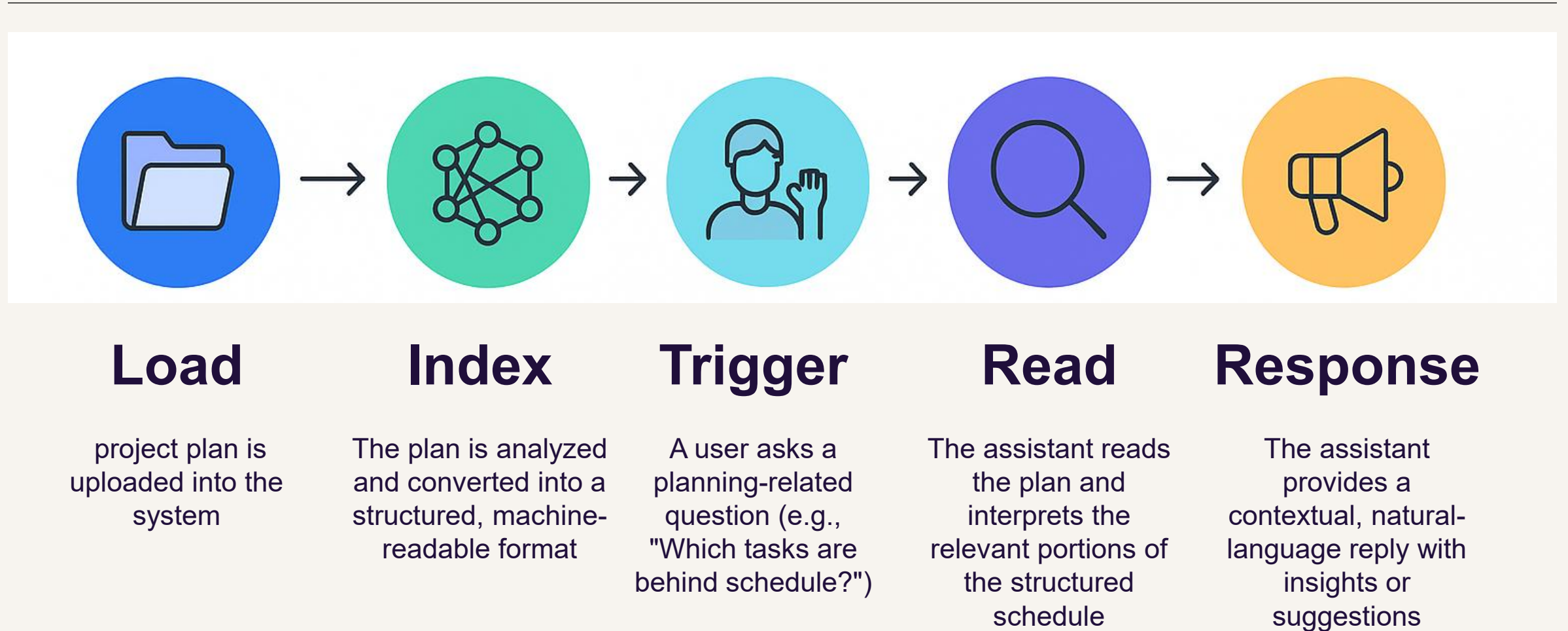
Document Assistant

What Happens Behind the Scenes?



Planner Assistant

What Happens Behind the Scenes?



Orchestrator

What Happens Behind the Scenes?



Query

The orchestrator captures the user's question or command

Classify

It analyzes the query to understand what type of information is needed (e.g., document analysis, schedule insight, performance metrics).

Routing

Based on intent, it forwards the query to one or more specialized assistants (e.g., Document Assistant, Planner Assistant, Metrics Assistant, etc...).

Collect

It gathers the individual replies from each assistant.

Response

It synthesizes the responses into one coherent, user-friendly answer.

Power of Data

Structured vs. Unstructured Information

Structured Data

Why Structured Data Is Easy for Machines to Understand

1

Consistent Format

Everything is labelled and predictable, no interpretation needed

- Tables, fields, rows, and columns follow a **fixed schema**
- Examples: Task Name, Start Date, End Date, Status
- Machines can process this **without ambiguity**

2

Quantitative and Measurable

Structured data speaks the language of algorithms

- Includes numbers, dates, durations, percentages
- Machines can **sort, compare, filter, and calculate**
- Enables **forecasting, critical path analysis, earned value metrics** (e.g., BCWS, ACWP, SPI, CPI)

3

Easy to Query and Visualize

Structured data powers automation and real-time insights

- Can be **connected to dashboards**, graphs, charts
- **Easy to automate** alerts or detect deviations from baseline
- AI can identify trends and **recommend schedule adjustments**

Unstructured Data

Why Structured Data Is Easy for Machines to Understand

1

It Contains the Real Story

Everything is labelled and predictable, no interpretation needed

- **Contracts, emails, meeting minutes, and reports** capture decisions, risks, and intentions.
- These documents provide the **context** behind cost and schedule shifts.

2

It Holds Tacit Knowledge

Structured data speaks the language of algorithms

- **Engineers' notes, stakeholder comments, and risk logs** reflect expert judgment and nuance.
- Often **informal but critical** to understanding project dynamics.

3

It's Hard to Search (until now)

Structured data powers automation and real-time insights

- **Traditional systems** can't read or understand freeform documents.
- **GenAI + RAG now unlock this hidden layer**, making it searchable and insightful.

Structured Vs Unstructured Data

Key differences in summary

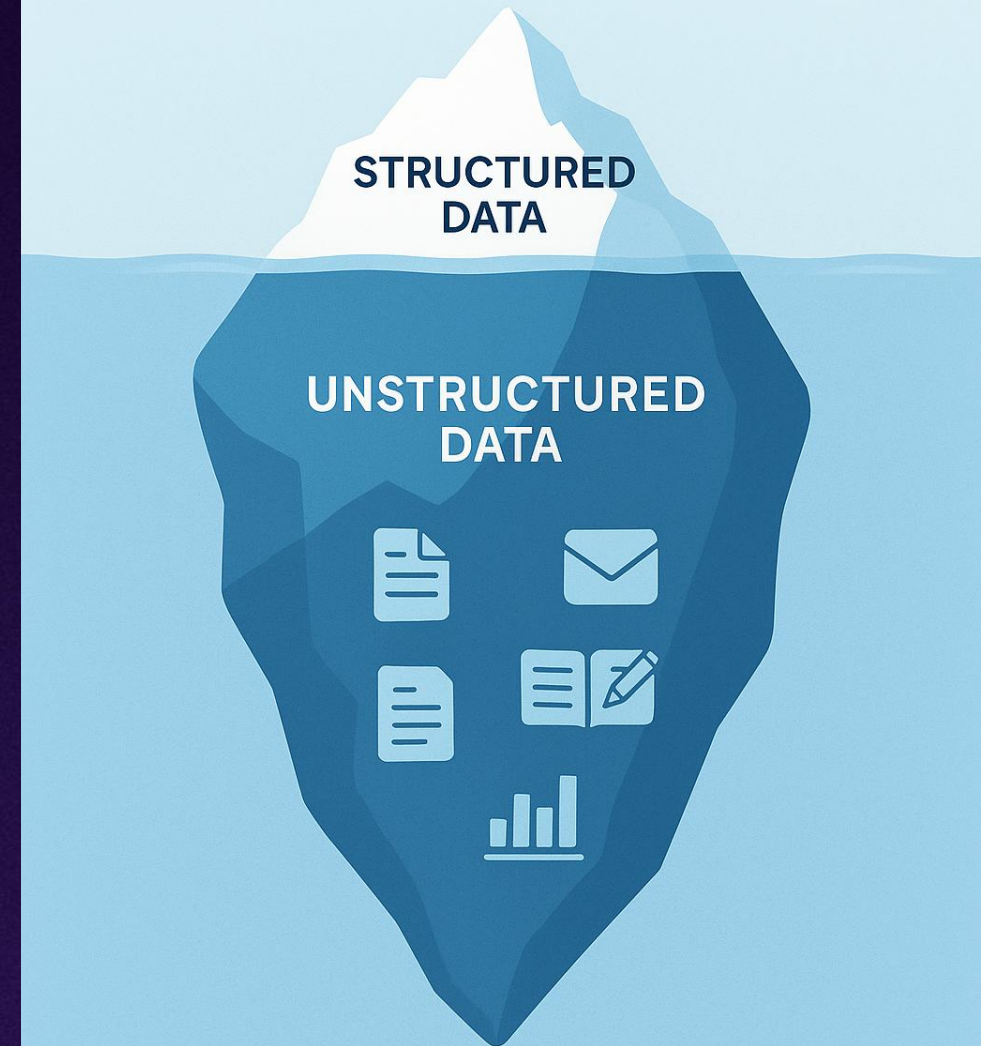
	 Structured Data	 Unstructured Data
Format	Organized into tables, fields, models	Freeform: emails, PDFs, contracts, meeting notes
Examples	Gantt charts, budgets, schedules, KPIs	Emails, risk logs, scanned documents, reports
AI Accessibility	Easy for machines to read and process	Difficult for traditional tools to analyse
Use in PM	Enables forecasting, earned value analysis	Holds hidden risks, context, stakeholder nuance
AI's Role	Structured input for planning and metrics	Requires transformation via RAG or NLP techniques

“

The power of Data

Structured data shows *what* is happening, unstructured data explains *why*

Why Most Value Lies in Unstructured Data



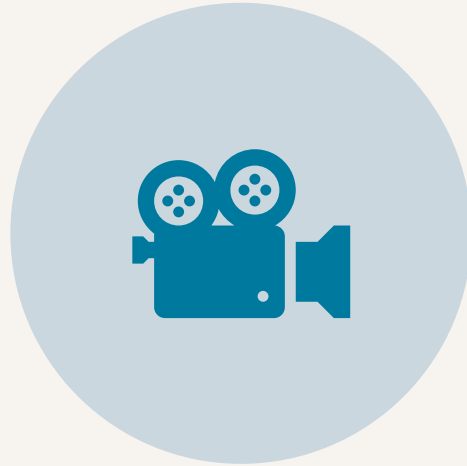
Use Case

AI Agent in Action

Test app

How it works

www.wisyplan.com



PRE-RECORDED
VIDEOS



LIVE TEST

Test app

General test about custom knowledge and plan retrieval

www.wisyplan.com



This is a general test of the app:

- Tests custom knowledge based on uploaded document retrieval
- Plan analysis

The screenshot displays the Wisy Plan web application interface. The left sidebar contains the following menu items: Wisy Plan, Dashboard / Wisy Plan, Custom Knowledge, Gantt Chart, External Inbox, and AI Project Manager Assistant. The main content area is titled "Custom Knowledge" and features an "Upload Knowledge Files" section. This section includes a description: "Upload documents containing project-specific information that will enhance the AI's understanding of your project context." Below this is a large dashed box with an "Upload File" button and the instruction "Drag & drop your file here or click to browse". Accepted file types are listed as: PDF, MSWORD, VND, OPENXML, FORMATS, OFFICEDOCUMENT, WORDPROCESSINGML, DOCUMENT. Below the upload section is a list of "Uploaded Knowledge Files" with three entries: "Annex C - Risk Allocation Matrix.docx" (03/05/2025, 13:38:05 • 0.02 MB), "Annex D - Project Program.docx" (03/05/2025, 13:38:57 • 0.02 MB), and "Annex E - Provisional Sums and Contingency Items.docx" (03/05/2025, 13:39:59 • 0.02 MB). Each entry has download and delete icons. The bottom of the screen shows a Windows taskbar with the date 05/05/2025 and time 15:34.

Test app

Digital Twin request simulation

www.wisyplan.com



In this test we are simulating a request from the Client about creating a digital Twin of the building, which is not considered in the contract. There are emails and teams chats about this topic which the AI Agent picks properly.

The screenshot shows a web browser window with the WisyPlan logo in the top left corner. The address bar displays the URL: <https://www.wisyplan.com/project/0f2949cc-8b70-4041-b36b-950257e553fa/assistant>. The left sidebar is dark green and contains the following menu items: "Northern Sydney H...", "Dashboard / Northern Sydney Hea...", "Custom Knowledge", "Gantt Chart", "External Inbox", and "AI Project Manager Assistant". The main content area is white and titled "Project Management Assistant". Inside this area, there is a chat window titled "PM Assistant" with a green header. The chat message from the assistant reads: "Hello! I'm your Project Management Assistant for Northern Sydney Health Campus. How can I help you today?". Below the chat window is a text input field with the placeholder text "Ask a question about your project..." and a green send button with an upward arrow. The bottom of the screen shows a Windows taskbar with the date and time "01:29 06/05/2025" and the weather "17°C Partly cloudy".

Test app

MEP Design Issue simulation

www.wisyplan.com



In this test we are simulating an issue with the MEP Design. There are official emails but also unofficial chats about the topic.

It is interesting how the AI Agent creates a summary considering all information (official emails stating the issue) and informal chats trying to find a solution.

The screenshot displays the WisyPlan web application interface. The browser address bar shows the URL: <https://www.wisyplan.com/project/0f2949cc-8b70-4041-b36b-950257e553fa/assistant>. The left sidebar, titled "Northern Sydney H...", contains a navigation menu with the following items: "Dashboard / Northern Sydney Hea...", "Custom Knowledge", "Gantt Chart", "External Inbox", and "AI Project Manager Assistant". The main content area is titled "Project Management Assistant" and features a chat window with a "PM Assistant" icon. The chat message reads: "I wanted to follow up regarding our previous discussions about the Digital Twin. After careful review, we've determined that the FF&E (Furniture, Fixtures, and Equipment) tagging is currently outside the scope as outlined in our contract. We can certainly offer this tagging as an optional upgrade if you find it necessary, and we're happy to explore this option further with you. Please let us know how you'd like to proceed or if you have any questions. Thank you for your understanding. Best regards, [Your Name], [Your Position], [Your Company], [Your Contact Information]". Below the chat message is a text input field with the placeholder "Ask a question about your project..." and a green send button with an upward arrow. The Windows taskbar at the bottom shows the date and time as 01:32 on 06/05/2025, along with various application icons and a search bar.

Program Manager Dashboard

Keep control of the projects

www.wisypplan.com



This is an example of a dashboard for Program Managers who need to keep control of the a group of projects

 WisypPlan

[← Back to Dashboard](#)

Construction Program Dashboard

Downtown Mixed-Use Development

15 Jan 2025 - 30 Dec 2026

[Export Report](#)

 Project Phases

6 Active, 2 Completed

 Construction Progress

34% Complete

 Budget vs. Actuals

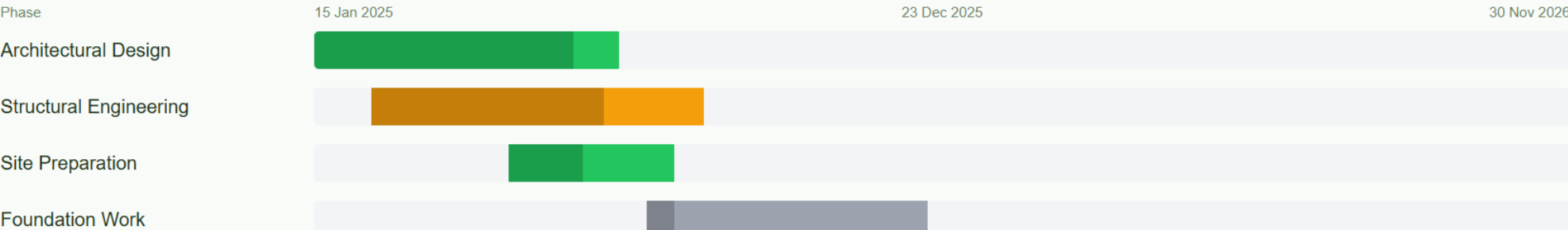
\$4.3M / \$12.5M

 Open Issues

6 Issues

1 Critical

Construction Timeline



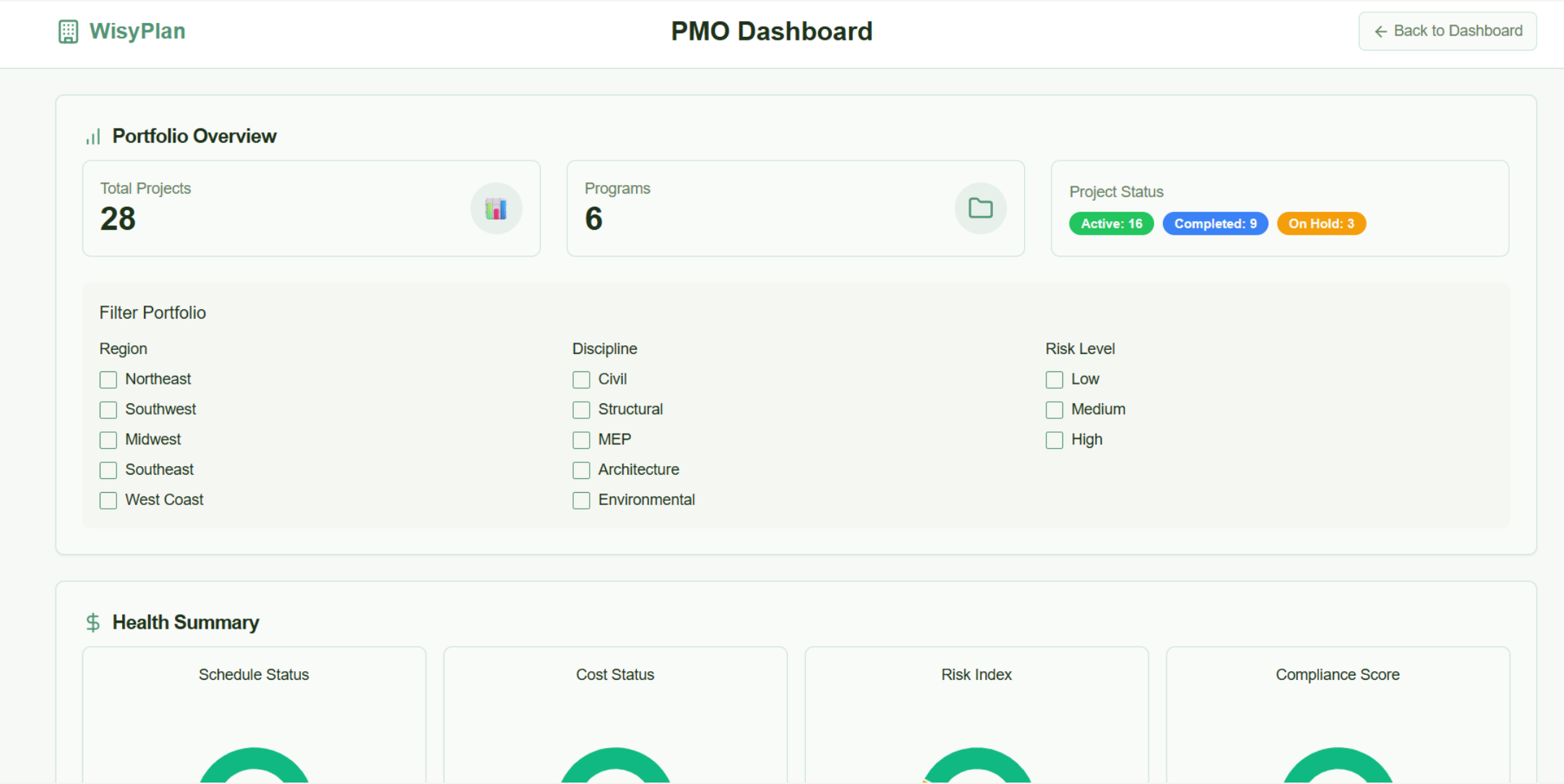
PMO Dashboard

Keep control of the programs

www.wisyplan.com



This is an example of a dashboard for PMO who needs to keep control of different programs in the entire portfolio





AI-Powered Decision-Making The Future of Project Management

AI-Powered Decision-Making: The Future of Project Management

Key Benefits of AI in Project Management

Enhanced Decision-Making: AI algorithms can analyze vast amounts of data to provide actionable insights, enabling project managers to make informed decisions swiftly.



Predictive Analytics: By leveraging historical data, AI can forecast potential project risks and outcomes, allowing for proactive mitigation strategies.



Resource Optimization: AI tools can assist in the efficient allocation of resources by predicting project needs and adjusting plans accordingly.



Improved Efficiency: Automation of routine tasks through AI reduces manual workload, allowing project teams to focus on strategic activities.



Risk Management: AI can identify patterns and anomalies that may indicate potential issues, facilitating early intervention and risk reduction.

“

AI as an **advisor**, not just a tool

“Start today. Start small. But start.”

Christian Pallaria & Sydney Mudau

Q & A
